



Needville, TX
888-331-5871

Flotation Calculations

Model: B-550 & B-550NR
Description: NuWater 600 GPD Aerobic Treatment & Nitrogen Reduction Units

Given

Weight of Structure w/ Slab Top: 14,880 lbs.
Weight of Water: 62.4 pcf
Weight of Soil: 110 pcf
Volume of Structure at Flow Line: Pretreatment Compartment = 353 gal.
Aeration Compartment = 560 gal.
Clarifier Compartment = 190 gal.
Pump Compartment= 15" static volume 209 gal.

A. Weight of unit at operating condition "Down Forces":

- I. Structure Weight w/ Liquid: Unit weight + (total volume/7.48 gals/cu ft)x62.4 lb/ft³
14,880 lbs + (1312 /7.48)x62.4 = 25,825 lbs.
- II. Weight of soil: (2" overburden) (L x W x H) x 110 pcf
(13.67'x5.25'x2/12) x 110 lb/ft³ = 1,316 lbs.
- III. Total Weight: Structure weight w/ Liquid + Total Soil Weight
25,825 lb + 1316 lb = 27,141 lbs.

B. Weight of water displacement "Up Forces": (L x W x H) x 62.4
(at 69" depth of bury) (5.25'x13.67'x5.75')x62.4 lb/ft³ = 25,750 lbs.

C. Factor of Safety (FS): Required FS: ≥1

$$\frac{\text{Down Forces/Up Forces}}{27,141 / 25,750} = 1.05$$

When the FS = 1 the "down forces" will equal the "up force" and the structure will be in equilibrium.

When the FS is less than 1 the "up force" will be greater than the "down forces" and floating will occur.

X When the FS is greater than 1 the "up force" will be less than the "down forces" and floating will not occur.

Conclusion:

Total unit weight at operating condition "down Forces" of **27,141 lbs.** is greater than the weight of water displacement "up forces" **25,750 lbs.** therefore the upward forces causing floatation will not control.

Minimum burial depth:

For functional purposes the structure must be buried 2" below grade.

Approved By: _____

Date: _____

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Seal:

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