

Subject: Check for floatation on the 500 GPD Night Pumping Hoot Aerobic Treatment System (modal numbers H-500 AS,CP; H-500 AT,CP) covered with six inches of soil.

Note: The tank will float when the total mass of the tank at operating condition is less than the mass of the water it displaces.

A. Figure #1 & #2 is the cross section of the 500 GPD Night Pumping Hoot Aerobic Treatment System.

B. Calculation:

1. Given:

- a. Tank wt. plus Clarifier Chamber Hopper _____ 16,500 lbs (from Hoot Aerobic System)
- b. Soil wt. _____ 75 lbs/sq ft
- c. Water wt at 60 deg F _____ 62.37 lbs/cu ft
- d. 1 cu ft _____ 7.48 gals

2. Calculate tank wt at operating condition with 6" soil cover (Total Tk wt = Twt + Swt)

- V1 = Volume of Pretreatment tk. At water level
- V2 = Volume of Aeration & Clarifier Chamber at water level
- V3 = Volume of Holding tk. at pump shut off

a. Calculate tk wt at operating condition (Twt)

$$\begin{aligned} \text{Twt} &= 16,500 \text{ lbs} + [(V1 + V2 + V3) / 7.48 \text{ gals/cu ft}] 62.37 \text{ lbs/cu ft} \\ &= 16,500 \text{ lbs} + [(400 \text{ gals} + 920 \text{ gals} + 290 \text{ gals}) / 7.48 \text{ gals/cu ft}] 62.37 \text{ lbs/cu ft} \\ &= \mathbf{29,925 \text{ lbs}} \end{aligned}$$

b. Calculated wt of 6" soil cover (Swt.)

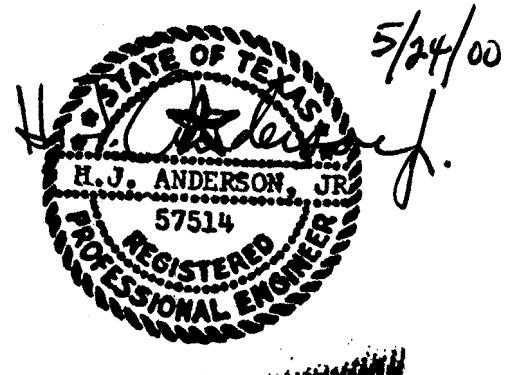
$$\begin{aligned} \text{Swt} &= (L \times W \times H) 75 \text{ lbs/cu ft} \\ &= (14.67 \text{ ft} \times 6.21 \text{ ft} \times 0.5 \text{ ft}) 75 \text{ lbs/cu ft} \\ &= \mathbf{3,416 \text{ lbs}} \end{aligned}$$

c. Total Tk wt = Twt + Swt

$$\begin{aligned} &= 29,925 \text{ lbs} + 3,416 \text{ lbs} \\ &= \mathbf{33,341 \text{ lbs}} \end{aligned}$$

3. Calculate wt. Of water displacement (H2Owt)

$$\begin{aligned} \text{a. H2Owt} &= (L \times W \times H) 62.37 \text{ lbs/cu ft} \\ &= (14.67 \text{ ft} \times 6.21 \text{ ft} \times 5.75 \text{ ft}) 62.37 \text{ lbs/cu ft} \\ &= \mathbf{32,671 \text{ lbs}} \end{aligned}$$



Conclusion: Total Tk wt. (33,341 lbs) is greater than water wt displaced (32,671 lbs). Therefore, the 500 GPD Night Pumping Hoot Aerobic Treatment System at operation condition and 6 inches of cover will not float.