

## Buoyancy Calculations and Materials Properties sheet

Weight of 1 gallon of fresh water is: 8.345404 pounds.

Weight of 1 cu foot of fresh water is: 62.42718356 pounds

Specific gravity of water is: 1

Weight of 1 gallon of Propane is: 4.2 pounds

The specific gravity of propane liquid is 0.504

Specific Gravity of Concrete, Limestone w/Portland is 2.37

Concrete, Limestone w/Portland weighs 148 lbs per cubic foot.

Each cubic foot of concrete weighing 148 pounds in air contributes 85.57 pounds of ballast when the concrete is submerged in water.

**For 500 gallon water capacity Propane tank:**

Weight of Empty Propane tank in air is 949 pounds.

Weight of 500 gallons of water is: 4172.702 pounds

**Propane tanks are filled to only 80% of their water capacity.**

400 gallons of liquid propane weighs 1680 pounds,

500 Gallon Propane Tank (Water Capacity)	Weight range: 2629 pounds (in air, full of product) to Buoyancy of -3224 (submerged, empty of product)
In air tank empty weight:	+949 pounds
In air tank full weight:	+ 2629 pounds
Submerged tank full buoyancy:	-1544 pounds
Submerged tank empty buoyancy:	- 3224 pounds
Concrete for neutral buoyancy:	$3224/85.57 = 37.68$ Cubic Feet
Concrete for Safety Factor of 1.3	$37.68 \times 1.3 = 49.98$ Cubic Feet
2 cubic Yards of concrete will provide ballast with a Safety Factor of 1.43	

Find practical dimensions of a rectangular concrete form accommodating 2 cubic yards (93,312 cubic inches) being certain to account for nominal dimensions of lumber:

Lumber Dimensions	
Nominal	Actual
2" x 12"	1- 1/2" x 11- 1/4"
2" x 4"	1-1/2" x 3-1/2"
Combined	1- 1/2" X 14 - 3/4"

Internal Form Dimensions accommodating 2 cubic Yards of concrete		
Form Height	Form Width	Form Length
14.75"	50.21"	126"
$14.75 \times 50.21 \times 126 = > 93,312$ Cubic Inches (2 Cubic Yards)		