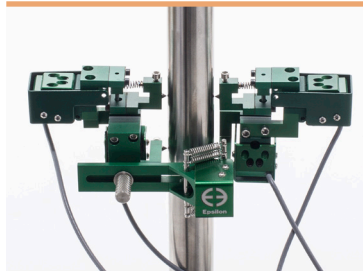


**Designed for simultaneously measuring axial and torsional**

**deflections on specimens tested in axial/torsional machines.**



*Model 3550 axial/torsional extensometer with a 25 mm gauge length,  $\pm 10\%$  axial measuring range, and  $\pm 2^\circ$  torsional shear strain angle measuring range (this corresponds to a  $4^\circ$  angle of twist on a 12.5 mm diameter specimen)*

The Model 3550 extensometer is most often used on round specimens tested in bi-axial test machines capable of simultaneous axial and torsional loading. The extensometer is often customized for particular applications. All units are capable of bi-directional displacement, so they may be used for cyclic testing under fully reversed loading conditions. The standard sized model is self-supporting on the specimen, and works on specimens from 9.5 to 25.4 mm (0.375 to 1.000 inches). The conical point contacts included with

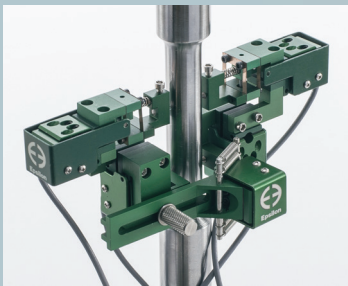
the extensometer are made from tungsten carbide. Their unique design directly measures the surface shear strain angle, which allows operation on a wide range of specimen diameters without changing calibration.

All models are designed specifically to minimize crosstalk between axes and to provide high accuracy measurements. All feature the dual flexure design common to other Epsilon extensometers.

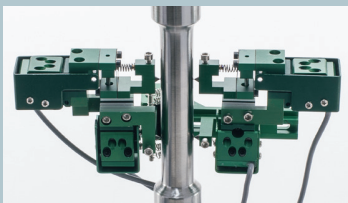
Available options cover temperature ranges from  $-270^\circ\text{C}$  to  $200^\circ\text{C}$  (the standard temperature range is  $-40^\circ\text{C}$  to  $100^\circ\text{C}$ ). Both inch and metric versions are available. A wide range of gauge length and measuring ranges are available. Because these transducers are often used for specialized tests, contact Epsilon with your specific test needs.

The Model 3550 extensometers are strain gaged devices, making them compatible with any electronics designed for strain gaged transducers. Most often they are connected to a test machine controller. The signal conditioning electronics for the extensometer is typically included with the test machine controller or may often be added. In this case the extensometer is shipped with the proper connector and wiring to plug directly into the electronics. For systems lacking the required electronics, Epsilon can provide a variety of solutions, allowing the extensometer output to be connected to data acquisition boards, chart recorders or other equipment.

*See the electronics section of this catalog for available signal conditioners and strain meters.*



*Model 3550 extensometer (angled view)  
3550-025M-010-002-ST*



*Model 3550 extensometer (back view)  
3550-025M-010-002-ST*

 See the Model 3550 extensometer setup video

## Features

- Full bridge, 350 ohm strain gaged design for compatibility with nearly any test system.
- Self-supporting on the specimen.
- Cyclic testing may be performed at up to 2 Hz.
- Includes the Epsilon Shunt Calibration System for on-site electrical calibration.
- Rugged, dual flexure design for strength and improved performance - much stronger than single flexure designs.
- Includes high quality foam lined case.

## SPECIFICATIONS

**Excitation:** 5 to 10 VDC recommended, 12 VDC or VAC max.

**Output:** 2 to 4 mV/V, nominal, depending on model

**Accuracy:** Standard configurations meet ASTM E83 class B-1 and ISO 9513 class 0,5 requirements for accuracy in the axial direction. A test certificate is included. All standard configurations have linearity of 0.20% full scale measuring range or better in torsion.

**Linearity:**  $\leq 0.15\%$  of full scale measuring range, depending on model

**Temperature Range:** Standard (-ST) is  $-40\text{ }^{\circ}\text{C}$  to  $+100\text{ }^{\circ}\text{C}$  ( $-40\text{ }^{\circ}\text{F}$  to  $210\text{ }^{\circ}\text{F}$ )  
Optional (-LHT) is  $-270\text{ }^{\circ}\text{C}$  to  $+200\text{ }^{\circ}\text{C}$  ( $-454\text{ }^{\circ}\text{F}$  to  $400\text{ }^{\circ}\text{F}$ )

**Cable:** Integral, ultra-flexible cable, 2.5 m (8 ft) standard

**Operating Force:**  $<30\text{ g}$  typical

**Crosstalk:** Less than 0.5%

## OPTIONS

Connectors to interface to nearly any brand of test equipment  
Model 3590AT axial/torsional calibrator (see page 120)



Visit our website at [www.epsilontech.com](http://www.epsilontech.com)  
Contact us for your special testing requirements.

Epsilon's axial/torsional extensometer was designed to directly measure the shear strain,  $\gamma$  shown in the figure. This design allows the correct determination of the shear strain without having to know the radius of the specimen being tested,  $R_1$ .

The shear strain is related to the angle of twist (a commonly referenced parameter in torsion testing),  $\phi$ , by the following relationship:

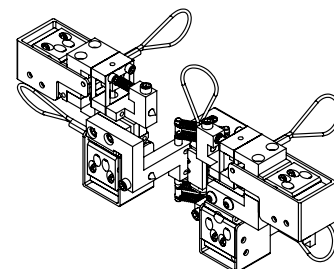
$$\gamma = R_1 \frac{d\phi}{dL_1}$$

For extensometers that measure  $\phi$  directly instead of  $\gamma$ , corrections need to be made for every different specimen diameter tested and for axial strain to correctly determine the shear strain.

The example to the left shows the variation of the angle of twist as a change in specimen diameter relative to the constant resulting shear strain.

Model Number	Axial Gauge Length	Axial Strain	Torsional Shear Strain Angle
3550-025M-005-002-ST	25 mm	$\pm 5\%$	$\pm 2^{\circ}$
3550-025M-005-003-ST	25 mm	$\pm 5\%$	$\pm 3^{\circ}$
3550-025M-010-002-ST	25 mm	$\pm 10\%$	$\pm 2^{\circ}$
3550-0100-010-002-ST	1 inch	$\pm 10\%$	$\pm 2^{\circ}$

-ST temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $100\text{ }^{\circ}\text{C}$  ( $-40\text{ }^{\circ}\text{F}$  to  $210\text{ }^{\circ}\text{F}$ ), but -HT1, -HT2, -LT, and -LHT options are also available. This unit is built to order; contact Epsilon for a unit specific to your testing requirements.



MODEL 3550 EXAMPLE

