CONVERSIONS & FORMULAS

Area Formulas

1 square ft. = 144 square inches
1 square yd. = 9 square ft.
1 cubic yd. = 27 cubic ft.

Square or Rectangle Area =
Length x Width = ft^2 (square feet)
Length x width x height = ft^3 (cubic feet)

Circular Area = .785 x $Diameter^2$ or
3.14 X $Radius^2$ (pi x R^2) (pi = 3.14)

Horsepower (hp) Formulas

1 horsepower = 550 foot-pounds/second
= 33,000 foot-pounds/minute
= 1,980,000 foot-pounds/hour

Brake Horsepower = Water Horsepower / Pump Efficiency

Efficiency:
% Efficiency = out power / input power

Kilowatts (kW) = 0.746 x Motor Horsepower

Motor Horsepower = Brake Horsepower / Motor Efficiency

Water Horsepower = Q (flow gal/min.) x H (Head in ft.) / 3960

Wire to Water Efficiency:
Overall Efficiency = Water Horsepower x 100 / Electrical Horsepower

Treatment Formulas

Filtration Rate (gpm/ft^2) = Flow (gal/min) / Surface Area (ft^2)

Percent Strength by Weight = Weight of Solute x 100 / Weight of Solution

Specific Capacity = Flow (gallons per minute) / Well Drawdown (feet)

Surface Loading, GPD/sq. ft. = Flow (gal/day) / Surface Area (sq ft)

Other Formulas

Chemical Dosage:
These formulas require to be divided by % of strength.
Flow—Chemical by weight:
lbs/day = MGD x mg/L x 8.34
lbs/day = gal/min x mg/L x .012

Circumference:
3.14 X Diameter (Pi x Diameter)

Concentration:
1 part per million (ppm) = 1 milligram per liter
=0.0584 grains per gallon
=8.34 Pounds per MG
1 pound of weight per million pounds
1 part per billion = 1 ug/L (microgram/Liter)
1 part per million = 1 mg/L (milligram/Liter)

CT = Chlorine Concentration (mg/L) x Time (min)

Detention time = Tank Volume (gallons) / Flow (gpm or gpd or gph)

Flows:
1 gallons per minute = 1,440 gallons/day
1 cubic foot per second (cfs) = 646,272 gallons/day
= 448.8 gallons per minute
1 million gallons per day = 1.55 cubic ft/sec.=
694.4 gallons per minute
Flow Rate =
Q (flow ft^3/sec.) = V (velocity ft/sec.) x A (area ft^2)

Force =
Pressure (psi) x Area ($inches^2$)

Hydraulics:
2.31 Head Feet = 1 PSI
0.433 PSI = 1.0 Feet of Head

Per Capita Water Use =
Water used (gal/day)/total number of people

Percent = Part / Whole x 100

Specific Gravity =
Solution weight (lbs/gal)
Weight of Water (8.34 lbs/gal)

Common Conversions

Volume and Capacity:

1 cubic ft. = 7.48 gallons
1 cubic yd. = 27 cubic ft.
1 quart = 2 pints = 32 fluid ounces
1 liter = 1000 milliliters = 1.06 quarts = 1000 cubic centimeters
1 gallon (gal) = 8 pints = 231 cubic inches =
3.785 liters = 3,785 milliliters
1 acre foot (ac. ft.) = 43,560 cubic feet = 325,851 gallons

Time:

1 minute = 60 seconds
1 hour = 60 minutes = 3600 seconds
1 day = 24 hours = 1,440 minutes = 86,400 seconds
1 week = 7 days
1 yr. = 12 months = 52 weeks = 365 days

Lengths:

1 foot = 12 inches
1 yd. = 3 ft. = 36 inches
1 mile = 5,280 ft.

Temperature:

Degree Fahrenheit = Degree C x 9/5 +32
Degree Centigrade = (Degree F –32) x 5/9

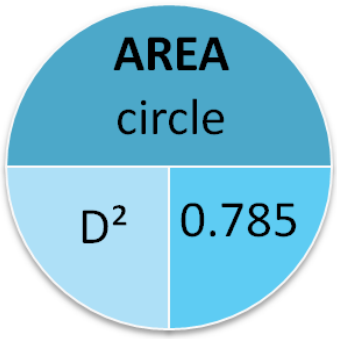
Weight:

1 pound = 16 ounces = 7000 grains = 453.6 grams = .454 kilograms
1 kilogram = 1,000 gm = 2.205 pounds
1 ton = 2,000 pounds
1 gallon of water = 8.34 pounds
1 cubic ft. of water = 62.4 pounds
1 liter of water = 1 kilogram = 1000 grams
1 milliliter of water = 1 gram
Density of water = 1gm/ml or 1gm/cc
Specific gravity of water = 1.00
Weight of Solution = Weight of Solute + Weight of Solvent

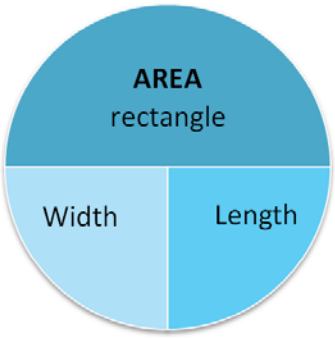
PIE WHEELS

- To find the quantity *above* the horizontal line: multiply the pie wedges below the line together.
- To solve for one of the pie wedges *below* the horizontal line: cover that pie wedge, then divide the remaining pie wedge(s) into the quantity above the horizontal line.

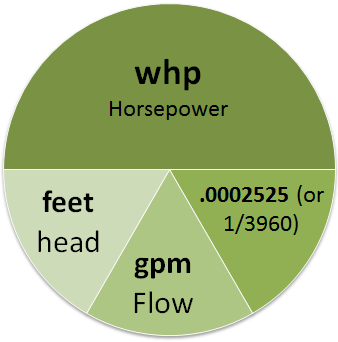
Area of a Circle



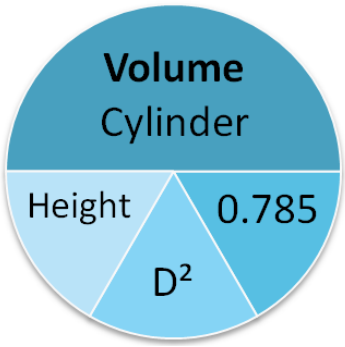
Area of a Rectangle



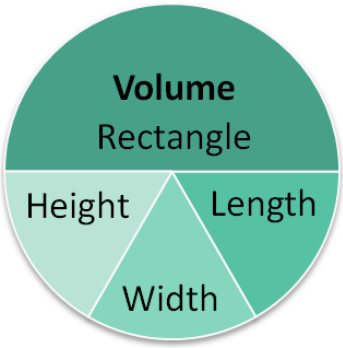
Horsepower, Water (whp)



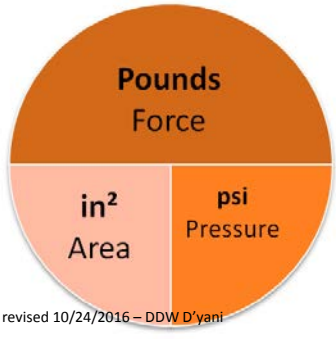
Volume of Cylinder



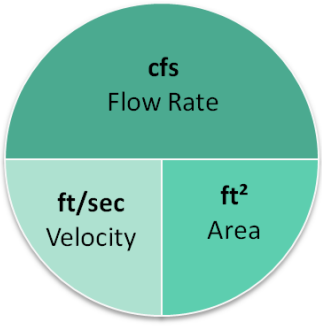
Volume of Rectangular Tank



Force, pounds



Flow Rate, cfs



Feed Rate, lbs/day