


Gauge Length and Measuring Range

Understanding basic extensometer parameters and selecting an appropriate instrument

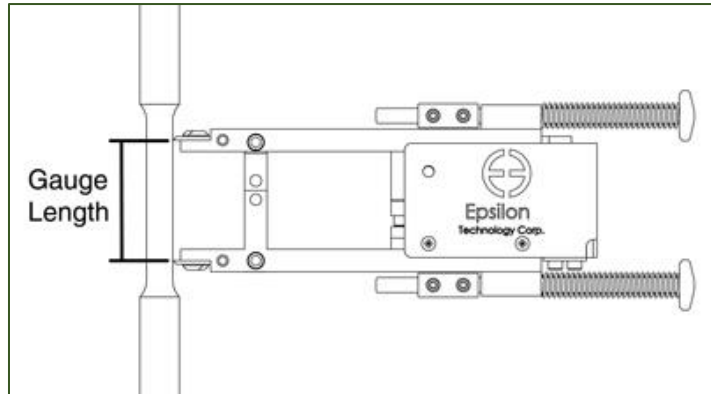
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Gauge Length (for Axial Extensometers)

Extensometer Gauge Length is the distance between the extensometer's initial measuring points on the specimen. If you are using a testing standard, check the standard for extensometer gauge length requirements.

 Many test standards specify the specimen dimensions and corresponding extensometer gauge length.

Many specimens have a reduced section that is longer than the extensometer's gauge length.



Selecting a gauge length

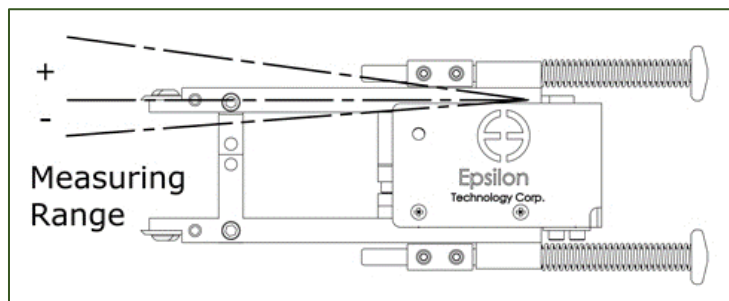
Where possible, longer gauge length specimens and extensometers are generally preferable for many reasons. Gauge lengths of 1-2" (25-50mm) are most commonly selected, and tend to help overcome a host of potential challenges – *not limited to the extensometer* – when testing with shorter gauge lengths. Lengths < 10mm are more challenging, and < 6mm should be considered generally selected only where necessary.

Measuring Range

Measuring Range is the measuring capacity of the extensometer in tension (+) or compression (-) in units of % strain, maximum extension, or maximum deflection.

Selecting a measuring range

Estimate the maximum strain or extension you will need to measure, such as the total strain when the extensometer is removed after offset yield or the elongation at fracture. Select a measuring range for the extensometer that meets or exceeds this range.



When measuring range is in units of % strain, this means the maximum extension as a percentage of the gauge length.

$$\epsilon = \frac{\Delta L}{L_0}$$

Measuring ranges of 10-50% elongation are most commonly selected. There may be ergonomic and other disadvantages to selecting a measuring range which is significantly more than the range of interest (*e.g. 100% for a 10% range test*), and there is generally little advantage to selecting a range <10% elongation.



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