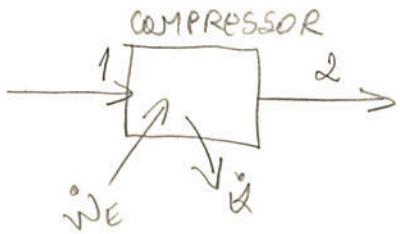
11 AR $\dot{M} = 1\ kg/s$



$\dot{W}_E = ?$

$V_1 = 75\ m/s$ $p_1 = \cancel{101}\ kPa$ 101325

$V_2 = 125\ m/s$ $T_1 = \cancel{300}\ K$ 288,15 K

$T_2 = 345\ K$ $p_2 = \cancel{200}\ kPa$

$q = 18\ kJ/kg$ $\dot{Q} = q \cdot \dot{M} = 18\ kW$

Z = constante $c_p = 1004\ J/kg.K$

$$\frac{\partial}{\partial t}\int_{VC}\left(u + \frac{V^2}{2} + gz\right)\rho\, dV + \int_{SC}\left(h + \frac{V^2}{2} + gz\right)\rho\vec{V}\cdot\vec{n}\, dA = \dot{Q} + \dot{W}_E$$

($u + pv$; $\frac{\partial}{\partial t}\int_{VC}(\ldots)\rho dV \simeq 0$)

$$\int_{SC}\left(h + \frac{V^2}{2}\right)\rho\vec{V}\cdot\vec{n}\, dA = \dot{Q} + \dot{W}_E \qquad h = c_p T \qquad R = 286.9$$

$$\boxed{\dot{W}_E = \dot{M}\left[c_p(T_2 - T_1) + \frac{(V_2^2 - V_1^2)}{2}\right] - \dot{Q}}$$

$p = \rho RT$ $pv = RT$

$v = \frac{RT}{p}$

$v_1 = \cancel{0,852}$ 0,8159

$v_2 = 0,49\cancel{49}\ m^3/kg$

$c_v = 717,\cancel{14}\ J/kg.K$

$$\dot{W}_E = 1\left[1004(345 - \overset{288.15}{300}) + \frac{(125^2 - 75^2)}{2}\right] + 18000$$

$$= \cancel{45180}\ 57077 + 5000 + 18000 = \cancel{32180\ W}\ 80,077\ kW$$

$u = c_v T$

$$\dot{W}_E = \dot{M}\left[\overset{40784}{c_v(T_2 - T_1)} + \overbrace{p_2 v_2 - p_1 v_1}^{16309} + \overbrace{\frac{(V_2^2 - V_1^2)}{2}}^{5000}\right] - \dot{Q}$$

$98980 - 82671$

OK

$$\cancel{32465} + \cancel{12948} + 5000 + 18000 = \cancel{32213\ W}\ 80,093$$

$\dot{W}_E = \cancel{32,2\ kW}$

$\dot{W}_E = 80,077\ kW$