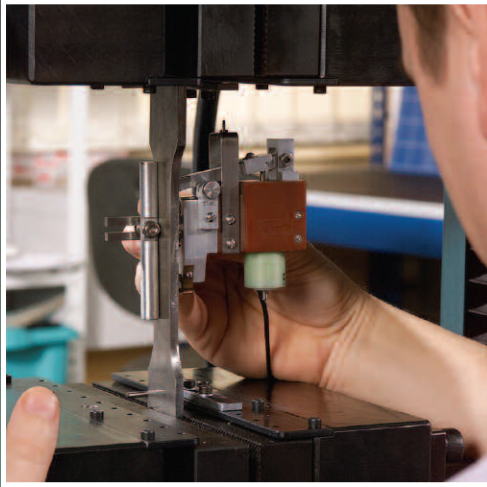


# Tinius Olsen

## Electronic Strain Instrumentation



# Strain Instrumentation

If the elastic and plastic properties of a material or product are evaluated for quality control, specification conformance, or engineering design, precise and critical data is required. Much of this data can be conveniently obtained from a universal testing machine through the use of electronic strain instrumentation and related accessories.

In all cases it is important that the correct instrument is chosen for the task at hand. Primary considerations in this selection process include the calibrated range(s) required to obtain the classification (or accuracy) of the applicable specifications; the gage length; a suitable clamping arrangement based on the size and composition of the specimen; and a sufficient measuring range.

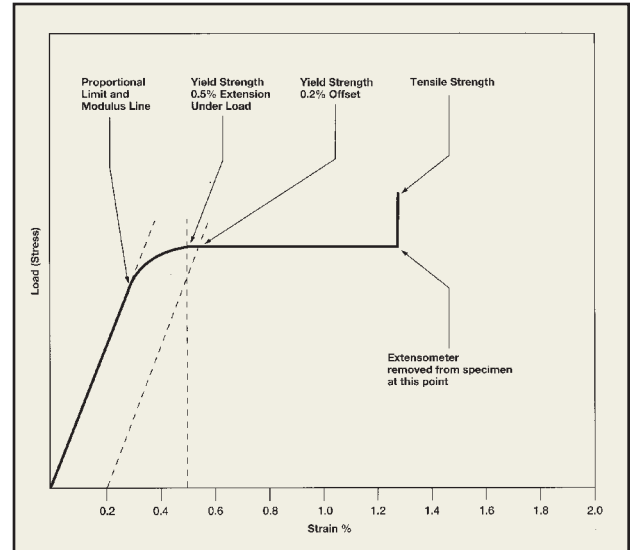
For example, when determining the modulus or yield strength of metals and other high modulus materials, an extensometer that provides a calibrated range of 2% or less is recommended to provide ample resolution and accuracy.

If additional properties such as Yield Point Elongation, Uniform Elongation, Total Elongation, Strain Hardening Exponent (n) or Plastic Strain Ratio (r) are also required, the chosen extensometer must have additional calibrated ranges covering the associated elongation.

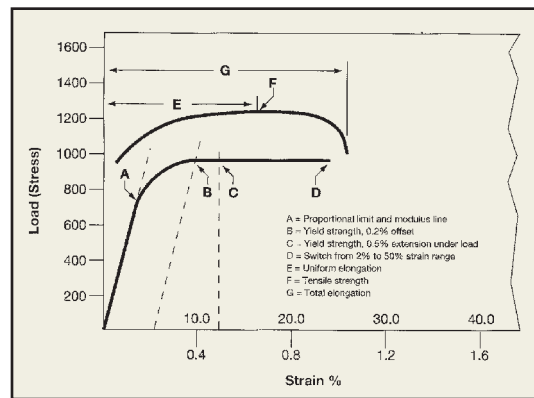
When determining the modulus of elasticity of lower modulus materials, such as plastics, an extensometer providing a calibrated

range of 10% will normally provide sufficient resolution and accuracy while still providing larger elongation ranges for determining elongation at yield and at break.

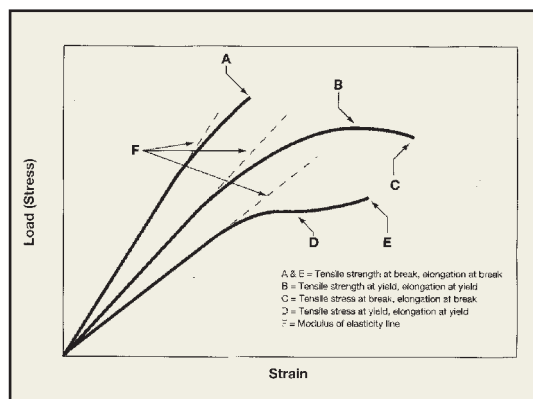
Whether you are testing metals, polymers, elastomers, other materials, or products at room temperature or at non-ambient temperatures, Tinius Olsen can provide the necessary strain instrumentation to complement your testing machines. All are designed to help you meet the practical and functional demands of your testing program.



**Fig 1.** This shows a typical stress vs strain graph obtained from a metallic specimen. Notice the straight, clearly defined modulus line, key to accurate modulus and yield strength determinations.



**Fig 2.** Typical stress vs strain curve from a metallic specimen using a high resolution 2% strain range for the modulus and yield portion and switching to a 50% range for the remainder of the test.



**Fig 3.** Examples of three commonly shaped stress vs strain curves obtained from plastics, elastomers, and other non-metals with typical points of interest identified.

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