# Units of Measure

## U.S. Units of Measure

### Linear Measurement
- 12 inches = 1 foot
- 3 feet = 1 yard
- 5½ yards = 1 rod
- 40 rods = 1 furlong
- 8 furlongs (5280 ft) = 1 statute mile
- 3 nautical miles = 1 league

### Square Measure
- 144 sq inches = 1 sq foot
- 9 sq feet = 1 sq yard
- 43,560 sq feet = 1 acre

### Cubic Measure
- 1,728 cu in = 1 cu foot
- 27 cu ft = 1 cu yard
- 129 cu ft = 1 cord (wood)
- 40 cu ft = 1 ton (shipping)
- 2,150.42 cu in = 1 standard bushel
- 231 cu in = 1 U.S. standard gallon
- 1 cu ft = about 4/5 of a bushel

### Liquid Measure
- 50-60 drops = 1 teaspoon
- 3 teaspoons = 1 Tablespoon
- 2 Tablespoons = 1 fluid ounce
- 8 fluid ounces = 1 cup
- 2 cups = 1 pint
- 2 pints = 1 quart
- 4 quarts = 1 gallon
- 31.5 gallons = 1 barrel

### Dry Measure
- 3 teaspoons = 1 Tablespoon
- 16 Tablespoons = 1 cup
- 2 cups = 1 pint
- 2 pints = 1 quart
- 8 quarts = 1 peck
- 4 pecks = 1 bushel

### Temperature

To convert Fahrenheit to Centigrade (Celsius): Subtract 32 and multiply by .55

(68° F minus 32 x .55 = 20° C)

To convert Centigrade to Fahrenheit: Multiply by 1.8 and add 32 (20° C x 1.8 + 32 = 68° F)

### Liquid Conversions

- 1 pt (100 gal) = 1 tsp (gal)
- 1 qt (10 gal) = 2 tsp (gal)
- 1 teaspoon = 1/3 Tbsp or 1/6 ounce
- 1 Tablespoon = 3 tsp or 1/2 ounce
- 1 fluid ounce = 2 Tbsp or 6 tsp
- 1 cup = 1/2 pint, 16 Tbsp, 48 tsp, or 6 ounces
- 1 quart = 2 pints, 4 cups, 64 Tbsp, or 32 ounces
- 1 gallon = 4 qts, 8 pints, 16 cups, or 128 ounces

### Parts Per Million

1 oz/100 gal = 75 ppm

To determine parts per million (ppm) of an element in a fertilizer, simply multiply the percent of that element by 75. The answer will be the ppm of the element per ounce of the fertilizer in 100 gallons of water.

Example: 20-10-20 contains 20% Nitrogen. 20% multiplied by 75 is 15, which is the ppm of Nitrogen in 1 ounce of 20-10-20 per 100 gallons of water. Therefore, if 200 ppm N is desired, divide 200 by 15 = 13.3 oz. 13.3 oz of 20-10-20 are required to produce a 200 ppm N solution in 100 gallons of water.

A simple formula can also be used: ppm desired divided by 75 divided by the decimal expression of nutrient desired = oz of fertilizer to use in 100 gals water.

Example: how much 20-10-20 fertilizer should you use to obtain a 200 ppm Nitrogen solution?

\[
\frac{200 \text{ ppm}}{75} = 13.3 \text{ oz/100 gals of water}
\]

### U.S. and Metric Equivalents

### Linear Measure
- 1 inch = 2.54 centimeters
- 1 foot = 0.3048 meters
- 1 yard = 0.9144 meters
- 1 mile = 1.6093 kilometers
- 1.0936 yard = 1 meter
- 0.5280 ft = 1 kilometer

### Square Measure
- 1 sq inch = 6.4516 sq centimeters
- 1 sq foot = 0.092903 sq meters
- 1 sq yard = 0.09304 sq meters
- 1 sq mile = 2.59 square kilometers
- 1 acre = 0.4047 square kilometers
- 1 hectare = 10,000 sq meters

### Cubic Measure
- 1 cubic inch = 16.387 cu centimeters
- 1 cubic foot = 0.028317 cubic meter
- 1 cubic yard = 0.76455 cubic meter
- 1 cubic mile = 1.6093 cubic kilometers

### Weight

- 1 ton (U.S. 2000 lbs) = 0.90718 metric tons
- 1 long ton (U.K. 2240 lbs) = 1.0160 metric tons
- 1 gram = 15.4323 grams
- 1 kilogram = 0.035274 ounce
- 1 metric ton = 2,204.6 pounds
- 1 metric ton = 1.1023 short tons
- 1 metric ton = 0.98421 long tons
- 1 metric ton = 2204.623 lbs

### Area

- 1 acre = 43,560 sq feet
- 4,840 sq yards
- 107,636.66 sq feet
- 4.84 acres

### Energy

- 1 foot pound = 1.35572 joules
- 1 horse power = 746 watts
- 1 calorie = 4.184 joules

### Common Constants

- Speed of light = 299,792,458 meters per second
- Gravitational acceleration at Earth's surface = 9.80665 meters per second squared

### Conversion of Energy

- 1 kilowatt hour = 3,600 watt hours
- 1 gigawatt hour = 3,600,000,000 watt hours

### Conversion of Power

- 1 horsepower = 746 watts
- 1 kilowatt = 1,000 watts
- 1 megawatt = 1,000,000 watts

### Conversion of Pressure

- 1 atmosphere = 14.696 pounds per square inch (psi)

### Conversion of Temperature

- 1 degree Fahrenheit = 1.8 degrees Celsius
- 1 degree Celsius = 33.8 degrees Fahrenheit

### Conversion of Mass

- 1 ton (2000 pounds) = 0.90718 metric tons
- 1 kilogram = 2.2046 pounds

### Conversion of Volume

- 1 cubic meter = 35.315 cubic feet
- 1 cubic meter = 1,000 liters

### Conversion of Length

- 1 meter = 39.37 inches
- 1 inch = 2.54 centimeters

### Conversion of Area

- 1 square meter = 10.76 square feet
- 1 square foot = 0.0929 square meters

### Conversion of Weight

- 1 kilogram = 2.2046 pounds
- 1 pound = 0.45359 kilograms

### Conversion of Energy

- 1 megawatt hour = 3,600,000,000 joules
- 1 joule = 0.001 watt seconds

### Conversion of Force

- 1 newton = 0.2248 pound force
- 1 pound force = 4.4482 newtons

### Conversion of Temperature

- 1 degree Celsius = 1.8 degrees Fahrenheit
- 1 degree Fahrenheit = 0.5556 degrees Celsius

### Conversion of Volume

- 1 liter = 0.0353 cubic feet
- 1 cubic foot = 28.3168 liters