

---

---

# PROBLEM 11-11N QUESTION

---

---

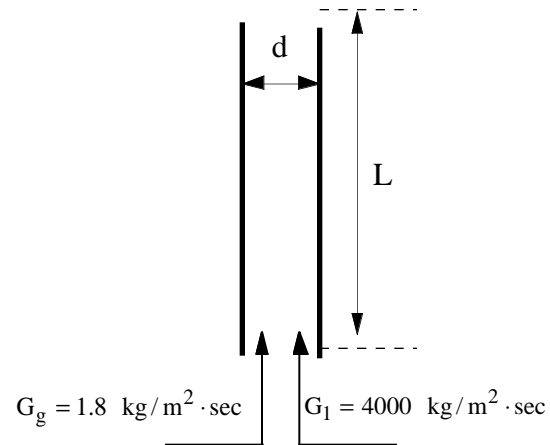
## Calculating Void Fraction In Adiabatic Steam-Water Flow

---

---

Consider an adiabatic tube in steady state steam-water upflow under the following conditions:

$$\begin{aligned}p &= 1 \text{ atm} \\d &= 0.01 \text{ m} \\L &= 1 \text{ m} \\ \rho_l &= 1,000 \text{ kg/m}^3 \\ \rho_g &= 1,000 \text{ kg/m}^3 \\ h_{fg} &= 2,246 \text{ kJ/kg} \\ k_s &= 0.025 \text{ W/m}\cdot\text{K} \\ \mu_g &= 12 \times 10^{-6} \text{ N}\cdot\text{sec/m}^2\end{aligned}$$



### QUESTIONS:

- A. Find the void fraction. Use at least two different methods to calculate your answer, and compare the results.
- B. Now calculate the void fraction for the case of liquid downflow and vapor upflow. If your calculations indicate that the tube is flooding, verify this by applying an appropriate flooding correlation.