

Section 5 - The Mechanical Properties of Materials

- 5.1 describe the elements of a tensile test and relate experimental parameters and measured quantities to stress, strain, modulus, ductility, and toughness.
- 5.2 draw a typical stress-strain diagram characteristic of the different classes of engineering materials
- 5.3 define what is meant by the acronym ASTM and describe the importance of this organization to materials testing procedures
- 5.4 distinguish between elastic and plastic deformation
- 5.5 describe the role of dislocations in plastic deformation of crystalline materials
- 5.6 name and describe the principal methods of strengthening of a metal: strain hardening (i.e. work hardening), solution strengthening, precipitation strengthening, and grain refining.
- 5.7 describe several different methods for measuring hardness and relate hardness to yield strength
- 5.8 relate changes in a cold-worked microstructure due to annealing to corresponding changes in mechanical properties.