

Thermal conductivity (heat transferred per unit time per unit area, and per degree per unit length)..... k

$$k = \frac{\frac{q}{A}}{(t_1 - t_2)/L}$$

Surface coefficient of heat transfer, Film coefficient of heat transfer, Individual coefficient of heat transfer (heat transferred per unit time per unit area per degree)..... f

$$f = \frac{\frac{q}{A}}{t_1 - t_2}$$

(In general f is not equal to k/L , where L is the actual thickness of the fluid film).

Over-all coefficient of heat transfer, Thermal transmittance per unit area (heat transferred per unit time per unit area per degree over-all)..... U

$$U = \frac{\frac{q}{A}}{t_1 - t_2}$$

Thermal transmission (heat transferred per unit time)..... q

$$q = \frac{Q}{t}$$

Thermal resistance (degrees per unit of heat transferred per unit time)..... R

$$R = \frac{t_1 - t_2}{q} = \frac{L}{kA}$$

Thermal resistivity..... $1/k$

Vaporization values at constant pressure, Differences between values for saturated vapor and saturated liquid at the same pressure.....*Subscript* t_g

Velocity..... V

Volume (total)..... V

Volume per unit time, Rate at which quantity of material passes through a machine, Quantity of heat per unit time, Quantity of heat per unit weight..... q

Watt..... w

Watthour..... whr

Weight of a major item, Total weight..... W

Weight rate, Weight per unit of power, Weight per unit of time..... w

Work (total)..... W

CONVERSION EQUATIONS

Fahrenheit degrees = $9/5$ (centigrade degrees) + 32.

Centigrade degrees = $5/9$ (Fahrenheit degrees - 32).

Absolute temperature, expressed in Fahrenheit degrees = Fahrenheit degrees + 459.6. In heating and ventilating work, 460 is usually used.

Absolute temperature, expressed in centigrade degrees = centigrade degrees + 273.1.

Power, Heat, and Work

1 ton refrigeration = { 12,000 Btu per hour
200 Btu per minute

Latent heat of ice = 143.33 Btu per pound

1 Btu = { 777.5 ft-lb
0.293 whr
252.02 mean calories

1 watthour = { 2,655.2 ft-lb
3.415 Btu
3600 joules
860.648 mean calories

1 kilowatthour = { 3,415 Btu
3.52 lb water evaporated from
and at 212 F
34.15 lb water raised 100 F

1 mean calorie = { 0.003968 Btu
3.085 ft-lb
0.0011619 whr

1 kilowatt (1000 watts) = { 1.3405 hp
56.92 Btu per minute
44,252.7 ft-lb per minute

1 horsepower = { 0.746 kw
42.44 Btu per minute
33,000 ft-lb per minute
550 ft-lb per second

1 boiler horsepower = { 33,471.9 Btu per hour
9.80 kw

Weight and Volume

1 gal (U. S.) = { 231 cu in.
0.13368 cu ft

1 British or Imperial gallon = 277.274 cu in.

1 cu ft = { 7.4805 gal
1728 cu in.

1 cu ft water at 60 F = 62.37 lb

1 cu ft water at 212 F = 59.76 lb

1 gal water at 60 F = 8.34 lb

1 gal water at 212 F = 7.99 lb

1 lb (avdp) = { 16 oz
7000 grains

1 bushel = 1.244 cu ft

1 short ton = 2000 lb

1 long ton = 2240 lb

Pressure

1 lb per square inch = { 144 lb per square foot
2.0416 in. mercury at 62 F
2.309 ft water at 62 F
27.71 in. water at 62 F

1 oz per square inch = { 0.1276 in. mercury at 62 F
1.732 in. water at 62 F