



Needville, TX
888-331-5871

Flotation Calculations

Model: B-800 & B-800NR
Description: NuWater 800 GPD Aerobic Treatment & Nitrogen Reduction Units

Given

Weight of Structure w/ Slab Top: 16,700 lbs.
Weight of Water: 62.4 pcf
Weight of Soil: 110 pcf
Volume of Structure at Flow Line: Pretreatment Compartment = 431 gal.
Aeration Compartment = 697 gal.
Clarifier Compartment = 250 gal.
Pump Compartment= 15" static volume 233 gal.

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

- I. Structure Weight w/ Liquid: Unit weight + (total volume/7.48 gals/cu ft)62.4 lb/ft³
16,700 lbs + (1611 / 7.48)x62.4 = 30,139 lbs.
- II. Weight of soil: (2" overburden) (L x W x H)110 pcf
(13.71'x6.25'x2/12) x 110 lb/ft³ = 1,571 lbs.
- III. Total Weight: Structure weight w/ Liquid + Total Soil Weight
30,139 lb + 1571 lb = 31,710 lbs.

B. Weight of water displacement "Up Forces": (L x W x H) x 62.4
(at 69" depth of bury) (13.71'x6.25'x5.75')x62.4 lb/ft³ = 30,745 lbs.

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

Down Forces/Up Forces
31,710 /30,745 = 1.03

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 **31,710 lbs.** is greater than the weight of water displacement "up forces" **30,745 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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