

Subject: Check for floatation on the 750 GPD Night Pumping Hoot Aerobic Treatment System (modal numbers H-750 An ,CP;) covered with 10 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 is the cross section of the 750 GPD Night Pumping Hoot Aerobic Treatment System.

B. Calculation:

1. Given:

- a. Tank wt. plus Clarifier Chamber Hopper _____ 17,920 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 a 10" minimum 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**)

$$\begin{aligned} \text{Twt} &= 17,920 \text{ lbs} + [(V1 + V2) / 7.48 \text{ gals/cu ft}] 62.37 \text{ lbs/cu ft} \\ &= 17,920 \text{ lbs} + [(1372.5 \text{ gals} + 445 \text{ gals}) / 7.48 \text{ gals/cu ft}] 62.37 \text{ lbs/cu ft} \\ &= \mathbf{33,075 \text{ lbs}} \end{aligned}$$

b. Calculated wt of 10" soil cover (**Swt.**)

$$\begin{aligned} \text{Swt} &= (L \times W \times H) 75 \text{ lbs/cu ft} \\ &= (14.92 \text{ ft} \times 6.96 \text{ ft} \times .83 \text{ ft}) 75 \text{ lbs/cu ft} \\ &= \mathbf{6,464 \text{ lbs}} \end{aligned}$$

c. **Total Tk wt = Twt + Swt**

$$\begin{aligned} &= 33075 \text{ lbs} + 6464 \text{ lbs} \\ &= \mathbf{39,539 \text{ lbs}} \end{aligned}$$

3. Calculate wt. Of water displacement (**H2Owt**)

$$\begin{aligned} \text{a. H2Owt} &= (L \times W \times H) 62.37 \text{ lbs/cu ft} \\ &= (14.92 \text{ ft} \times 6.96 \text{ ft} \times 6.00 \text{ ft}) 62.37 \text{ lbs/cu ft} \\ &= \mathbf{38,860 \text{ lbs}} \end{aligned}$$

Conclusion: Total Tk wt. (39,539 lbs) is greater than the water wt displaced (38,860 lbs). Therefore, the 750 GPD Night Pumping Hoot Aerobic Treatment System at operation condition and 10 inches minimum soil cover will not float.

