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## Aquarium Thickness Calculation

### Question

How do I calculate the thickness of an aquarium that I want to build out of ACRYLITE® GP acrylic sheet?

### Answer

#### AQUARIUM THICKNESS CALCULATION

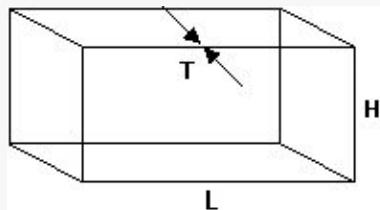
Please click on the attachment below for a Microsoft Excel spreadsheet which will determine the proper thickness for an aquarium made of **ACRYLITE® GP acrylic sheet**.

CYRO recommends that all acrylic water vessels, including aquariums, should be constructed with cell cast **ACRYLITE GP sheet**. This requirement exists for two reasons:

1. **ACRYLITE GP sheet** is more capable of withstanding continuous loads than continuously manufactured or extruded sheet.
2. **ACRYLITE GP sheet** maintains a high level of mechanical strength after water absorption has reached equilibrium.

Cemented joints must withstand the effects of the continuous hydraulic pressure and the high level of water absorption for many years. Two-part polymerizable cements are recommended for this to meet this requirement. For proper cementing techniques [Click Here](#). Solvent cements are NOT recommended.

To determine what thickness acrylic sheet should be used, the calculation below can be used assuming the base is uniformly supported.



T - thickness of sheet

H - height of tank

L - length of tank

$$\text{Required Thickness } T \text{ (in)} = \sqrt{\frac{\beta q H^2}{\alpha}}$$

q = maximum water pressure (lbs/in.<sup>2</sup>) = (0.0361 lbs water/in<sup>3</sup>) \* H (inches)

H = aquarium height (inches)

$\alpha$  = maximum permissible stress for **ACRYLITE GP** in an aquarium (750 psi)  
 $\beta$  = coefficient from L/H relationship as follows:

L/H	0.25	0.50	0.75	1.00	1.50	2.00	3.00	4.00
$\beta$	0.037	0.120	0.212	0.321	0.523	0.677	0.866	0.940

Note: For L/H ratios not shown, use the  $\beta$  value for the next higher ratio.

**Example:**

L = 36 in.

H = 15 in.

L/H = 2.4 therefore:  $b = 0.866$  (taken from the chart for L/H = 3.0)

$q = (0.0361 \text{ lbs/in}^3) \times (15 \text{ in}) = 0.542 \text{ lbs/in}^2$

$$T \text{ (in)} = \sqrt{\frac{\beta q H^2}{\alpha}} = \sqrt{\frac{0.866 * 0.542 * 225}{750}} = 0.375 \text{ inches}$$

If a top is cemented on, the recommended thickness is 0.375 inches. With an open top use a safety factor of 1.5, bringing the recommended thickness to 0.563 inches to be used in this size tank.

Notify Me by E-mail if this Answer is Updated

**File Attachments**

-  Aquarium.xls

**How well did this answer your question?**

100%
  75%
  50%
  25%
  0%

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