

GENERAL ENGINEERING INFORMATION

ENGLISH STANDARD MEASURES

Long Measures

1 mile = 1760 yards = 5280 feet
1 yard = 3 feet = 36 inches
1 foot = 12 inches

Square Measure

1 square mile = 640 acres = 6400 square chains
1 acre = 10 square chains = 4840 square yards = 43,560 square feet
1 square rod = 30.25 square yards = 272.25 square feet = 625 square links
1 square yard = 9 square feet
1 square foot = 144 square inches
An acre is equal to a square, the side of which is 208.7 feet

Dry Measure

1 bushel (U.S. or Winchester struck bushel) = 1.2445 cubic foot = 2150.42 cubic inches
1 bushel = 4 pecks = 42 quarts = 64 pints
1 peck = 8 quarts = 16 pints
1 quart = 2 pints
1 heaped bushel = 1-1/4 struck bushel
1 cubic foot = 0.8036 struck bushel
1 British Imperial bushel = 8 Imperial gallons = 1.2837 cubic foot = 2218.19 cubic inches

Liquid Measure

1 U.S. gallon = 0.1337 cubic foot = 231 cubic inches = 4 quarts = 8 pints
1 quart = 2 pints = 8 gills
1 pint = 4 gills
1 British Imperial gallon = 1.2003 U.S. gallons = 277.27 cubic inches
1 cubic foot = 7.48 U.S. gallons
1 barrel = 31.5 U.S. gallons

METRIC SYSTEM OF MEASUREMENTS

The principle units are the meter for length, the liter for capacity, and the gram for weight. The following prefixes are used for sub-divisions and multiples: milli = 1/1000; centi = 1/100; deci = 1/10; deca = 10; hecto = 100; kilo = 1000.

Measure of Length

10 millimeters(mm) = 1 centimeter
10 centimeters = 1 decimeter(dm)
10 decimeters = 1 meter(m)
100 meters = 1 kilometer(km)

Measures of Weight

10 milligrams(mg) = 1 centigram(cg)
10 centigrams = 1 decigram(dg)
10 decigrams = 1 gram(g)
10 grams = 1 decagram(Dg)
10 decagrams = 1 hectogram(Hg)
10 hectograms = 1 kilogram(Kg)
1000 kilograms = 1 (metric) ton (T)

Square Measure

100 sq. millimeters(mm²) = 1 centigram
10 sq. centimeters = 1 sq. decimeter(dm²)
100 sq. decimeters = 1 sq. meter(m²)

Dry and Liquid Measure

10 millimeters(ml) = 1 centiliter(cl)
10 centiliters = 1 deciliter(dl)

Length Conversion Constants for Metric and U.S. Units

Millimeters x .039370 = inches
Meters x 39.370 = inches
Meters x 3.2808 = feet
Meters x 1.09361 = yards
Kilometers x 3280.8 feet
Kilometers x .62137 = statute miles
Kilometers x .53959 = nautical miles
Inches x 25.4001 = millimeters
Inches x .0254 = meters
Feet x .30480 = meters
Yards x .91440 = meters
Feet x .0003048 = kilometers
Statute miles x 1.60935 kilometers
Nautical miles x 1.85325 = kilometers

Circular and Angular Measure

60 seconds(") = 1 minute (')
60 minutes = 1 degree (°)
360 degrees = 1 circumference (C)
57.3 degrees = 1 radian
2 π radians = 1 circumference (C)

Temperature

The following equations are useful for converting temperature from one system to another:

F = degrees Fahrenheit; C = degrees Centigrade

Deg. C = (Deg. F 32) x 5/9

Deg. F = (Deg. C x 9/5) + 32

Avoirdupois or Commercial Weight

1 gross or long ton = 2240 pounds
1 net or short ton = 2000 pounds
1 pound = 16 ounces = 7000 grains
1 ounce = 16 drams = 437.5 grains

Cubic Measure

1 cubic yard = 27 cubic feet
1 cubic foot = 1728 cubic inches

The following measures are used for wood and masonry:

1 cord of wood = 4 x 4 x 8 feet = 128 cubic feet

1 perch of masonry = 16-1/2 x 1-1/2 x 1 foot = 24-3/4 cubic feet

Shipping Measure

For measuring entire internal capacity of a vessel:

1 register ton = 100 cubic feet

For Measurement of Cargo:

1 U.S. shipping ton = 40 cubic feet = 32.143 U.S. bushels = 32.16 Imperial bushels

British shipping ton = 42 cubic feet = 33.75 U.S. bushels = 32.72 Imperial bushels

Weight Conversion Constants for Metric and U.S. Units

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|--|---|
| Grams x 981 = dynes | Dynes x .0010193 = grams |
| Grams x 15.432 = grains | Grains x .0648 = grams |
| Grams x .03527 = ounces (Avd.) | Ounces (Avd.) x 28.35 = grams |
| Grams x 0.33818 = fluid ounces (water) | Fluid ounces (Water) x 29.57 = grams |
| Kilograms x 35.27 ounces (Avd.) | Ounces (Avd.) x .02835 = kilograms |
| Kilograms x 2.20462 = pounds (Avd.) | Pounds (Avd.) x .45359 = kilograms |
| Metric Tons (1000 Kg)x 1.0231 = Net ton (2000 lbs.) | Net ton (2000 lbs) x .90719 = metric tons (1000 Kg) |
| Metric tons (1000 Kg) x .98421 = gross tons (2240 lbs) | Gross ton (2240 lbs)x 1.01605 = Metric tons (1000 Kg) |

Area Conversion Constants for Metric and U.S. Units

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|--|---|
| Square millimeters x .00155 = sq. inches | Square inches x 645.163 = sq. millimeters |
| Square centimeters x .155 = sq. inches | Square inches x 6.45163 = sq. centimeters |
| Square meters x 10.76387 = sq. feet | Square feet x .0929 = sq. meters |
| Square meters x 1.19599 = sq. yards | Square yards x .83613 = square meters |
| Hectares x 2.47104 = acres | Acres x .40469 = hectares |
| Square kilometers x 247.104 = acres | Acres x .0040469 = sq. kilometers |
| Square kilometers x .3861 = sq. miles | Square miles x 2.5899 = sq. kilometers |

Volume Conversion Constants for Metric and U.S. Units

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|--|---|
| Cubic centimeters x .033818 = fluid ounces | Fluid ounces x 29.57 = cubic centimeters |
| Cubic centimeters x .061023 = cubic inches | Cubic inches x 16.387 = cubic centimeters |
| Cubic centimeters x .271 = fluid drams | Fluid drams x 3.69 = cubic centimeters |
| Liters x 61.023 = cubic inches | Cubic inches x .016387 = liters |
| Liters x 1.05668 = quarts | Quarts x .94636 = lites |
| Liters x .26417 = gallons | Gallons x 3.78543 = liters |
| Liters x .035317 = cubic feet | Cubic feet x 28.316 = liters |
| Hectoliters x 26.417 = gallons | Gallons x .0378543 = hectoliters |
| Hectoliters x 3.5317 = cubic feet | Cubic feet x .28316 = hectoliters |
| Hectoliters x 2.83794 = bushel | Bushels x .352379 = hectoliters |
| Hectoliters x .1308 cubic yards | Cubic yards x 7.645 hectoliters |
| Cubic meters x 264.17 = gallons | Gallons x .00378543 = cubic meters |
| Cubic meters x 35.317 = cubic feet | Cubic feet x .028316 = cubic metes |
| Cubic meters x 1.308 = cubic yards | Cubic yards x .7645 = cubic meters |

