



Material Science Report

Yield Strength

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What is Yield strength?

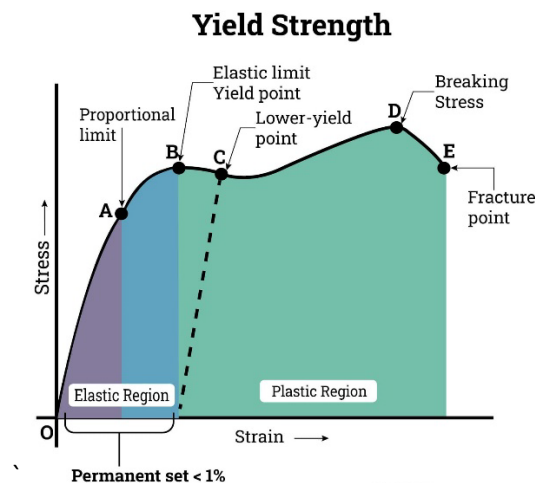
Yield strength is a mechanical property that describes the stress at which a material undergoes a specific amount of permanent deformation or plastic deformation.

Difference between Yield strength and Elastic limit?

The yield strength is a certain stress value at which a material experiences a defined degree of permanent deformation, whereas the elastic limit is the greatest stress a material can withstand without permanently deforming. While the yield strength is a more accurate measurement at a particular location on the stress-strain curve, the elastic limit is a more general concept that applies to the entire elastic range.

How is the Yield strength determined?

First, a material is put through a Tensile test, in which a specimen of the material is exposed to axial stress until it deforms plastically. Then one common method for determining yield strength is the 0.2% offset method. This involves drawing a line parallel to the linear elastic portion of the stress-strain curve, starting at 0.2% strain (or 0.002 in strain), and intersecting the curve. The stress value corresponding to this intersection point is considered as the yield strength.



Although the 0.2% offset was chosen somewhat arbitrarily, it is now a commonly recognized norm in materials testing. It offers a reliable and consistent method of calculating the yield strength without depending on a particular point on the curve that could be noisy or variable.