

# Standard Video Extensometer (SVE)

Non-Contacting Video Extensometer



# Setting the Pace with Non-Contacting Video Extensometry

## Methods of Strain Measurement

Measurement of strain during material testing is traditionally carried out using some form of contact strain measurement device. While providing accurate measurement in many applications, contact extensometers can have an adverse effect on test results. Knife-edge contact points can initiate premature failure. The operating force of the extensometer can increase the apparent stiffness of the test specimen. The weight of a contact extensometer can also distort delicate specimens. The new Instron® Standard Video Extensometer (SVE) is a non-contacting extensometer with measured performance that meets most testing standards for accuracy. The unit contains no moving mechanical parts and therefore is not susceptible to effects from mechanical inertia or wear, high energy release at specimen failure and high maintenance charges found with contacting extensometry. The SVE can be used to measure a wide range of materials through to specimen failure without having to be removed. This has major advantages over mechanical contacting extensometer.

## Non-Contacting Standard Video Extensometer

The SVE measures strain by tracking contrasting gauge marks placed on the specimen. The SVE has absolute measurement capability allowing extension to be measured in absolute displacement units as well as percentage strain. This means accuracy can 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 calculation, eliminating errors introduced by inaccurate specimen marking.

The SVE offers numerous benefits over traditional contact extensometers:

- No influence of the weight or operating force on the test specimen
- No problems with knife-edge slip or damage to the specimen
- No errors due to inertia of moving parts
- No moving parts eliminate errors due to wear
- No possibility of damage due to energy release at failure

## Example Applications

The SVE is ideal for testing a wide variety of plastic, elastomeric and other materials in tension, compression and flexure in both ambient and non ambient temperature conditions.

The SVE meets the requirements of the following major testing standards can be used for many other diverse applications.

- Tensile: ASTM D 638, ASTM D 882, ISO 37, ASTM D 412, ISO 527\*  
\* Partial compliance
- Compression: ASTM D 695, ASTM D 1621, ISO 604
- Flexure: ASTM D 790, EN ISO 178

## Hand-Operated Marker (HOM)

The HOM allows for marks to be placed on a specimen with consistent size, color density and spacing. Inks will stretch along with the specimen, unlike traditional stick-on paper dots that may move as the material is being strained, which can introduce error.

## Key Features

- Non-contact measurement
- High resolution and accuracy
- Ergonomic design: Easy-to-use and to set-up
- Set-up wizards to guide the operator
- Simple specimen preparation
- Robust and tolerant of ambient lighting conditions and specimen surface color and finish
- Fully integrated with Instron testing software
- Field of View (FOV) to match the application
- Precision two-dimensional calibration fixture



▲ Standard video extensometer fitted on to the model 3344



▲ Hand-Operated MArker (HOM)

# Engineered for Precision and Ease-of-Use

## Fully Integrated User Interface

The functionality of the video extensometer can be controlled through set-up windows fully integrated into Instron® Bluehill® 2 application software. This means that only one computer is required to run the system, saving on cost and space and improving the ease-of-use of the system. The user interface allows the user to set-up the extensometer and enable and disable it's use. Once set-up, the acquisition of strain data automatically starts when a test is commenced.

## System Elements

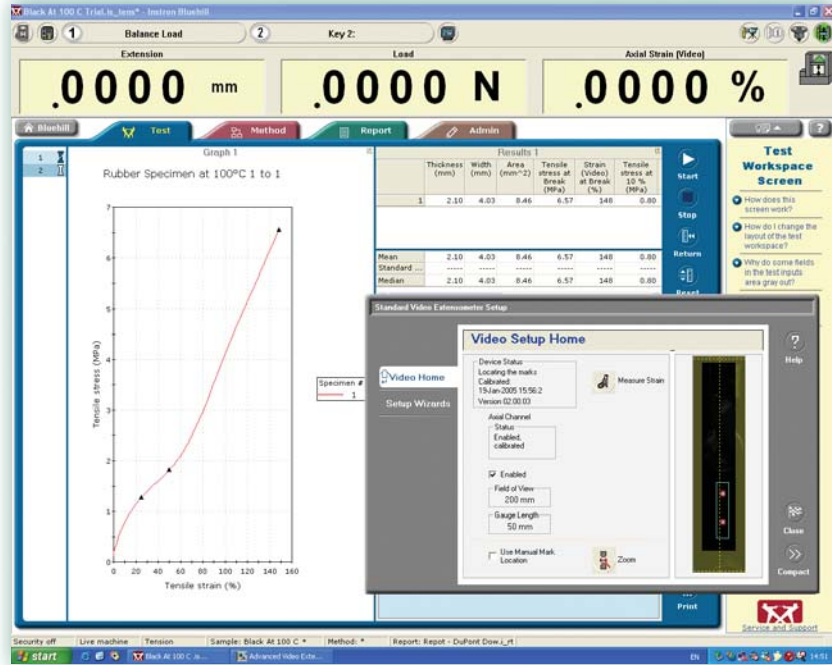
**Camera** - A high performance digital camera with an IEEE 1394 (Firewire) digital interface provides high resolution and digital synchronized high test data rates.

**Illumination** - An integrated, high intensity -pulsed, low voltage, low temperature LED illumination system ensures that optimum lighting is maintained under all ambient lighting conditions. The use of innovative 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.



▲ Standard video extensometer fitted on to the model 5569

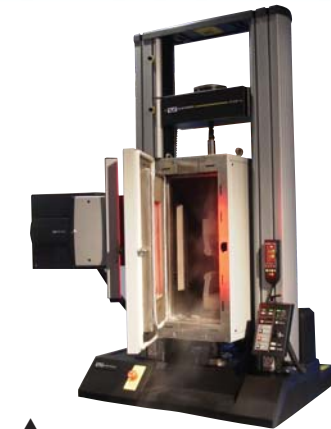


▲ Fully integrated software

## Non-Ambient Testing Conditions

Certain materials become very soft at elevated temperatures, while others become very brittle at low temperatures. Aggressive environments can also greatly reduce the apparent strength of materials. Due to these effects, the presence of a contact force from a contacting extensometer is highly undesirable, and the non-contacting nature of the Instron video extensometer offers substantial benefits.

All extensometers contain sensitive measurement devices, which are affected by the environment in which they operate. Many extensometers are only capable of operating in an ambient environment, while special high temperature versions can be complex and expensive. The non-contacting nature of the Instron video extensometer means that the unit can be mounted outside of the hostile environment, therefore eliminating the effects of temperature. Distortion effects due to the glass window of the chamber are minimised by the use of multi point calibration.



▲ Standard video extensometer fitted on to a temperature chamber to measure strain in non-ambient conditions



▲ High extension rubber testing

# Specifications

Catalog Number	2663-822				
FOV	50 mm (2 in)	100 mm (4 in)	200 mm (8 in)	350 mm (14 in)	500 mm (20 in)
<b>AXIAL MEASUREMENT</b>					
<b>Resolution</b>	3 $\mu\text{m}$ (0.12 $\mu\text{in}$ )	4 $\mu\text{m}$ (0.16 $\mu\text{in}$ )	5 $\mu\text{m}$ (0.20 $\mu\text{in}$ )	25 $\mu\text{m}$ (1.0 $\mu\text{in}$ )	50 $\mu\text{m}$ (2.0 $\mu\text{in}$ )
<b>Accuracy</b>	$\pm 5 \mu\text{m}$ (0.2 $\mu\text{in}$ ) or 0.5% of reading*	$\pm 7.5 \mu\text{m}$ (0.3 $\mu\text{in}$ ) or 0.5% of reading*	$\pm 10 \mu\text{m}$ (0.4 $\mu\text{in}$ ) or 0.5% of reading*	$\pm 50 \mu\text{m}$ (2.0 $\mu\text{in}$ ) or 1% of reading*	$\pm 100 \mu\text{m}$ (4 $\mu\text{in}$ ) or 1% of reading*
<b>Minimum axial gauge length</b>	5 mm (0.2 in)	10 mm (0.4 in)	10 mm (0.4 in)	10 mm (0.4 in)	10 mm (0.4 in)
<b>Data rates</b>	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
<b>Recommended marking</b>	2 mm (0.08 in) diameter dots	4 mm (0.16 in) diameter dots	4 mm (0.16 in) diameter dots	4 mm (0.16 in) diameter dots	4 mm (0.16 in) diameter dots
<b>Alternate marking</b>	1 mm (0.04 in) thick lines	1 mm (0.04 in) thick lines	2 mm (0.08 in) thick lines	3 mm (0.12 in) thick lines	5 mm (0.20 in) thick lines
<b>Maximum following test speed</b>	125 mm/min (5 in/min)	250 mm/min (10 in/min)	500 mm/min (20 in/min)	700 mm/min (28 in/min)	1000 mm/min (40 in/min)
<b>Resolution with chamber (Axial and transverse)</b>	3 $\mu\text{m}$ + 1 $\mu\text{m}/^{\circ}25\text{C}$	4 $\mu\text{m}$ + 1 $\mu\text{m}/^{\circ}25\text{C}$	5 $\mu\text{m}$ (0.20 $\mu\text{in}$ )	25 $\mu\text{m}$ + 1 $\mu\text{m}/^{\circ}25\text{C}$	50 $\mu\text{m}$ + 1 $\mu\text{m}/^{\circ}25\text{C}$
<b>Accuracy with chamber</b>	$\pm 6 \mu\text{m}$ or twice resolution*	$\pm 8 \mu\text{m}$ or twice resolution*	$\pm 10 \mu\text{m}$ or twice resolution*	$\pm 50 \mu\text{m}$ or twice resolution*	$\pm 100 \mu\text{m}$ or twice resolution*

\* Whichever is greater

FOV	50 mm (2 in)	100 mm (4 in)	200 mm (8 in)	350 mm (14 in)	500 mm (20 in)
<b>Classification to ISO 5893</b>	Class A	Class A	Class A	Class B	Class C
<b>Classification to ASTM E 83</b>	Class C	Class C	Class C	Class D	Class D

\* The classification to other standards, please consult factory

## Accessory kits

The SVE extensometer is supplied with a case containing: specimen marker pens, a gauge mark template, a set-up fixture and adapters. The case can be used to store up to five Field of View (FOV) lenses.

## Machine mountings

Options for mounting on to various Instron frames and temperature chambers are available

## Notes:

1. PC platform: The SVE runs on the same PC as the testing machine software. The minimum specification for the PC is: 2.8 GHz Pentium 4 with 256MB memory and Windows® 2000 or Windows XP operating system. The PC must have an available PCI slot and a parallel printer interface with EPP (IEEE 1284).
2. Application software: The SVE is supported by Instron® and Bluehill® Lite.
3. Supply voltage: 100 V to 240 V AC, 460 W, 50/60 Hz.
4. Operating noise level: at 1 m, frequency range < 70 (Hz)

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