

IZRAČUN ZAPRTE EKSPANZIJSKE POSODE - SIST EN 12828:**TOPLOTNA ČRPALKA KLIMATA - TČ.KN1****1. Volumen vode v sistemu**

$$\begin{aligned} Q^\circ &= &= & 11,2 \text{ kW} \\ V_{,s} &= &= & 140,0 \text{ l} \end{aligned}$$

2. Raztezek vode

$$\begin{aligned} T_1 &= &= & 10 \\ \rho_{01} &= &= & 999,7 \text{ m}^3/\text{kg} \end{aligned}$$

$$\begin{aligned} T_2 = T_{,stb} &= &= & 65,0 \text{ }^\circ\text{C} \\ \rho_{02} &= &= & 980,6 \text{ m}^3/\text{kg} \end{aligned}$$

$$\begin{aligned} V_{,e} &= V_{,s} \times (v_2 / v_1 - 1) &= & 2,73 \text{ l} \\ V_{,wr} &= (V_{,e} < 15 \text{ l}) = 0,20 \times V_{,e} &= & 0,55 \text{ l} \\ & (V_{,e} > 15 \text{ l, min } 3 \text{ l}) = 0,05 \times V_{,e} \end{aligned}$$

3. Začetni tlak vode v sistemu

$$\begin{aligned} H_{,st} &= &= & 1,50 \text{ m H}_2\text{O} \\ p_{,st} &= &= & 0,15 \text{ bar} \\ p_{,D} &= &= & 0,00 \text{ bar} \end{aligned}$$

$$p_{,0} = p_{,st} + p_{,d} = 0,15 \text{ bar}$$

4. Končni tlak vode v sistemu

$$\begin{aligned} p_{,sv} &= &= & 3,00 \text{ bar} \\ p_{,e} &= 0,9 \times p_{,sv} &= & 2,70 \text{ bar} \end{aligned}$$

5. Volumen ekspanzijske posode

$$V_{,ex,min} = (V_{,e} + V_{,wr}) \times ((p_{,e} + 1) / (p_{,e} - p_{,0})) = 4,8 \text{ l}$$

$$V_{,ex} = 18,0 \text{ l}$$

6. Minimalni tlak polnjenja

$$p_{,a,min} > V_{,exp} \times (p_{,0} + 1) / (V_{,exp} - V_{,wr}) - 1 > 0,2 \text{ l}$$

4. Maksimalni tlak polnjenja

$$p_{,a,max} < (p_{,e} + 1) / (1 + V_{,e} \times (p_{,e} + 1) / (V_{,ex} \times (p_{,0} + 1))) - 1 < 1,5 \text{ bar}$$

5. Izračun varnostne cevi

$$D_{oi} = 15 + 0,93 \times \sqrt{Q^\circ} = 18,1 \text{ [mm]}$$

Izberemo varnostno cev:

$$\begin{aligned} DN &= &= & 20,0 \\ Di &= &= & 22,3 \end{aligned}$$