

Standard Video Extensometer | SVE 2663-822

Measurement of strain during materials testing is traditionally carried out using some form of contact strain measurement device. While providing accurate measurements in many applications, contact extensometers may have an adverse effect on test results. To solve this, Instron® introduced the first commercial video extensometer in 1991.

Features

The Standard Video Extensometer (SVE) is a high-performance, non-contacting extensometer that offers numerous benefits over traditional contacting extensometers, including:

- Measurement performance that meets or exceeds that of a traditional contact extensometer
- No influence on the test specimen
- No problems with knife-edge slippage
- No errors due to inertia of moving parts
- No wear of moving parts
- No possibility of damage due to energy release at failure

The SVE uses a high-resolution digital camera and advanced real-time image processing to make precise axial strain measurements on material test specimens. High performance is matched by an ergonomic design that allows easy setup and provides unencumbered access to the test area.

Applications

The SVE is available with various Fields of View (FOV) to suit different applications in both ambient and non-ambient temperature conditions. The 100 mm (4 in) and 200 mm (8 in) FOV lenses are suitable for testing a wide variety of materials in either tension or compression:

- Plastics, including thin films
- Elastomers
- Textiles
- Paper
- Biomaterials

The 350 mm (13.8 in) and 500 mm FOV lenses are primarily designed for elastomers and other materials with high strain to failure.

The 50 mm (2 in) FOV lens is optimal for small specimens and components with minimal strain to failure.



Accessory Kits

The SVE is supplied with:

- Marker pens
- A gauge mark template
- Two-dimensional calibration fixtures and adapters
- A storage case for spare lenses

Absolute Measurement Capability

Generally, non-contact measurement systems are only capable of relative measurement, which is the measurement of change in displacement relative to an initial distance, and is commonly called strain. In contrast, the SVE has absolute measurement capability, allowing extension to be measured in absolute displacement units, as well as percentage strain. This allows for accuracy to be verified using established extensometer calibrators and standards. In addition, the actual gauge length is automatically measured before the beginning of each test and used for strain calculations that eliminate errors introduced by inaccurate specimen marking.

Multi-Point, Two-Dimensional Calibration

Using non-contact optical systems allows for imperfections in the optics that can introduce errors into the calculated strain or extension. The SVE compensates for this with a full multi-point, two-dimensional calibration using a grid of precision marks. A calibration wizard guides the operator through the calibration, simplifying the process and ensuring consistency.

Gauge Mark Location and Tracking

The video image captured by the digital camera is transferred to the PC. Real-time image processing algorithms run on the PC then locate the centers of the two gauge marks. Specimen strain is then calculated from the mark separation at the start of the test (gauge length) and the current mark separations. Tracking the center of the mark eliminates possible errors caused by stretching of the marks at high elongations.

Patented Illumination

Our US and European patented, low-voltage LED illumination system uses an integrated high-intensity lighting array to ensure that optimum lighting is maintained under all ambient lighting conditions. The use of innovative polarized light filters completely eliminates bright reflections from certain materials providing unrivaled mark contrast and accurate measurement.

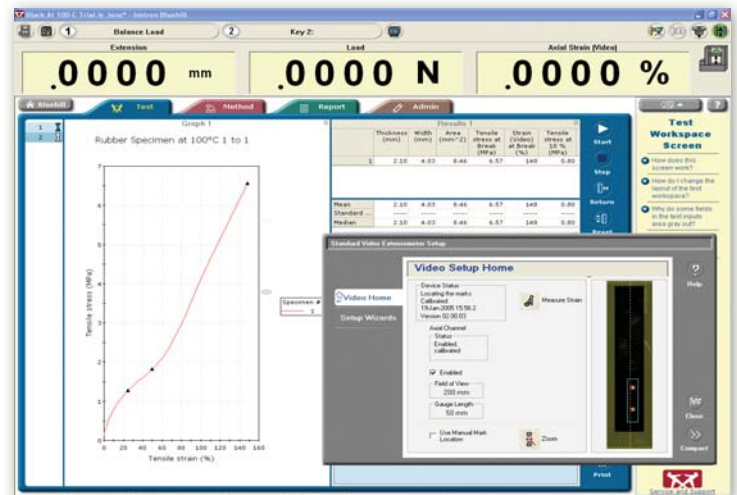
Image Processing Algorithms

Real-time calculation of strain from the camera images is achieved using sophisticated image processing algorithms that track the center of the marks. This approach eliminates errors that can occur due to stretching and distortion of the marks.

* US 7,047,819 B2, US 7,610,815 B2, and EP 1,424,547 B1



SVE on an Environmental Chamber



Fully Integrated Software



Elastomer Testing with the SVE

Specifications

Field of View (FOV)	mm	50	100	200	350	500
	in	2	4	8	14	20

Axial Measurement

Resolution	μm	1.5	2.5	5	10	50
	μin	0.06	0.10	0.20	0.40	2.0
Accuracy	μm	±2.5 μm or 0.5% of Reading*	±5 μm or 0.5% of Reading*	±10 μm or 0.5% of Reading*	±50 μm or 1% of Reading*	±100 μm or 1% of Reading*
Minimum Axial Gauge Length	mm	5	10	10	10	10
	in	0.2	0.4	0.4	0.4	0.4
Data Rate	Hz	50	50	50	50	50
Recommended Marking (Diameter of Dots)	mm	2	4	4	4	4
	in	0.08	0.16	0.16	0.16	0.16
Alternate Marking (Line Thickness)	mm	1	1	2	3	5
	in	0.04	0.04	0.08	0.12	0.20
Maximum Following Speed (per minute)	mm	150	250	500	700	1000
	in	5.9	10	20	28	40
Resolution with Chamber (at 23 °C)		1.5 μm + 1 μm/25 °C	2.5 μm + 1 μm/25 °C	5 μm + 1 μm/25 °C	10 μm + 1 μm/25 °C	50 μm + 1 μm/25 °C
Accuracy with Chamber	μm	±2.5 or Twice Resolution*	±5 or Twice Resolution*	±10 or Twice Resolution*	±50 or Twice Resolution*	±100 or Twice Resolution*

Classification to Standards

Classification to ISO 9513:2012	mm	Class 0.5 (Travel > 5)	Class 0.5 (Travel > 10, G.L. > 10)	Class 0.5 (Travel > 20, G.L. > 20)	—	—
		Class 1 (Travel < 5)	Class 1 (Travel > 5)	Class 1 (Travel > 10)	Class 1 (Travel > 50, G.L. > 17.5)	Class 1 (Travel > 100, G.L. > 25)
		—	Class 2 (Travel < 5)	Class 2 (Travel > 5)	Class 2 (Travel > 25, G.L. > 15)	Class 2 (Travel > 12.5, G.L. > 20)
Classification to ASTM E 83	mm	B-1 (G.L. > 25)	B-1 (G.L. > 50)	B-1 (G.L. > 100)	C (G.L. > 50)	C (G.L. > 100)
		B-2 (G.L. > 12.5)	B-2 (G.L. > 25)	B-2 (G.L. > 50)	D (G.L. > 10)	D (G.L. > 10)
		C (G.L. > 5)	C (G.L. > 5)	C (G.L. > 10)		

*Whichever is greater

Hardware and Software Requirements

- Bluehill® Materials Testing Software
- PC platform - The SVE runs on the same PC as the testing machine software. The minimum specification for the PC is: 3.06 GHz Pentium 4 with 512 MB memory and Microsoft® Windows® 7 Professional (32 and 64 bit) or Windows XP professional (32 bit only)

www.instron.com



Worldwide Headquarters
825 University Ave, Norwood, MA 02062-2643, USA
Tel: +1 800 564 8378 or +1 781 575 5000

European Headquarters
Coronation Road, High Wycombe, Bucks HP12 3SY, UK
Tel: +44 1494 464646

Instron Industrial Products
900 Liberty Street, Grove City, PA 16127, USA
Tel: +1 724 458 9610

Instron is a registered trademark of Illinois Tool Works Inc. (ITW). Other names, logos, icons and marks identifying Instron products and services referenced herein are trademarks of ITW and may not be used without the prior written permission of ITW. Other product and company names listed are trademarks or trade names of their respective companies. Copyright © 2013 Illinois Tool Works Inc. All rights reserved. All of the specifications shown in this document are subject to change without notice.