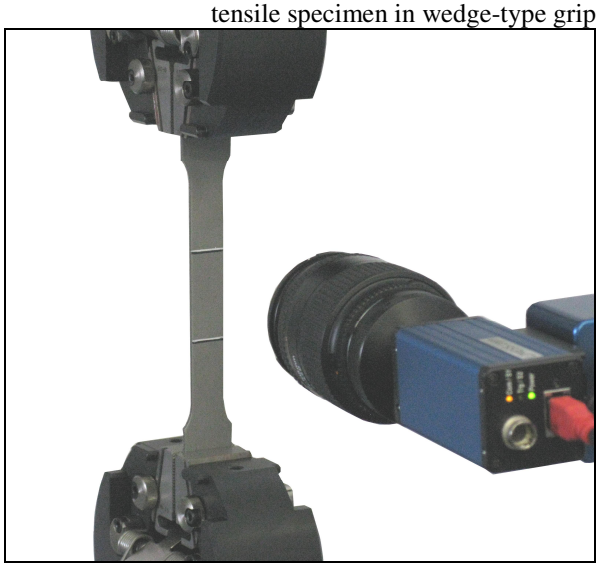
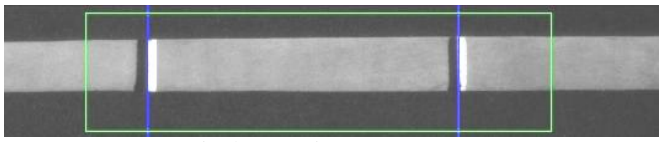
Non-contact extensometer

Video extensometer
Video Shot-50

The non-contact linear expansion measurement allows the automatic determination of the initial gauge length (L_0). The optical system does not influence the measurement with knife edges or its own weight. Furthermore the measuring system is free from wear.
The video extensometer is an excellent choice for specimens which are very sensitive to notches and induced crack tips.

CCD camera with zoom-lens and
tensile specimen in wedge-type grip





optical extension measurement
blue line: gauge marks in the software
green frame: analysis area, Area of Interest (AOI)

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Your partner:

Universal testing machines
Optical extensometers

Hegewald & Peschke
Meß- und Prüftechnik GmbH

Description

Resolution

The camera system has a vertical / horizontal resolution of 1,628 / 1,236 pixel. This resolution of the camera is upgraded by the factor of 60 to 100 with the complex analysis algorithms with subpixel accuracy. Thus, the measuring accuracy in the visual field is 1 / 100,000. The measuring accuracies for different visual fields are:
visual field 100 mm, resolution 1 µm
visual field 500 mm, resolution 5 µm
visual field 1,000 mm, resolution 10 µm

Working distance

The ideal lense and suitable clamp are chosen depending on the application (specimen geometry, etc.). This guarantees the optimal resolution for every individual testing task. Important parameters are: initial gauge length (L_0), max. extension of the specimen (ε).

Image evaluation

The image is analysed on the basis of the differences in the levels of grey in the so-called Area of Interest (AOI). The different levels of brightness are determined with a special image correlation algorithm alongside the edges of the lines.

Handling

The settings for the video images are done with a separate PC. They can be saved in parameter files and loaded again later. After the calibration of the system, it is able to identify the distance between the marks automatically (initial gauge length). The starting and ending of the measurement are transmitted from the testing PC, which is working with the material testing software LabMaster, to the video extensometer PC.
The gauge marks can be applied in two ways. It is possible to either use stickers with clear black & white marks, which should be used for specimens with a structured surface. Or, if the contrast is good enough, it is also possible to just mark the gauge mark with a pen. Thus, specimens can be prepared quickly and easily.

Technical data

Working distance, gauge length range – individual choice of a suitable lense for the perfect visual field.
Image evaluation – digitalised image is divided by grey levels; then algorithmic processing of the line edges with subpixel accuracy.
Measuring accuracy (relative) - approx. 0.002 % extension (e.g. 20 µ strains, at L_0=50mm is Δl=0.001mm), when using gauge mark stickers and ideal lighting conditions.
Measuring accuracy (absolut) – 1 / 100,000 of the visual field (e.g. visual field: 100 mm, resolution: 1 µm)
Measuring rate – up to 50 images per second (FPS, frames per second)
Maximum testing speed – depending on the defined analysis area (Area of Interest, AOI)
Interfaces - camera: FireWire (iLink or IEEE 1394), thus no frame grapper board necessary; data transfer to the testing PC: RS232
Gauge marks - application: pen or sticker; identification: automatic, based on contrast differences; automatic determination of L_0

Scope of delivery

2MPixel grey-level camera and cables, lense (zoom or fixed focal distance, depending on the testing task), tripod (alternatively fixed support), cold light lighting consisting of 1 lampshade with tripod, desktop PC with state-of-the-art equipment, suitcase.

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