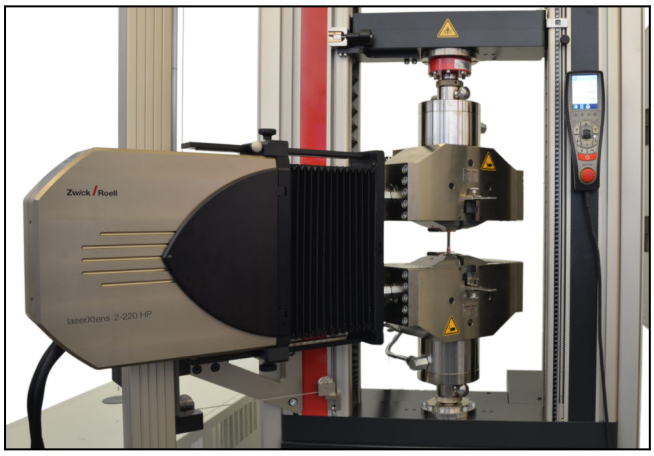
Zwick / Roell

Product Information

laserXtens 2-220 HP

CTA: 173713 220994



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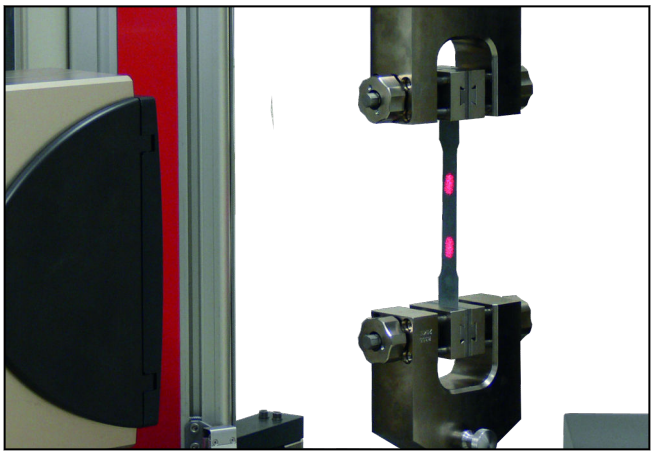


laserXtens 2-220 HP, measuring principle

Applications

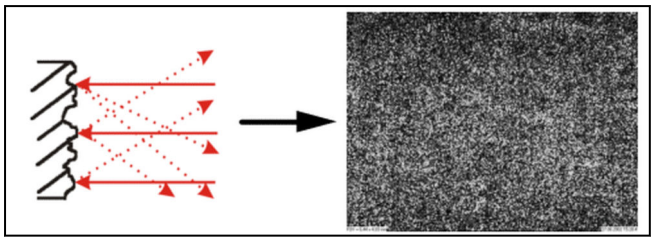
Extensometers from the laserXtens systems series measure without contact and with the highest level of accuracy. The measuring principle eliminates the need to apply gauge marks. This allows the laserXtens systems to be used for a wide range of applications:

- 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.



A speckle pattern is generated on the specimen surface by laser light.

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.

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laserXtens 2-220 HP system principle

The measuring head of the laserXtens 2-220 HP consists of two digital cameras that are mounted to motorized carriages. This enables the distances between the cameras to vary and thus different initial gauge lengths to be implemented.

The laserXtens 2-220 HP is suitable for use with temperature chambers.

Additionally, the laserXtens 2-220 HP can be used for for strain-rate controlled tests to ISO 6892-1 Method A1 “Closed Loop” (for gauge lengths ≥ 50 mm).

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.

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

- 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.

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).

All data at ambient temperature.

We reserve the right to make technical changes in the course of ongoing development.

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laserXtens 2-220 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.

All data at ambient temperature.

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Technical data

Type Item No.	laserXtens 2-220 HP 1043978	
Initial gauge length	3 ... 200	mm
Measurement displacement with speckle tracking	• Initial gauge length: 3 ... 25 mm; max. measured displacement: 25 mm - initial gauge length (measurement with camera) • Initial gauge length: 20 ... 180 mm; max. measured displacement: 50 mm • Initial gauge length: 180 ... 200 mm; max. measured displacement: 220 mm - initial gauge length	
Measurement displacement for flow measurement	After measurement displacement via speckle tracking, laserXtens switches to flow measurement.	
Strain rate control compliant to ISO 6892-1 Method A1	from 50[1)]	mm
Resolution	0.07	µm to EN ISO 9513
Accuracy class		
To EN ISO 9513	0.5	
According to ASTM E83	B2 from gauge length 15 mm	
Typical measurement frequency (adjustable)	70	Hz
Measurement speed, max. at the measurement point	500	mm/min
Specimen thickness		
Flat specimens, measured on the broad side	≤30	mm
Flat specimens, measured on the specimen edge	>1[2)]	mm
Round specimens	1 ... 30[2)]	mm
Dimensions:		
Height	460	mm
Width	485 ... 745	mm
Depth	140	mm
Ambient temperature	+10 ... +35	°C
Minimum version	testXpert II V 3.71 / testXpert III	
Laser safety class to DIN EN 60825-1 (11-2001)	2[3)]	
Scope of delivery	Measuring head with motorized gauge length adjustment (automatic L0 setting), 2 digital cameras including lenses F=75mm, 2 red laser light sources, software for image acquisition, evaluation of the cross correlation and transfer to testXpert III, accessory case with scale aid.	

1) Not in ZwickRoell temperature chamber

2) Pre-tests are required for specimens with a specimen thickness < 1 mm.

3) 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

All data at ambient temperature.

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	laserXtens 7-220 HP / laserXtens 2-220 HP
Resolution at + 180 °C	Max. 0.5 µm
Resolution at + 250 °C	Max. 0.8 µm
Resolution at -20 °C	Max. 0.4 µm
Resolution at -40 °C	Max. 0.6 µm
Resolution at -80 °C	Max. 0.9 µm

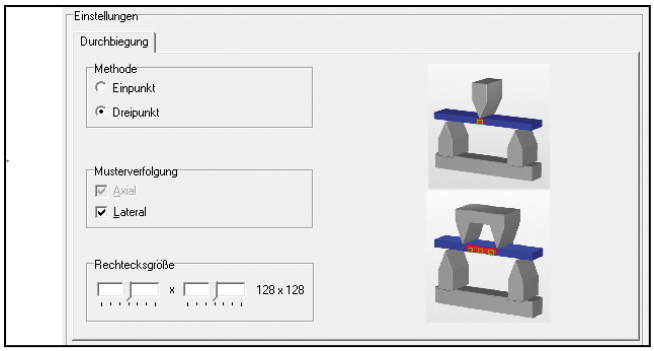
Hardware option for determination of change in width
This option is used for highly accurate determination of change in width on the specimen edge, for example for determining the r-value. An additional camera is either integrated into the housing or mounted to the housing so that the camera looks at 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 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.

Software options

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