2 Walls W*H + 2 Walls L*H + Floor + Ceiling= $2*12*10ft^2+2*20*10ft^2+2*12*20ft^2$

$=240+400+480=\boxed{1,120ft^2}$

4.3 Concentration

Concentration is typically expressed as mg/l which is the weight of the constituent (mg) in 1 l (liter) of solution (wastewater). As 1 l of water weighs 1 million mg, a concentration of 1 mg/l implies 1 mg of constituent per 1 million mg of water or one part per million (ppm). **Thus, mg/l and ppm are synonymous.**

Sometimes the constituent concentration is expressed in terms of percentage.

For example: sludge containing 5% solids or a 12.5% chlorine concentration solution.

As one liter of water weighs 1,000,000 mg, one percent of that weight is 10,000 mg. So 1% solids implies 10,000 mg of solids per liter or 10,000 mg/l or 10,000 ppm.

$1\%concentration = 10,000\ \ ppm\ \ or\ \ \frac{mg}{l}$

$0.1\%concentration = 1,000\ \ ppm\ \ or\ \ \frac{mg}{l}$

$0.01\%concentration = 100\ \ ppm\ \ or\ \ \frac{mg}{l}$

$10\%concentration = 100,000\ \ ppm\ \ or\ \ \frac{mg}{l}$

$5\%concentration = 50,000\ \ ppm\ \ or\ \ \frac{mg}{l}$

$A\ \ 12.5\%\ \ bleach\ \ solution\ \ contains\ \ 12.5\%\ \ or\ \ 125,000\ \ \frac{mg}{l}\ \ of\ \ \ active\ \ chlorine$

4.3.1 Example Problem

1. Calculate the lbs/day of solids entering the plant given the influent flow is 500,000 gallons per day with an average solids concentration of 250 mg/l.

   Solution:

   Solids (lbs/day)= Total water entering per day * concentration of solids

   So if we use the water entering in gallons per day, we need to calculate the solids in lbs per gallon so the answer will be in lbs/day

   $\frac{lbs\ \ solids}{day} = total\ \ water\ \ entering\ \ (\frac{\cancel{gal}}{day}) * concentration\ \ of\ \ solids\ \ \frac{lbs}{\cancel{gal}}$

   $\frac{lbs\ \ solids}{day} = \frac{500,000\ \ gal}{day} * \frac{250\ \ mg\ \ solids}{l} * \frac{3.785\ \ l}{gal} * \frac{g}{1,000\ \ mg} * \frac{lb}{453.6\ \ g}$

   $= \frac{1,043\ \ lbs\ \ solids}{day}$