

ENGR 2243 – Mechanics of Materials
Axially Loaded Members – Thermal Effects

Thermal Stresses and Strains

- Thermal stresses are developed only if the thermal deformation is restrained
- Thermal strains are always present when there is a temperature change
- For most materials

Change in Temperature

Thermal Strain $\epsilon_T = \alpha (\Delta T)$

(Coefficient of Thermal Expansion \Rightarrow Appendix I
Expansion $(\frac{1}{C}$ or $\frac{1}{F})$)

Expansion $\Rightarrow (+)$
Shortening $\Rightarrow (-)$

- Thermal Stress

