FORMULÁRIO

(Propriedades Mecânicas)

$$\sigma = \frac{F}{A}$$

$$\varepsilon = \frac{\delta}{L}$$

$$\sigma = \varepsilon E$$

$$\tau = \frac{F}{A}$$

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 $\varepsilon = \frac{\delta}{L}$ $\sigma = \varepsilon E$ $\tau = \frac{F}{A}$ $\delta_P = \frac{PL}{AE}$

$$\delta_T = \alpha(\Delta T)L$$

$$\tau = G\gamma$$

$$\delta_T = \alpha(\Delta T)L$$
 $au = G\gamma$ $G = \frac{E}{2(1+\upsilon)}$ $\gamma = \frac{\rho\phi}{L}$ $au = \frac{T \times \rho}{J}$ $au_m = \frac{T \times c}{J}$

$$\gamma = \frac{\rho \phi}{L}$$

$$\tau = \frac{T \times \rho}{I}$$

$$\tau_m = \frac{T \times c}{I}$$

$$\phi = \frac{TL}{JG}$$

$$\varepsilon_1 = \frac{1}{F} (\sigma_1 - \upsilon \sigma_2 - \upsilon \sigma_3)$$

$$\phi = \frac{TL}{LG} \qquad \varepsilon_1 = \frac{1}{E} (\sigma_1 - \upsilon \sigma_2 - \upsilon \sigma_3) \qquad \varepsilon_2 = \frac{1}{E} (\sigma_2 - \upsilon \sigma_1 - \upsilon \sigma_3) \qquad \varepsilon_3 = \frac{1}{E} (\sigma_3 - \upsilon \sigma_1 - \upsilon \sigma_2)$$

$$\varepsilon_3 = \frac{1}{E} (\sigma_3 - \upsilon \sigma_1 - \upsilon \sigma_2)$$

$$\sigma = \frac{M \times y}{I}$$

$$\sigma_m = \frac{M \times c}{I}$$

$$\sigma_m = \frac{M}{W}$$

$$W = \frac{I}{c}$$

$$\sigma = \frac{M \times y}{I}$$
 $\sigma_m = \frac{M \times c}{I}$ $\sigma_m = \frac{M}{W}$ $W = \frac{I}{C}$ $I = \frac{1}{12}bh^3$ (secção retangular)

$$W = \frac{1}{6}bh^2$$
 (secção retangular)

$$I=rac{\pi}{4}c^4$$
 (veio circular maciço)

$$W = \frac{1}{6}bh^2$$
 (secção retangular) $I = \frac{\pi}{4}c^4$ (veio circular maciço) $I = \frac{\pi}{4}(c_2^4 - c_1^4)$ (veio circular oco)

$$J = \frac{\pi}{2}c^4$$
 (veio circular maciço)

$$J = \frac{\pi}{2}c^4$$
 (veio circular maciço) $J = \frac{\pi}{2}(c_2^4 - c_1^4)$ (veio circular oco) $\tau_m = \frac{3V}{2A}$ ou $\tau_m = \frac{V}{A}$

$$\tau_m = \frac{3}{2} \frac{V}{A}$$
 ou $\tau_m = \frac{V}{A_m}$

$$\sigma_{\text{max/min}} = \left(\frac{\sigma_x + \sigma_y}{2}\right) \pm \sqrt{\left[\frac{\sigma_x - \sigma_y}{2}\right]^2 + \tau_{xy}^2} \qquad \qquad \tau_{\text{max}} = \sqrt{\left[\frac{\sigma_x - \sigma_y}{2}\right]^2 + \tau_{xy}^2} \qquad \qquad \sigma_{\text{med}} = \left(\frac{\sigma_x + \sigma_y}{2}\right)$$

$$\tau_{\text{max}} = \sqrt{\left[\frac{\sigma_x - \sigma_y}{2}\right]^2 + \tau_{xy}^2}$$

$$\sigma_{med} = \left(\frac{\sigma_x + \sigma_y}{2}\right)$$

$$\tan 2\theta_p = \frac{2\tau_{xy}}{\left(\sigma_x - \sigma_y\right)}$$

$$\tan 2\,\theta_{\rm s} = -\frac{\sigma_{\rm x} - \sigma_{\rm y}}{2\tau_{\rm xy}}$$

$$\tau_{m\acute{a}x} < \frac{\sigma_{ced}}{2}$$

$$\tau_{m\acute{a}x} < \frac{\sigma_{ced}}{2} \qquad (\sigma_1^2 - \sigma_1\sigma_3 + \sigma_3^2)^{\frac{1}{2}} < \sigma_{ced}$$

$$\overline{Y} = \frac{\sum \overline{y}A}{\sum A} \qquad I_{x'} = \sum \left(\overline{I} + A d^2\right)$$