USEFUL HVAC VALUES AND MULTIPLIERS

- 3.414 BTU per Watt
- One Kilowatt equals 3,415 BTU per hour
- 746 Watts per horsepower
- One Ton of cooling equals
  - 288,000 BTU per 24 hours
  - 12,000 BTU per hour
  - 200 BTU per minute
- 1 Therm = 100,000 BTU
- 7,000 grains = 1 pound
- One horsepower per ton @ 40 degree evaporator saturation temperature & 100 degree condensing temperature
- Atmospheric pressure @ sea level is 14.70 psia
- Gauge pressure equals psia minus 14.70
- Psia equals psig plus 14.70
- .24 specific heat of air
- .075 pounds per cubic foot (Density of standard air)
- 13.33 cubic feet per pound (Specific volume of standard air)
- 25,400 microns per inch
- 29.92 inches Hg (Standard sea level air pressure)
- 8760 hours in a year
- R-value of an inside air film is .68

Standard air is air at 70 degrees fahrenheit dry bulb, 0% relative humidity, at sea level.

USEFUL HVAC CONVERSION MEASURES

Length

1 Mile = 1,760 Yds. = 5,280 Ft. = 63,360 In. = 1.609 Km
1 Ft. = 0.3048 M = 30.48 Cm = 304.8 Mm
1 In. = 2.54 Cm = 25.4 Mm
1 Cm = 0.3937 In.
1 M = 39.37 In. = 3.2808 Ft. = 1.094 Yds.
1 Km = 3281 Ft. = 0.6214 Miles = 1094 Yds.
1 Fathom = 6 Feet = 1.828804 Meters
1 Furlong = 660 Feet

Weight

1 Gal. H_2O = 8.33 Lbs.H_2O
1 Lb. = 16 Oz. = 7,000 Grains = 0.4536 Kg
1 Ton = 2,000 Lbs. = 907 Kg
1 Kg = 2.205 Lbs.
1 Lb. Steam = 1 Lb.H_2O

Area

1 Sq. Ft. = 144 Sq. In.
1 Acre = 43,560 Sq. Ft. = 4840 Sq. Yds. = 0.4047 Hectares
1 Sq. Mile = 640 Acres
1 Sq. Yd. = 9 Sq. Ft. = 1296 Sq. In.
1 Hectare = 2.417 Acres
1 Sq. M = 1,550 Sq. In. = 0.0929 Sq. Ft. = 1.1968 Sq. Yds.

USEFUL HVAC CONVERSION MEASURES *(cont.)*

Volume

1 Cu. Yd. = 27 Cu. Ft. = 46,656 Cu. In. = 1616 Pints = 807.9 Quarts = 764.6 Liters
1 Cu. Ft. = 1,728 Cu. In.
1 Liter = 0.2642 Gallons = 1.057 Quarts = 2.113 Pints
1 Gallon = 4 Quarts = 8 Pints = 3.785 Liters
1 Cu. Meter = 61,023 Cu. In. = 0.02832 Cu. Ft. = 1.3093 Cu. Yds.

1 Barrel Oil = 42 Gallons Oil
1 Barrel Beer = 31.5 Gallons Beer
1 Barrel Wine = 31.0 Gallons Wine
1 Bushel = 1.2445 Cu. Ft. = 32 Quarts (Dry) = 64 Pints (Dry) = 4 Pecks

1 Hogshead = 63 Gallon = 8.42184 Cu. Ft.

Velocity

1 MPH = 5280 Ft./Hr. = 88 Ft./Min. = 1.467 Ft./Sec. = 0.8684 Knots
1 Knot = 1.1515 Mph = 1.8532 Km/Hr. = 1.0 Nautical Miles/Hr.
1 League = 3.0 Miles (Approx.)

Pressure

14.7 psi = 33.95 Ft. H_2O = 29.92 In. Hg = 407.2 In. W.G. = 2,116.8 Lbs./Sq. Ft.
1 psi = 2.307 Ft. H_2O = 2.036 In. Hg = 16 ounces = 27.7 In. WC
1 Ft. H_2O = 0.4335 psi = 62.43 Lbs./Sq. Ft.
1 Ounce = 1.73 In. WC

USEFUL HVAC CONVERSION MEASURES *(cont.)*

Air Density
Standard Air @ 60°F., 14.7 psi:

13.329 Cu. Ft./Lb. = 0.0750 Lbs./Cu. Ft.
1 Lb./Cu. Ft. = 177.72 Cu. Ft./Lbs.
1 Cu. Ft./Lb. = 0.00563 Lbs./Cu. Ft.
1 Kg/Cu M = 16.017 Lbs./Cu. Ft.
1 Cu. M/Kg = 0.0624 Cu. Ft./Lb.

Energy

1 HP = 0.746 KW = 746 Watts = 2,545 BTU/h ≈ 1.0 kVA
1 KW = 1,000 Watts = 3,413 BTU/h = 1.341 HP
1 Watt = 3.413 BTU/h
1 Ton Ac = 12,000 BTU/h Cooling = 15,000 BTU/h Heat Rejection
1 BTU/h = 1 BTU per hour
1 BHP = 34,500 BTU/h (33,472 BTU/h) = 34.5 Lb. Steam per hour = 34.5 Lb. H_2O/Hr. = 0.069 GPM = 4.14 GPH = 140 EDR (Sq. Ft. of Equivalent Radiation)
1 Therm = 100,000 BTU/h
1 MBH = 1,000 BTU/h
1 Lb. Stm./Hr. = 0.002 GPM
1 GPM = 500 Lbs. Steam per hour
EDR = Equivalent Direct Radiation
1 EDR = 0.000496 GPM = 0.25 Lbs. Steam Condensate per hour
1000 EDR = 0.496 GPM
1 EDR Hot Water = 150 BTU/h
1 EDR Steam = 240 BTU/h
1 EDR = 240 BTU/h (Up to 1,000 Ft. Above Sea Level)
1 EDR = 230 BTU/h (1,000 Ft–3,000 Ft. Above Sea Level)

USEFUL HVAC CONVERSION MEASURES *(cont.)*

1 EDR = 223 BTU/h (3,000 Ft.–5,000 Ft. Above Sea Level)
1 EDR = 216 BTU/h (5,000 Ft.–7,000 Ft. Above Sea Level)
1 EDR = 209 BTU/h (7,000 Ft.–10,000 Ft. Above Sea Level)

Flow

1 mgd (million gal. per day) = 1.547 Cu. Ft./Sec. = 694.4 GPM
1 Cu.Ft/Min. = 62.43 Lbs. H_2O/Min. = 448.8 Gal. per hour

Metric Conversions

KJ/Hr	=	BTU/h × 1.055
CMM	=	CFM × 0.02832
LPM	=	GPM × 3.785
KJ/Lb.	=	BTU/lb. × 2.326
Meters	=	Feet × 0.3048
Sq. Meters	=	Sq. Feet × 0.0929
Cu. Meters	=	Cu. Feet × 0.02832
Kg	=	Pounds × 0.4536
Kg/Cu. Meter	=	Pounds/Cu. Ft. × 16.017 (Density)
Cu. Meters/Kg	=	Cu. Ft./Pound × 0.0624 (Specific Volume)
Kg H_2O/Kg DA	=	Gr H_2O/Lb. DA/7,000 = Lb.H_2O/Lb DA

METRIC LIQUID VOLUME EQUIVALENTS	
Metric	**U.S.**
3.7854 L	1 gallon
0.946 L	1 quart
0.473 L	1 pint
1 L	0.264 gallons
1 L	33.814 ounces
29.576 ml	1 fluid ounce
236.584 ml	1 cup

METRIC LENGTH EQUIVALENTS	
Metric	**U.S.**
1 m	39.37 inches
1 m	3.28 feet
1 m	1.094 yards
1 m	.0016 mile
1 km	0.625 miles
1.609 km	1 mile
25.4 mm	1 inch
2.54 cm	1 inch
304.8 mm	1 foot
1 mm	0.03937 inch
1 cm	0.3937 inch
1 dm	3.937 inches

METRIC PRESSURE CONVERSIONS	
Measurement	**Equivalent**
1 pound per square inch (psi)	6.8947 kPa
1 m column of water	9.794 kPa
10.2 cm of water	1 kPa
1 cm column of mercury	1.3332 kPa
1 inch of mercury (inHg)	3.3864 kPa
6 cm of mercury	8 kPa