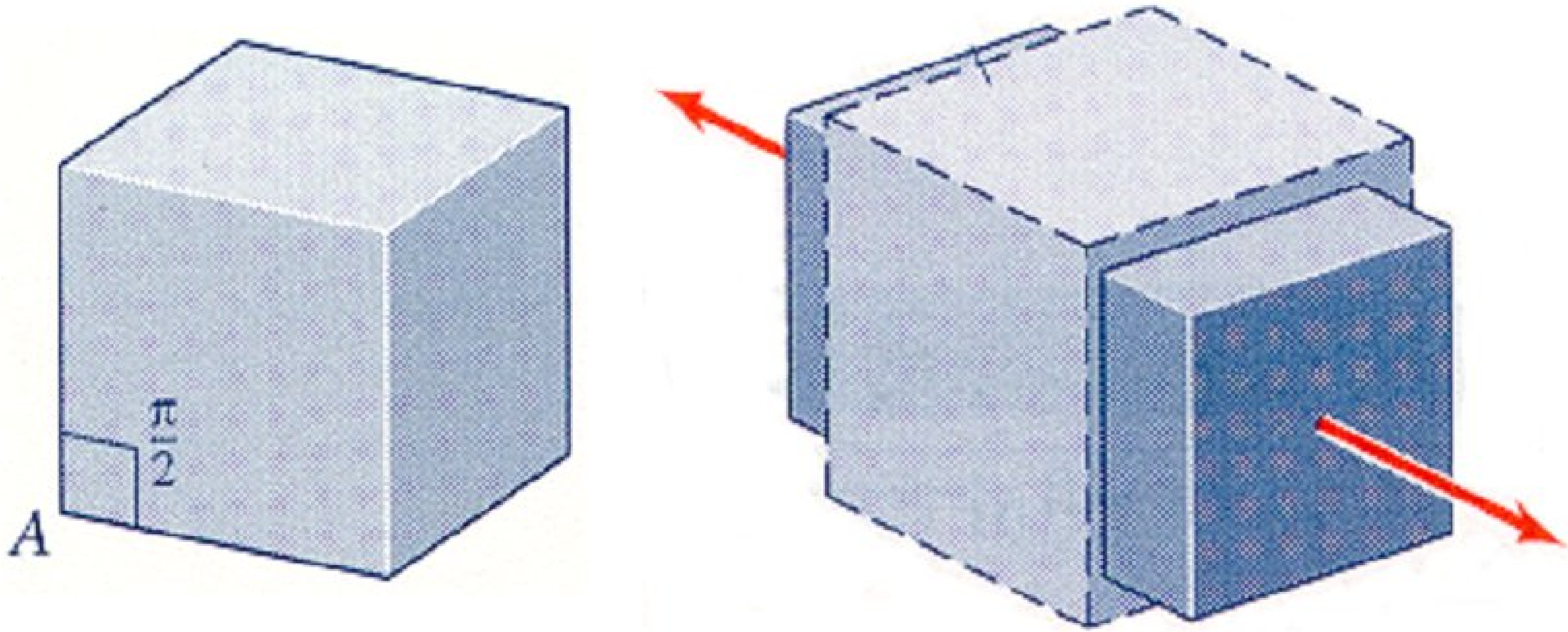
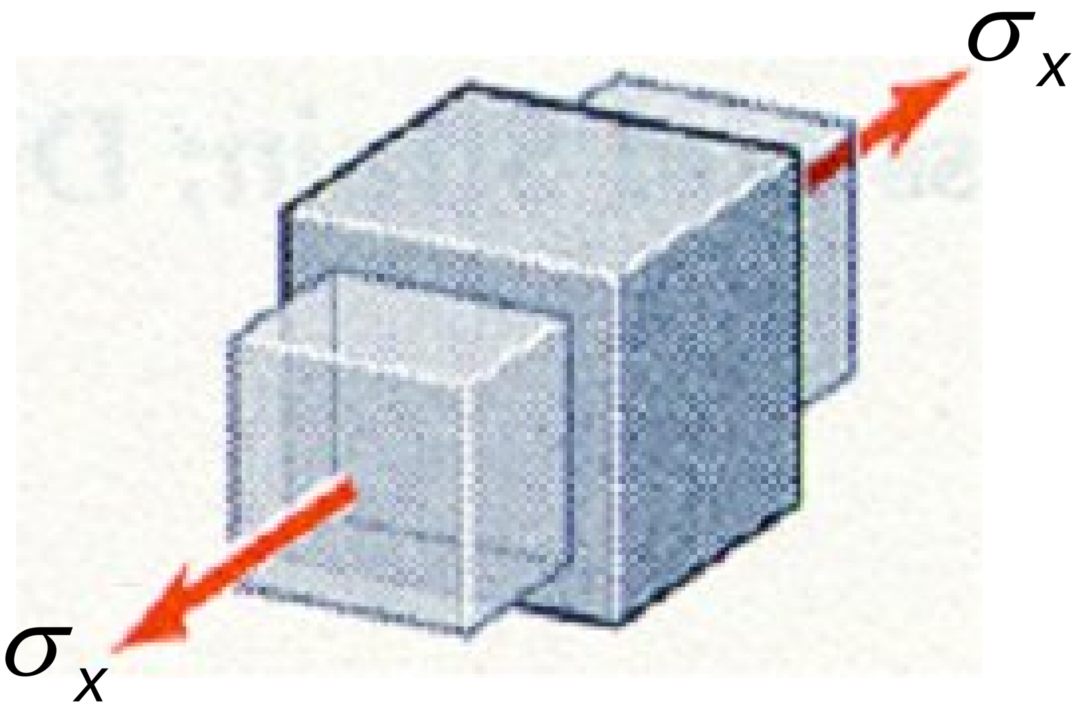
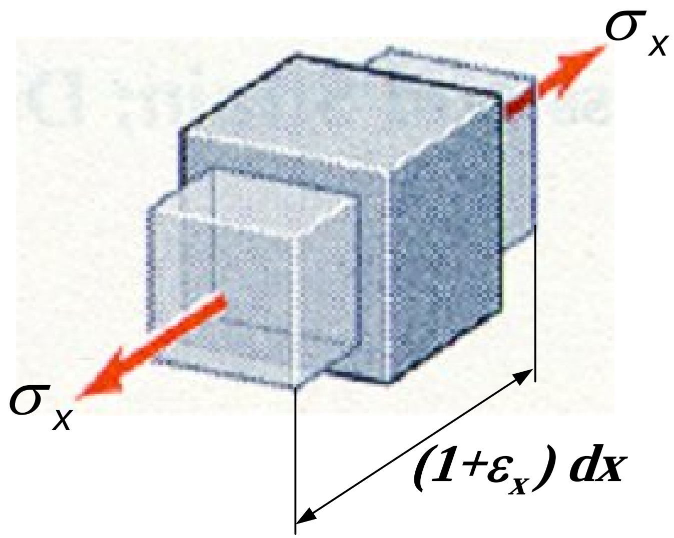
RELACIONES TENSIÓN-DEFORMACIÓN

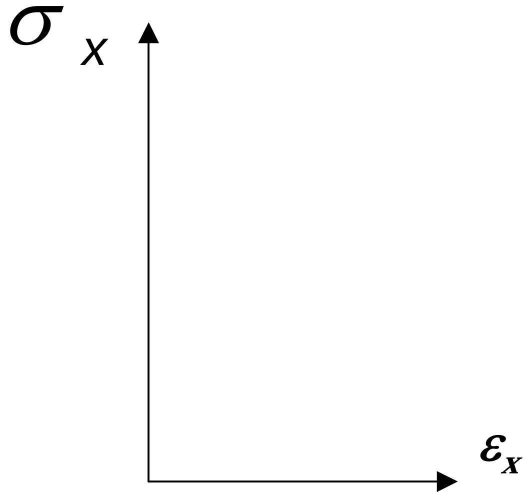
Sólido elástico:




σ_x
σ_x

Sólido elástico lineal:





- E siempre

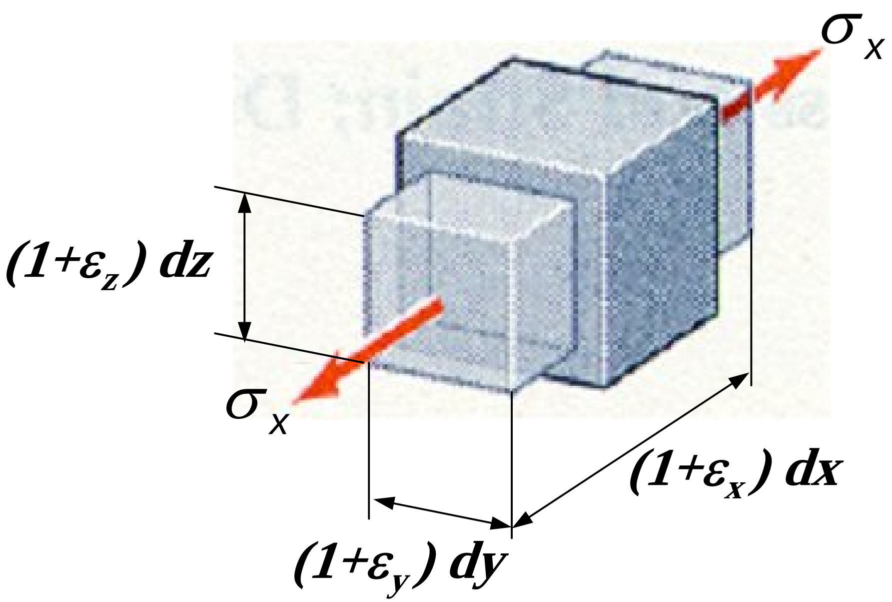
- [E]:Unidades de

-Valores:

Aceros no inoxidables:

Aluminios:

Polímeros:



- ν siempre

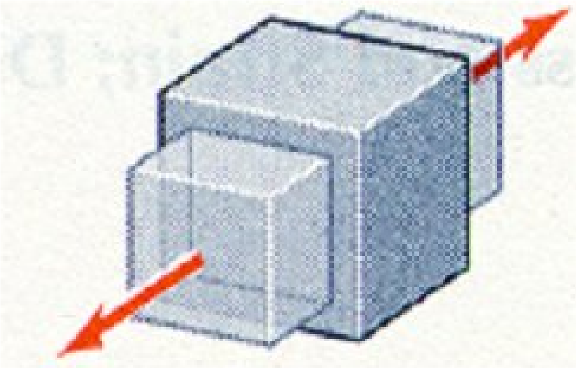
- [ν]:

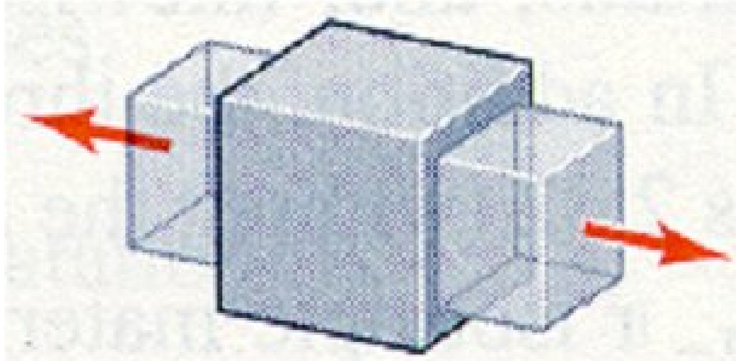
-Valores: ν siempre está entre

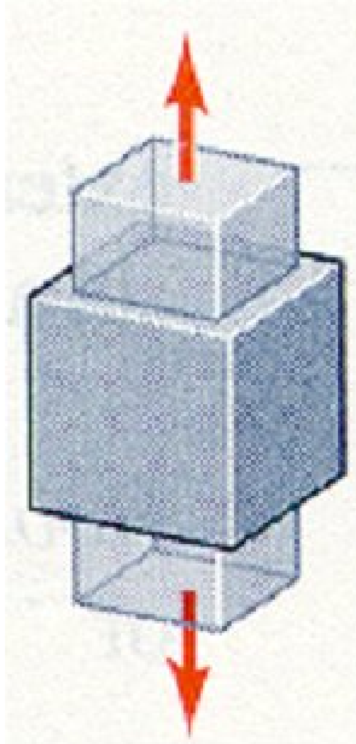
Aceros: ν =

Aluminios: ν =

Polímeros: ν ≈



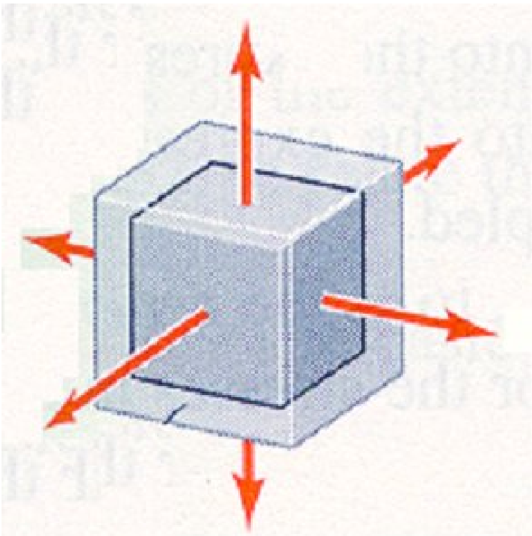




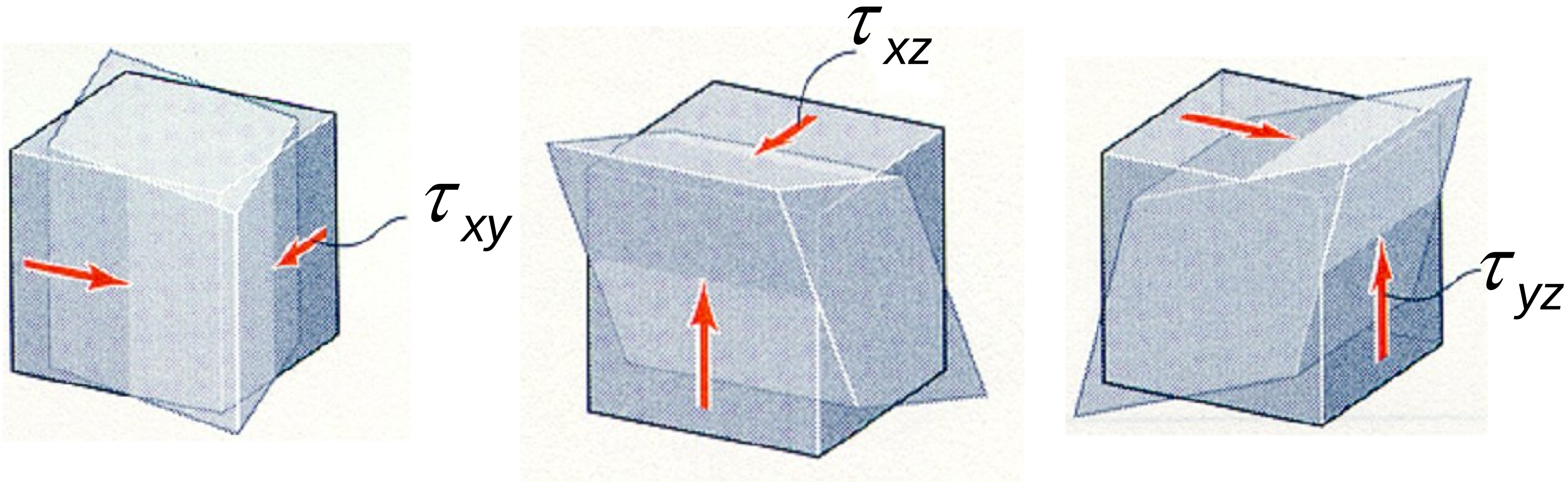
$$\varepsilon_x = \frac{1}{E}\sigma_x$$

$$\varepsilon_y = -\frac{\nu}{E}\sigma_x$$

$$\varepsilon_z = -\frac{\nu}{E}\sigma_x$$



$$\begin{cases} \varepsilon_x = \dfrac{1}{E}\left[\sigma_x - \nu\left(\sigma_y + \sigma_z\right)\right] \\ \varepsilon_y = \dfrac{1}{E}\left[\sigma_y - \nu\left(\sigma_x + \sigma_z\right)\right] \\ \varepsilon_z = \dfrac{1}{E}\left[\sigma_z - \nu\left(\sigma_x + \sigma_y\right)\right] \end{cases}$$



Leyes de Hooke (2ª parte)

$$G = \frac{E}{2 \cdot (1 + \nu)}$$

G: Módulo de cortadura
o de elasticidad transversal

Leyes de Hooke con temperatura y otras deformaciones iniciales

$$\varepsilon_x = \frac{1}{E}\left[\sigma_x - \nu\left(\sigma_y + \sigma_z\right)\right]$$

$$\varepsilon_y = \frac{1}{E}\left[\sigma_y - \nu\left(\sigma_x + \sigma_z\right)\right] + \alpha\Delta T + \varepsilon_{0y}$$

$$\varepsilon_z = \frac{1}{E}\left[\sigma_z - \nu\left(\sigma_x + \sigma_y\right)\right] + \alpha\Delta T + \varepsilon_{0z}$$

$$\gamma_{xy} = \frac{\tau_{xy}}{G}$$

$$\gamma_{xz} = \frac{\tau_{xz}}{G}$$

$$\gamma_{yz} = \frac{\tau_{yz}}{G}$$

Ecuaciones de Lamé:

$$\sigma_x = \lambda \cdot \theta + 2G \cdot \varepsilon_x$$

$$\sigma_y = \lambda \cdot \theta + 2G \cdot \varepsilon_y$$

$$\sigma_z = \lambda \cdot \theta + 2G \cdot \varepsilon_z$$

$$\gamma_{xy} = \frac{\tau_{xy}}{G}$$

$$\gamma_{xz} = \frac{\tau_{xz}}{G}$$

$$\gamma_{yz} = \frac{\tau_{yz}}{G}$$

$$\lambda = \frac{2\nu \cdot G}{(1-2\nu)} = \frac{\nu \cdot E}{(1+\nu)(1-2\nu)}$$

λ: Coeficiente de Lamé

$$\theta = \varepsilon_x + \varepsilon_y + \varepsilon_z$$