

MSET – TENSION

Purpose

Evaluate materials loaded in tension by converting load, elongation, and or strain data to the tensile properties.

Tension

Engineering products, and components such as bridge cabling, require an understanding of material properties. Tensile, and breaking strength are a few properties used to properly size the large cables that carry very large loads.



Theory

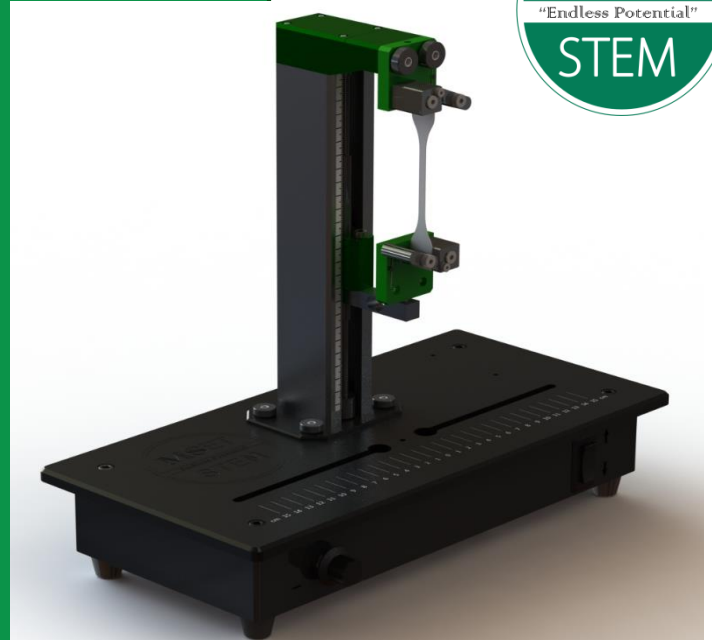
Tensile properties are measured by applying a pulling force “F” to the ends of a test sample with a cross sectional area “A”. As the material is loaded it will experience a change in length “ ΔL ” from its original length “L”. The load is converted to stress “ σ ” so that it can be used for any size of a design.

$$\sigma = F/A$$

The change in length is converted to strain using the following:

$$\epsilon = L/\Delta L$$

Setup



Results

Once the data collected is converted to stress and strain it can be plotted, and evaluated to report tensile properties. The stiffness “modulus of elasticity”, proportional limit, yield strength, ultimate strength, breaking strength, resilience, and toughness can then be used to select, and size materials for other engineering applications.

