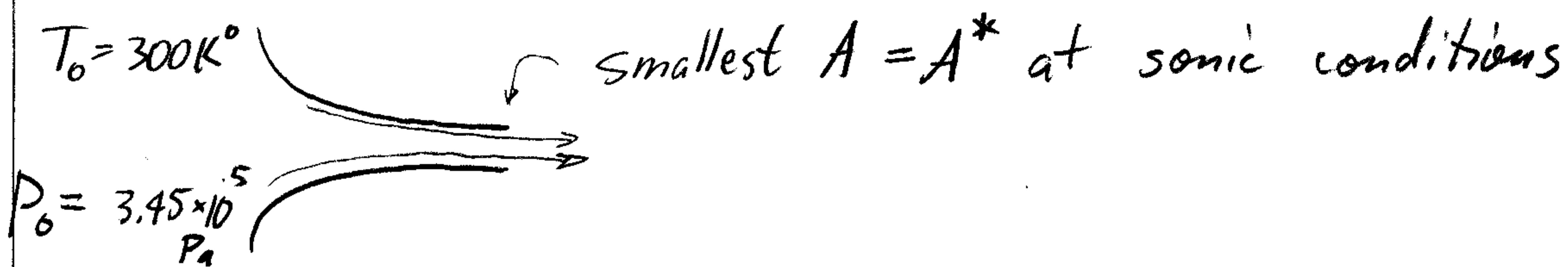


Flow out of tank through air hose:



$$\text{Required } \dot{m} = 0.01 \text{ kg/s} = \rho^* a^* A^*$$

$$\rho^* = \rho_0 \left[1 + \frac{\gamma-1}{2} \right]^{\frac{1}{\gamma-1}} = 0.634 \rho_0$$

$$\text{but } h_0 = c_p T_0 = 1004 \text{ J/kg}^\circ\text{K} \cdot 300^\circ = 301200 \text{ m}^2/\text{s}^2$$

$$a_0 = \sqrt{(r-1)h_0} = 347.1 \text{ m/s}$$

$$\rho_0 = \gamma P_0 / (r-1) h_0 = 4.01 \text{ kg/m}^3$$

$$\text{So } \rho^* = 0.634 \rho_0 = 2.542 \text{ kg/m}^3$$

$$a^* = a_0 \left[1 + \frac{\gamma-1}{2} \right]^{\frac{1}{2}} = 316.8 \text{ m/s}$$

$$A^* = \frac{\dot{m}}{\rho^* a^*} = \frac{0.01}{2.542 \cdot 316.8} = 1.24 \times 10^{-5} \text{ m}^2 = 0.124 \text{ cm}^2$$

$$r = 2 \text{ mm}$$

$$\text{diameter} = 4 \text{ mm} = 0.156 \text{ in.}$$