Subsurface System Formulas

area of square or rectangle (ft^2) = length (ft) X width (ft)

area of circle (ft^2) = 3.14 X radius^2 = π X radius^2 = πr^2

circumference of circle (ft) = $2 \pi r$

volume of rectangular tank in cubic feet (ft^3) = length X width X depth

volume of round tank or pipe in cubic feet (ft^3) = πr^2 X length (or depth)

volume of tank in gallons (gal) = volume of tank (ft^3) X 7.48 gal/ft^3

gallons per inch (gal/in) = $\text{L (ft)} \times \text{W (ft)} \times \dfrac{\text{1 ft}}{\text{12 in}} \times \dfrac{\text{7.48 gal}}{1\ ft^3}$

or

gallons per inch (gal/in) = $\dfrac{\text{volume (gal)}}{\text{liquid depth (in)}}$

percent solids in a tank (%) = $\dfrac{\text{scum depth (in)} + \text{sludge depth (in)}}{\text{liquid depth (in)}} \times 100$

percent reduction = $\dfrac{\text{influent concentration} - \text{effluent concentration}}{\text{influent concentration}} \times 100$

minimum flow rate (gpm) = 4.896 x [pipe diameter (in)]^2

pump delivery rate (pdr) = $\dfrac{\text{volume pumped (gal)}}{\text{pump run time (min)}}$ *or* $\dfrac{\text{inches of liquid drop} \times \text{gal/in}}{\text{pump run time (min)}}$

pump delivery rate efficiency (%) = $\dfrac{\text{measured pump delivery rate (min)}}{\text{design pump delivery rate (min)}} \times 100$

detention time (unit of time) = $\dfrac{\text{volume (gallons)}}{\text{flow (volume/unit of time)}}$

hydraulic loading rate (gpd/ft^2) = $\dfrac{\text{gal. applied per day (gpd)}}{\text{area } (ft^2)}$

drawdown (in/dose) = $\dfrac{\text{dose volume (gal/dose)}}{\text{gal/in}}$

dose volume (gal/dose) = drawdown (in/dose) X gal/in

or

dose volume (gal/dose) = pump delivery rate (gpm) X min pumped/dose (run time)