

1.85 WATER AND WASTEWATER TREATMENT ENGINEERING HOMEWORK 2

1.

A plug-flow treatment reactor has an influent flow with a concentration of 150 mg/L of total toxic organics (TTO) and a flow rate of 380 L/min. The reaction is first-order with a rate constant of 0.4 hr^{-1} .

- a) Determine the required detention time and reactor volume to achieve an effluent concentration of 20 mg/L.
- b) Plot the percentage of TTO removed as a function of detention time.

2.

A completely-mixed treatment reactor has an influent flow with a concentration of 150 mg/L of total toxic organics (TTO) and a flow rate of 380 L/min. The reaction is first-order with a rate constant of 0.4 hr^{-1} .

- a) Determine the required detention time and reactor volume to achieve an effluent concentration of 20 mg/L.
- b) Plot the percentage of TTO removed as a function of detention time.
- c) How many times larger than the plug-flow reactor must the completely-mixed reactor be to achieve 80% removal?