

Example 5.1

Animal cells are cultivated on the external surface of dextran beads. These cell-laden beads (called microcarriers) have a density of 1.02 g/cm^3 and a diameter of $150 \text{ }\mu\text{m}$. A 50 L stirred tank with a height to diameter ratio of 1.2 is used to cultivate cells grown on microcarriers to produce a vaccine. After growth, the microcarriers are allowed to settle, and the microcarrier-free fluid is withdrawn. The carrier-free fluid has a density of 1.00 g/cm^3 and a viscosity of 1.1 cP.

- a) What is the terminal velocity of these particles?
- b) If the terminal velocity is reached quickly, estimate the total settling time.