Backwash Velocity Group Problem 1

Determine the required backwash velocity to expand the sand filters in lab to a porosity of **0.75**. Also, determine the depth of the expanded filter bed.

Assume the following data about our lab filters:

1. Depth of sand bed 0.5 ft.
2. Sand with a particle diameter of 0.5 mm or 0.02 in. with a settling velocity of 0.27 ft./s
3. Sand porosity is **0.30**

7.48 gallons = 1 ft^3

$$v = v_s \alpha_e^{4.5} \qquad L_e = \frac{L(1-\alpha)}{1-\left(v/v_s\right)^{0.22}}$$

86,400 seconds = 1 day

Backwash Velocity Group Problem 2

Determine the required backwash velocity to expand the sand filters in lab to a porosity of **0.75**. Also, determine the depth of the expanded filter bed.

Assume the following data about our lab filters:

1. Depth of sand bed 0.75 ft.
2. Sand with a particle diameter of 0.5 mm or 0.02 in. with a settling velocity of 0.27 ft./s
3. Sand porosity is **0.25**

7.48 gallons = 1 ft^3

$$v = v_s \alpha_e^{4.5} \qquad L_e = \frac{L(1-\alpha)}{1-\left(v/v_s\right)^{0.22}}$$

86,400 seconds = 1 day