

Subject: Check for floatation on the 1000 GPD Demond/Night Pumping Hoot Aerobic Treatment System (model numbers H-1000 AD,CF; H-1000 AN,CF) covered with eight 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 #3 is the cross section of the 1000 GPD Night Pumping Hoot Aerobic Treatment System.

B. Calculation:

1. Given:

- a. Tank wt. plus Clarifier Chamber Hopper _____ 16,940 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 8" soil cover (Total Tk wt = Twt + Swt)

V1 = Volume of Aeration & Clarifier Chamber at water level

V2 = Volume of Holding tk. at pump shut off

a. Calculate tk wt at operating condition (Twt)

$$\begin{aligned} \text{Twt} &= 16,940 \text{ lbs} + [(V1 + V2) / 7.48 \text{ gals/cu ft}] 62.37 \text{ lbs/cu ft} \\ &= 16,940 \text{ lbs} + [(1,840 \text{ gals} + 339 \text{ gals}) / 7.48 \text{ gals/cu ft}] 62.37 \text{ lbs/cu ft} \\ &= 35,109 \text{ lbs} \end{aligned}$$

b. Calculated wt of 8" soil cover (Swt.)

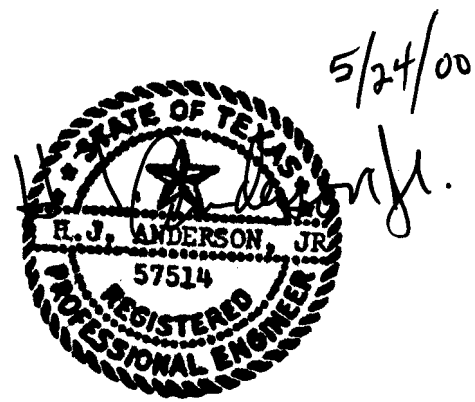
$$\begin{aligned} \text{Swt} &= (L \times W \times H) 75 \text{ lbs/cu ft} \\ &= (13.08 \text{ ft} \times 7.42 \text{ ft} \times 0.67 \text{ ft}) 75 \text{ lbs/cu ft} \\ &= 4,877 \text{ lbs} \end{aligned}$$

c. Total Tk wt = Twt + Swt

$$\begin{aligned} &= 35,109 \text{ lbs} + 4,877 \text{ lbs} \\ &= 39,986 \text{ lbs} \end{aligned}$$

3. Calculate wt. Of water displacement (H2Owt)

$$\begin{aligned} \text{H2Owt} &= (L \times W \times H) 62.37 \text{ lbs/cu ft} \\ &= (13.08 \text{ ft} \times 7.42 \text{ ft} \times 6.5 \text{ ft}) 62.37 \text{ lbs/cu ft} \\ &= 39,346 \text{ lbs} \end{aligned}$$



Conclusion: Total Tk wt. (39,986 lbs) is greater than water wt displaced (39,346 lbs). Therefore, the 1000 GPD Night Pumping Hoot Aerobic Treatment System at operation condition and 8 inches of cover will not float.