Konstante in enačbe

Vijačne zveze

Sile na navoju

$$F_t = F \cdot \tan(\gamma \pm \rho)$$

$$\tan\gamma = \frac{P}{\pi \cdot d_2}$$

$$\tan\rho = \frac{\mu}{\cos\frac{\alpha}{2}}$$

$$T = F_t \cdot \frac{d_2}{2}$$

Vijak brez prednapetja

$$\sigma = \frac{F}{A} \le \sigma_{dop}$$

$$A = \frac{\pi \cdot d_1^2}{4}$$

$$\sigma_{dop} = \frac{R_{p0,2}}{\nu}$$

$$p = \frac{F}{z \cdot A_p} \le p_{dop}$$

$$A_p = \frac{\pi}{4} \cdot \left(d^2 - D_1^2\right)$$

$$H = z \cdot P$$

Prednapeti vijak

$$A = \frac{\sqrt{2} \cdot F}{\sigma_{dop}}$$

$$\sigma_{dop} = \frac{R_{p0,2}}{\nu}$$

$$\sigma_p = \sqrt{\sigma^2 + 3 \cdot \left(\alpha_0 \cdot \tau\right)^2}$$

$$\sigma = \frac{F}{A},\ A = \frac{\pi \cdot d_1^2}{4}$$

$$\tau = \frac{T}{W_t},\ W_t = \frac{\pi \cdot d_1^3}{16}$$

$$p = \frac{F}{z \cdot A_p} \le p_{dop}$$

$$A_p = \frac{\pi}{4} \cdot \left(d^2 - D_1^2\right)$$

$$H = z \cdot P$$

Gibalni vijak

$$H = m = z \cdot P$$

$$z = \frac{4 \cdot F}{\pi \cdot \left(d^2 - D_1^2\right) \cdot p_{dop}}$$

$$\sigma_p = \sqrt{\sigma^2 + 3 \cdot \left(\alpha_0 \cdot \tau\right)^2}$$

$$\eta = \frac{W_{odv}}{W_{dov}} = \frac{\tan\gamma}{\tan(\gamma + \rho)}$$

$$\eta = \frac{W_{odv}}{W_{dov}} = \frac{\tan(\gamma - \rho)}{\tan\gamma}$$

Prečno obremenjen vijak

$$\tau = \frac{F}{A} \le \tau_{dop}$$

$$A = \frac{\pi \cdot D_1^2}{4}$$

$$\tau_{dop} = \frac{R_{p0,2}}{\nu}$$

$$p = \frac{F}{A_d} \le p_{dop}$$

$$A_d = s \cdot D_1$$

Zveze z zatiči

Vzdolžni zatič

$$\tau = \frac{F}{A} \le \tau_{dop}$$

$$A = d \cdot l$$

$$F = \frac{2 \cdot T}{D}$$

$$p = \frac{F}{A} \le p_{dop}$$

$$A = \frac{d \cdot l}{2}$$

Prečni zatič

$$\tau = \frac{F}{2 \cdot A} \le \tau_{dop}$$

$$A = \frac{\pi \cdot d^2}{4},\ F = \frac{2 \cdot T}{D}$$

$$p_p = \frac{F}{A_p} \le p_{dop}$$

$$A_p = d \cdot \left(D_e - D\right)$$

$$p_g = \frac{F}{A_g} \le p_{dop}$$

$$A_g = \frac{d \cdot D}{3}$$

Zveze s sorniki

$$\sigma = \frac{M_{maks}}{W_z} \le \sigma_{dop}$$

$$M_{maks} = \frac{F}{4} \cdot \left(a + \frac{b}{2}\right)$$

$$W_z = \frac{\pi \cdot d^3}{32}$$

$$\tau = \frac{F}{2 \cdot A} \le \tau_{dop}$$

$$A = \frac{\pi \cdot d^2}{4}$$

$$p_d = \frac{F}{A_d} \le p_{dop}$$

$$A_d = d \cdot b$$

$$p_V = \frac{F}{A_V} \le p_{dop}$$

$$A_V = 2 \cdot d \cdot a$$

Zveza z zagozdo

$$p = \frac{2 \cdot T}{d \cdot l^* \cdot t_2 \cdot i} \le p_{dop}$$

Zveza z mozniki

$$p = \frac{k \cdot 2 \cdot T}{d \cdot l^* \cdot \left(h - t_1\right) \cdot i} \le p_{dop}$$

$k = 1$, če je $i = 1$

$k = 1{,}35$, če je $i > 1$

Osi in gredi

$$d = \sqrt[3]{\frac{32 \cdot M_{maks}}{\pi \cdot \sigma_{dop}}}$$

$$d = \sqrt[3]{\frac{16 \cdot T}{\pi \cdot \tau_{dop}}}$$

$$T = \frac{P}{\omega} = 9{,}55 \cdot \frac{P}{n}$$

Volumski in masni pretok

$$\dot{V} = q_V = \frac{V}{t} = A \cdot w$$

$$\dot{m} = q_m = \frac{m}{t}$$

$$\dot{m} = q_m = \rho \cdot A \cdot w = \dot{V} \cdot \rho$$

$$\rho = \frac{m}{V}$$

$$\Delta p = \rho \cdot g \cdot h$$

Temperaturno raztezanje

$$\Delta l = l \cdot \alpha \cdot \Delta T$$

$$\Delta T = T_2 - T_1$$

$$l_1 = l \cdot (1 + \alpha \cdot \Delta T)$$

$$\Delta V = V \cdot \beta \cdot \Delta T$$

$$V_1 = V \cdot (1 + \beta \cdot \Delta T)$$

$$\beta = 3 \cdot \alpha$$

Plinska enačba

$$p \cdot V = m \cdot R \cdot T$$

$$\frac{p_1 \cdot V_1}{T_1} = \frac{p_2 \cdot V_2}{T_2}$$

$$R = \frac{m_1}{m} \cdot R_1 + \frac{m_2}{m} \cdot R_2 + \ldots$$

$$R = \mathrm{X}_{m_1} \cdot R_1 + \mathrm{X}_{m_2} \cdot R_2 + \ldots$$

Mešalno pravilo

$$T_m = \frac{\sum_{i=1}^{n} m_i \cdot c_i \cdot T_i}{\sum_{i=1}^{n} m_i \cdot c_i}$$

Delo

$$\Delta W = p \cdot \Delta V$$

Moč

$$P = \frac{W}{t}$$

Toplotni tok

$$\phi = \frac{Q}{t}$$

Izkoristek

$$\eta = \frac{P_{dej}}{P_{dov}}$$

Toplota

$$Q = m \cdot c \cdot \Delta T$$

$$Q_p = m \cdot c_p \cdot \Delta T$$

$$Q_v = m \cdot c_v \cdot \Delta T$$

$$\Delta Q = T \cdot \Delta S$$

$$R = c_p - c_V$$

$$\kappa = \frac{c_p}{c_V}$$

$$\Delta U = Q_{12} - W_{12}$$

Prenos toplote

$$\phi = U \cdot A \cdot \Delta T$$

$$U = \frac{1}{\frac{1}{\alpha_n} + \sum_{i=1}^{n} \frac{\delta_i}{\lambda_i} + \frac{1}{\alpha_z}}$$

Izohora V = konst.

$$\frac{p_1}{T_1} = \frac{p_2}{T_2}$$

$$W_{t12} = V \cdot (p_1 - p_2)$$

$$Q_{12} = m \cdot c_V \cdot (T_2 - T_1)$$

$$W_{12} = 0$$

$$\Delta S = m \cdot c_V \cdot ln \frac{T_2}{T_1}$$

$$\Delta S = m \cdot c_V \cdot ln \frac{p_2}{p_1}$$

Izobara p = konst.

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$W_{12} = p \cdot (V_2 - V_1)$$

$$Q_{12} = m \cdot c_p \cdot (T_2 - T_1)$$

$$W_{t12} = 0$$

$$\Delta S = m \cdot c_p \cdot ln \frac{T_2}{T_1}$$

$$\Delta S = m \cdot c_p \cdot ln \frac{V_2}{V_1}$$

Izoterma T = konst.

$$p_1 \cdot V_1 = p_2 \cdot V_2$$

$$\mathrm{W}_{12} = p_1 \cdot V_1 \cdot ln \frac{V_2}{V_1}$$

$$\mathrm{W}_{12} = p_2 \cdot V_2 \cdot ln \frac{V_2}{V_1}$$

$$\mathrm{W}_{12} = p_1 \cdot V_1 \cdot ln \frac{p_1}{p_2}$$

$$\mathrm{W}_{12} = p_2 \cdot V_2 \cdot ln \frac{p_1}{p_2}$$

$$\mathrm{W}_{12} = m \cdot R \cdot T \cdot ln \frac{p_1}{p_2}$$

$$\Delta S = m \cdot R \cdot ln \frac{V_2}{V_1}$$

$$\Delta S = -m \cdot R \cdot ln \frac{p_2}{p_1}$$

$$Q_{12} = W_{12} = W_{t12}$$

Izentropa ΔS = konst.

$$p_1 \cdot V_1^{\kappa} = p_2 \cdot V_2^{\kappa}$$

$$\frac{p_1}{p_2} = \left(\frac{V_2}{V_1}\right)^{\kappa}$$

$$\frac{T_1}{T_2} = \left(\frac{V_2}{V_1}\right)^{\kappa - 1}$$

$$\frac{T_1}{T_2} = \left(\frac{p_1}{p_2}\right)^{\frac{\kappa - 1}{\kappa}}$$

$$W_{12} = m \cdot c_V \cdot (T_1 - T_2)$$

$$W_{t12} = m \cdot c_p \cdot (T_1 - T_2)$$

$$W_{t12} = \kappa \cdot W_{12}$$

$$Q_{12} = 0$$