

## USEFUL WATER AND WASTEWATER FORMULAS

$$\text{Dosage mg/l} = (\text{chemical feed, lbs/day}) \div (\text{MGD} \times 8.34)$$

$$\text{Chemical feed, lbs/day} = \text{MGD} \times 8.34 \times \text{mg/l}$$

Note: Divide your answer by the % purity of the chemical if it is not 100%.

$$1\% = 10,000 \text{ mg/l}$$

$$^{\circ}\text{F} = (^{\circ}\text{C} \times 9 \div 5) + 32^{\circ} \quad \text{-or-} \quad (^{\circ}\text{C} \times 1.8) + 32^{\circ}$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) \times 5 \div 9 \quad \text{-or-} \quad (^{\circ}\text{F} - 32^{\circ}) \div 1.8$$

$$\text{Efficiency, \%} = [(\text{in} - \text{out}) \div \text{in}] \times 100$$

$$1\text{HP} = 0.746 \text{ Kw}$$

$$\text{Water HP} = (\text{gpm} \times \text{head, ft}) \div 3960$$

$$\text{Brake HP} = (\text{gpm} \times \text{head, ft}) \div (3960 \times \text{pump efficiency})$$

$$\text{Motor HP} = (\text{gpm} \times \text{head, ft}) \div (3960 \times \text{pump efficiency} \times \text{motor efficiency})$$

$$\text{Motor efficiency} = (\text{gpm} \times \text{head, ft} \times 0.746) \div (3960 \times \text{Kw})$$

$$\text{Detention time} = \text{volume} \div \text{flow}$$

$$\text{Flow, ft}^3/\text{sec} = (\text{area, ft}^2) \times (\text{velocity, ft/sec})$$

$$\text{Velocity} = \text{distance} \div \text{time}$$

$$\text{Surface Loading, gpd/ft}^2 = (\text{flow, gpd}) \div \text{surface area, ft}^2$$

$$\text{Weir overflow, gpd/ft} = \text{flow/gpd} \div \text{weir length, feet}$$

$$\text{Lagoon organic loading, lbs BOD/acre} = \text{BOD applied, lbs} \div \text{surface area, acres}$$

$$\text{Trickling filter organic loading, lbs BOD/day/1,000 ft}^3 = \text{BOD applied, lbs per day} \div 1,000 \text{ ft}^3$$

$$\text{MLVSS, lbs} = (\text{BOD, mg/l} \times \text{flow, MGD} \times 8.34) \div \text{F/M desired}$$

$$\text{F/M} = \text{BOD lbs/day} \div \text{MLVSS, lbs}$$

$$\text{SVI} = (\text{settleability, ml/l} \times 1000) \div \text{MLSS, mg/l}$$

$$\text{TSS, mg/l} = [(\text{crucible \& dry sample wt, g} - \text{crucible wt, g}) \div \text{sample volume, ml}] \times 1,000,000$$

$$\text{BOD, mg/l} = [(\text{initial DO, mg/l} - \text{final DO, mg/l}) \div \text{sample volume, ml}] \times \text{sample size (1000 or 300)}$$

$$\text{Concentration:} \quad \text{concentration (1)} \times \text{Volume (1)} = \text{concentration (2)} \times \text{volume (2)}$$

$$V_2 = (C_1 \times V_1) \div C_2$$

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$$\text{Filtration rate gpm/ft}^2 = \text{flow, gpm} \div \text{surface area, ft}^2$$

$$\text{Backwash rate gpm/ft}^2 = \text{backwash flow, gpm} / \text{surface area, ft}^2$$

$$\text{Specific capacity} = \text{yield} \div \text{drawdown}$$

$$\text{yield} = \text{gpm}$$

$$\text{drawdown} = \text{static level} - \text{pumping level}$$