

CHE 305 – Separation Processes
Spring 2010 – In Class Exercise on Column Sizing

Given:

- Flooding velocity = 0.8 m/s
- Operation at 85% of flooding
- $V = 100 \text{ kmol/hr}$
- $T = 80 \text{ }^{\circ}\text{C}$
- Pressure = 1 atm
- Gas Constant $R = 0.08206 \text{ L atm/mol K}$
- Each downcomer occupies 5% of the tray area
- Tray spacing is 0.6 m
- Total theoretical stages (by McCabe-Thiele) = 14 stages
- Partial Reboiler, Partial Condenser

Use the design criteria to do the following:

- a. Determine the volumetric gas flow rate.
- b. Determine the bubble area.
- c. Determine the column cross-sectional area.
- d. Determine the column diameter.
- e. Determine the column height.