

VeX Video Extensometer

System Brochure

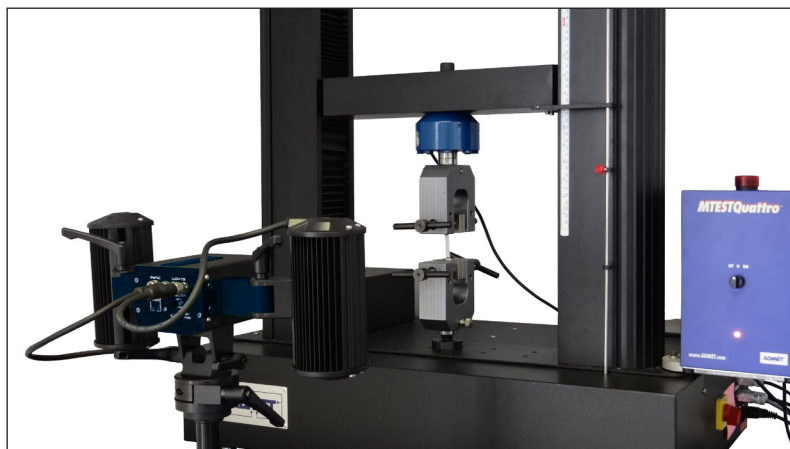


VeX Video Extensometer

Accuracy, Flexibility, and Performance

ADMET's PC-based VeX Video Extensometers are non-contacting distance measurement systems capable of measuring axial and transverse strains. Our VeX Extensometers enable strain measurements of high elongation materials, biomaterials in situ, wires, films and other thin specimens across a range of temperatures.

They are well suited for testing applications where a traditional clip-on extensometer would cause low stress readings due to high contact stresses localized at the extensometer knife edges, be too heavy for the test sample, or not be able to stay on the sample through break.



ADMET VeX-125 with an eXpert 2610

All ADMET VeX Extensometers operate by focusing a high-resolution video camera on a test specimen that has had high contrast marks (or targets) added to its surface. A PC-based video capture program analyzes the camera images and continuously reports the distance between the targets in real time. Distance readings are in absolute units or as a percentage change from the original distance between the high contrast gauge marks.

Resolution [μm]		Video Extensometer Model							
		VeX-50	VeX-100	VeX-125	VeX-150	VeX-200	VeX-250	VeX-300	VeX-400
FOV [mm]	25	0.2	0.1	0.1	0.1	0.1	0.1	0.1	< 0.1
	50	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1
	100	0.8	0.5	0.5	0.4	0.3	0.2	0.2	0.2
	250	1.9	1.3	1.2	1.0	0.7	0.6	0.5	0.4
	500	3.9	2.6	2.4	1.9	1.5	1.2	1.0	0.8
	750	5.8	3.9	3.7	2.9	2.2	1.8	1.5	1.2
	1000	7.8	5.2	4.9	3.9	3.0	2.4	2.1	1.5

The strain measuring resolution of an ADMET VeX Video Extensometer is dependent on the camera resolution and it's field of view (FOV). The field of view at any given time is determined by the focal length of the lens and the camera's distance from the specimen. In the general case, ADMET VeX Video Extensometers provide 0.5 μm to 5 μm resolution which meets ASTM E83 class B-1 or ISO 9513 class 0.5 standards. With certain configurations, system resolution can achieve 0.1 μm to 0.5 μm levels which meets ISO 9513 class 0.2 standards.

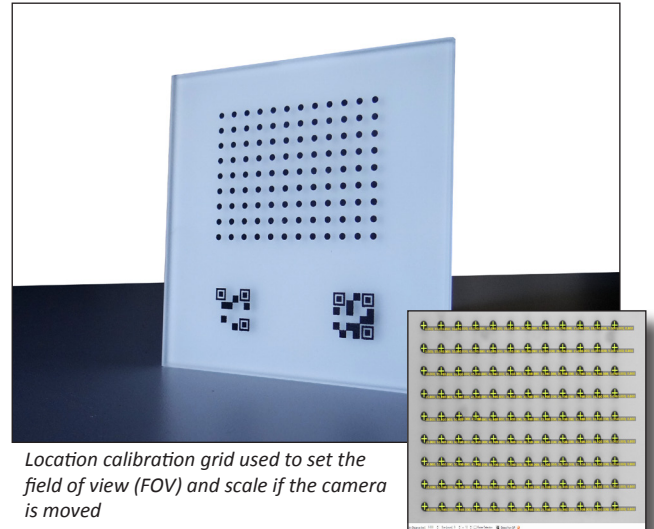
ADMET offers a number of camera/lens options to meet your strain measurement requirements. The table above lists achievable resolutions for each combination and field of view.

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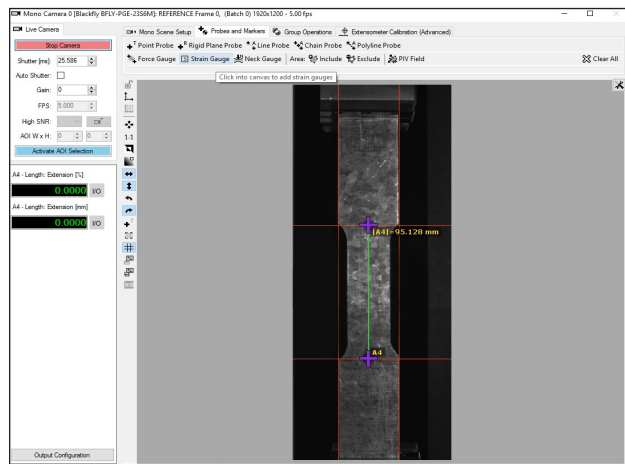
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Principle of Operation

ADMET VeX Video extensometers capture images that are resolved into pixels. In order to meet ASTM E83/ISO 9513 strain measuring standards, the pixelized images must be converted to length measurements. Before converting the digitized images into actual length measurements, the camera must be calibrated. Calibration is achieved by placing a patterned bar with known spacings between marks in the specimen grips. The pattern will then be viewed by the camera and its image processing software and a correlation between pixels and distance between calibration marks will be made. Calibration will need to be performed each time the camera is moved.



Location calibration grid used to set the field of view (FOV) and scale if the camera is moved

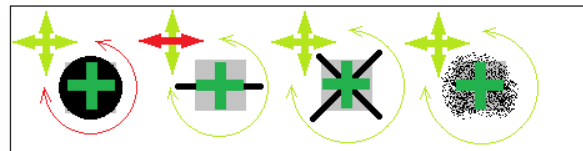


Test setup view in VeX software where the virtual targets are set on the sample

At the start of test, the spacing between marks will be recorded and used as the gage length. During test, the camera and image processing software will first find the center of each high contrast mark, measure the distance in pixels between marks then convert that to a length measurement based on the calibration. This processing sequence occurs for each length measurement in real-time.

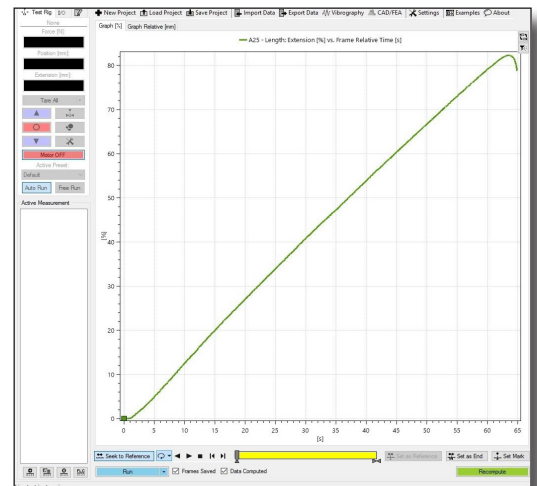
Strain measurements from the video extensometer are fed into ADMET's MTESTQuattro controller. MTESTQuattro records the strain readings and makes the data available for performing strain rate controlled tests which is required for tests such as ASTM E8.

Prior to placing a test specimen in the grips for testing, high contrast marks or targets must be applied to specimen.



Examples of target types that can be used on the sample to measure vertical, horizontal, and/or rotational deformation

Painted or stickered on marks are most commonly applied. Painted marks are preferred because they will deform with the specimen as it changes shape.



Graph of strain vs. time data collected during test by the VeX system as shown in the software at end of test

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Advantages & Features

The video extensometer features a variety of advantages over mechanical extensometers:

- Enable strain measurements of high elongation materials, biomaterials in situ, wires, films and other thin specimens across a range of temperatures
- Axial and transverse strain measurement allows for calculation of Poisson's Ratio and Modulus of Elasticity
- Strain measurement of specimens with irregular dimensions
- Selectable gauge lengths
- Test can be observed live and recorded from start to sample break
- Save images throughout the test; store images from test start, yield point, and sample break
- Post-test digital image correlation optional
- Data also available for use in common spreadsheet programs



System Specifications

- Field of view vertical up to 1000mm
- Measurement range vertical up to 600mm
- Measurement resolution vertical down to 0.0005mm
- Measurement accuracy vertical $\pm 0.5\%$ of readout
- Field of view horizontal up to 100mm
- Measurement range horizontal up to 60mm
- Measurement resolution horizontal down to 0.0005mm
- Measurement accuracy horizontal $\pm 0.5\%$ of readout
- Typical test speed measurement up to 400mm/min
- Fastest test speed measurement up to 10,000mm/min (requires 4,000 frames/sec camera)

Options include:

- Strain distribution
- Stereo camera systems available for 3D measurement
- Digital Image Correlation
- System specifications are customizable on request



A rugged storage case is available for moving the VeX Video Extensometer