ABC Formula/Conversion Table
for Plant Maintenance Exams

Amps $= \frac{\text{Volts}}{\text{Ohms}}$

Area of Circle $= (0.785) \text{ (Diameter)}^2$ or $(\Pi) \text{ (Radius)}^2$

Area of Cone (lateral area) $= (\Pi) \text{ (Radius)} \sqrt{\text{Radius}^2 + \text{Height}^2}$

Area of Cone (total surface area) $= (\Pi) \text{ (Radius)} \left( \sqrt{\text{Radius}^2 + \text{Height}^2} \right)$

Area of Cylinder (total outside surface area) $= [\text{Surface Area of End #1}] + [\text{Surface Area of End #2}] + \left[ (\Pi) \text{ (Diameter)} \text{ (Height or Depth)} \right]$

Area of Rectangle $= (\text{Length}) \text{ (Width)}$

Area of a Right Triangle $= \frac{(\text{Base})(\text{Height})}{2}$

Average (arithmetic mean) $= \frac{\text{Sum of All Terms}}{\text{Number of Terms}}$

Circumference of Circle $= (\Pi) \text{ (Diameter)}$

Degrees Celsius $= (\text{Degrees Fahrenheit} - 32) \left(\frac{5}{9}\right)$ or $\left(\frac{\text{F} - 32}{1.8}\right)$

Degrees Fahrenheit $= [(\text{Degrees Celsius}) \left(\frac{9}{5}\right) + 32] \text{ or } [(\text{Degrees Celsius}) (1.8) + 32]$

Electromotive Force (E.M.F), volts $= (\text{Current, amps}) \text{ (Resistance, ohms)}$ or $E = IR$

Filter Backwash Rate, gpm/sq ft $= \frac{\text{Flow, gpm}}{\text{Filter Area, sq ft}}$

Flow Rate, cfs $= (\text{Area, sq ft}) \text{ (Velocity, ft/sec)}$ or $Q = AV$ where: $Q =$ flow rate, $A =$ area, $V =$ velocity

Force, pounds $= (\text{Pressure, psi}) \text{ (Area, sq in)}$

Horsepower, Brake (bhp) $= \frac{(\text{Flow, gpm}) \text{ (Head, ft)}}{(3,960) \text{ (Decimal Pump Efficiency)}}$

Horsepower, Motor (mhp) $= \frac{(\text{Flow, gpm}) \text{ (Head, ft)}}{(3,960) \text{ (Decimal Pump Efficiency)} \text{ (Decimal Motor Efficiency)}}$

Horsepower, Water (whp) $= \frac{(\text{Flow, gpm}) \text{ (Head, ft)}}{3,960}$

Leakage, gpd $= \frac{\text{Volume, gallons}}{\text{Time, days}}$

Reduction in Flow, % $= \frac{(\text{Original Flow} - \text{Reduced Flow})(100\%)}{\text{Original Flow}}$

Effective March 24, 2008
Slope, % = \( \frac{\text{Drop or Rise}}{\text{Distance}} \times 100 \)

Specific Gravity = \( \frac{\text{Specific Weight of Substance, lbs/gal}}{\text{Specific Weight of Water, lbs/gal}} \)

Velocity, ft/sec = \( \frac{\text{Flow Rate, cu ft/sec}}{\text{Area, sq ft}} \) or \( \frac{\text{Distance, ft}}{\text{Time, sec}} \)

Volume of Cone = \( \frac{1}{3} \times 0.785 \times (\text{Diameter}^2) \times (\text{Height}) \)

Volume of Cylinder = \( 0.785 \times (\text{Diameter}^2) \times (\text{Height}) \)

Volume of Rectangular Tank = \( \text{Length} \times \text{Width} \times \text{Height} \)

Watts (DC circuit) = (Volts) (Amps)

Watts (AC circuit) = (Volts) (Amps) (Power Factor)

Wire-to-Water Efficiency, % = \( \frac{\text{Water Horsepower, HP}}{\text{Power Input, HP or Motor HP}} \times 100 \)

Wire-to-Water Efficiency, % = \( \frac{(\text{Flow, gpm})(\text{Total Dynamic Head, ft})(0.746 \text{ kw/hp})(100)}{(3,960)(\text{Electrical Demand, kilowatts})} \)

**Conversion Factors:**

- 1 acre = 43,560 square feet
- 1 acre foot = 326,000 gallons
- 1 cubic foot = 7.48 gallons
- 1 cubic foot = 62.4 pounds
- 1 cubic foot per second = 0.646 MGD
- 1 foot = 0.305 meters
- 1 foot of water = 0.433 psi
- 1 gallon = 3.79 liters
- 1 gallon = 8.34 pounds
- 1 grain per gallon = 17.1 mg/L

1 horsepower = 0.746 kW or 746 watts or 33,000 ft. lbs./min.
1 million gallons per day = 694 gallons per minute
1 million gallons per day = 1.55 cubic feet per second
1 mile = 5,280 feet
1 pound = 0.454 kilograms
1 pound per square inch = 2.31 feet of water
1 ton = 2,000 pounds
1% = 10,000 mg/L
Π or pi = 3.14

**Abbreviations:**
cfs cubic feet per second
ft feet
g grams
gpd gallons per day
gpg grains per gallon
gpm gallons per minute
in inches
kW kilowatt
lbs pounds
mg/L milligrams per liter
MGD million gallons per day
mL milliliter
psi pounds per square inch
Q flow

Effective March 24, 2008