

Basic Water & Wastewater Formulas

Area, ft^2 Rectangle Width, ft x Length, ft
 Circle $\frac{(\text{Diameter, } ft)^2 \pi}{4}$

Backwash rate, gpm/ft^2 $\frac{\text{Flow, } gpm}{\text{Area, } ft^2}$

Chlorine Dose,
 mg/L Cl_2 Demand, mg/L + Free Cl_2 Residual, mg/L

Circumference, ft $(\pi)(\text{Diameter, } ft)$

Detention time, hrs $\frac{(\text{Volume, } gal)(24 \text{ hrs/day})}{\text{Flow, } gpd}$

Flow, cfs (Velocity, ft/sec) (Area, ft^2)

Horsepower, HP $\frac{(\text{Flow, } gpm) (\text{Head, } ft)}{3960}$

Pounds, lbs (Flow, MGD)(Conc. mg/L)(8.34 lbs/gal)

Power, $watts$ (Voltage, $volts$)(Current, amp)

Power Factor $\frac{\text{Actual Power, } watts}{\text{Apparent Power, } V-A}$

Removal, % $\frac{\text{In} - \text{Out}}{\text{In}} \times 100$

Solution Strength, % $\frac{\text{Weight of Chemical}}{\text{Weight of Solution}} \times 100$

Basic Water & Wastewater Formulas

| | |
|-----------------------------------|--|
| Surface Overflow Rate, gpd/ft^2 | $\frac{\text{Flow, } gpd}{\text{Area, } ft^2}$ |
| Temperature °F | $(1.8 \times ^\circ C) + 32$ |
| °C | $(^{\circ}F - 32) (5/9)$ |
| Velocity, ft/sec | $\frac{\text{Flow, } ft^3/sec}{\text{Area, } ft^2}$ |
| Volume, ft^3 | Rectangle, Width, ft x Length, ft x Height, ft |
| | Cylinder $\pi \frac{(\text{Diameter, } ft)^2}{4} (\text{Height, } ft)$ |
| | Cone $\pi \frac{(\text{Diameter, } ft)^2 (\text{Height, } ft)}{12}$ |
| | Sphere $\pi \frac{(\text{Diameter, } ft)^3}{6}$ |

Conversion Factors

| | |
|---------------------------|-----------------------------|
| 1 ft^3 water = 7.48 gal | 1 psi = 2.31 feet of water |
| 1 gal water = 8.34 lbs | 1 % = 10,000 mg/L |
| 1 MGD = 694 gpm | 1 kilogram = 2.20 lbs |
| 1 MGD = 1.547 cfs | 1 centimeter = 0.394 inches |
| 1 Liter = 0.264 gal | 1 kilowatt = 1.34 HP |
| 1 Liter/sec = 15.85 gpm | 1 HP = 550 ft-lbs/sec |
| 1 acre = 43,560 ft^2 | 1 meter = 3.28 feet |
| | 1 kilopascal = 0.145 psi |



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