

HEATING VENTILATING AIR CONDITIONING GUIDE 1942

Micron.....	μ (mu)
Miles per hour.....	mph
Millimeter.....	mm
Minute.....	min
Molecular weight.....	mol. wt
Mol.....	mol
Ounce.....	oz
Pound.....	lb
Power, Horsepower, Work per unit time.....	P
Pressure, Absolute pressure, Gage pressure, Force per unit area.....	p
Quantity (total) of fluid, water, gas, heat; Quantity by volume; Total quantity of heat transferred.....	Q
Quality of steam, Pounds of dry steam per pound of mixture.....	x
Revolutions per minute.....	rpm
Saturated liquid at saturation pressure and temperature, Liquid in contact with vapor.....	Subscript <i>t</i>
Second.....	sec
Specific gravity.....	sp gr
Specific heat.....	sp ht or c
Specific heat at constant pressure.....	c_p
Specific heat at constant volume.....	c_v
Specific volume, Volume per unit weight, Volume per unit mass.....	v
Square foot.....	sq ft
Square inch.....	sq in.
Temperature (ordinary) F or C. (<i>Theta</i> is used preferably only when <i>t</i> is used for Time in the same discussion).....	<i>t</i> or θ (<i>theta</i>)
Temperature (absolute) F abs or K. (Capital <i>theta</i> is used preferably only when small <i>theta</i> is used for ordinary temperature).....	<i>T</i> or Θ (<i>capital theta</i>)
Thermal conductance* (heat transferred per unit time per degree).....	C

$$C = \frac{1}{R} = \frac{kA}{L} = \frac{q}{t_1 - t_2}$$

Thermal conductance per unit area, Unit conductance (heat transferred per unit time per unit area per degree)..... C_a

$$C_a = \frac{C}{A} = \frac{1}{RA} = \frac{q}{A(t_1 - t_2)} = \frac{k}{L}$$

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

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

*Terms ending *ivity* designate properties independent of size or shape, sometimes called *specific properties*. Examples: conductivity, resistivity. Terms ending *ance* designate quantities depending not only on the material, but also upon size and shape, sometimes called *total quantities*. Examples: conductance, transmittance. Terms ending *ion* designate rate of heat transfer. Examples: conduction, transmission.

CHAPTER 47. TERMINOLOGY

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 *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

Heat, Power and Work

1 ton refrigeration	= { 12,000 Btu per hour 200 Btu per minute
Latent heat of ice	= 143.4 Btu per pound
1 Btu	= { 778.26 ft-lb 0.293 whr 252 mean calories 2,655 ft-lb 3.413 Btu 3600 joules 860 mean calories 3,413 Btu
1 watthour	= { 3.517 lb water evaporated from and at 212 F 1.341 hp
1 kilowatthour	= { 56.88 Btu per minute 44,253 ft-lb per minute 3,969 Btu
1 kilowatt (1000 watts)	= { 3087 ft-lb 1.1627 whr 0.746 kw
1000 mean calorie } 1 kilogram calorie }	= { 42.42 Btu per minute 33,000 ft-lb per minute 550 ft-lb per second 33,475 Btu per hour 9.808 kw
1 horsepower	= { 231 cu in. 0.1337 cu ft
1 boiler horsepower	= 277.42 cu in.
Weight and Volume	= { 7.48 gal 1728 cu in.

Weight and Volume

1 gal (U. S.)	= { 231 cu in. 0.1337 cu ft
1 British or Imperial gallon	= 277.42 cu in.
1 cu ft	= { 7.48 gal 1728 cu in.
1 cu ft water at 60 F	= 62.37 lb
1 cu ft water at 212 F	= 59.83 lb
1 gal water at 60 F	= 8.34 lb
1 gal water at 212 F	= 7.998 lb
1 lb (avdp)	= { 16 oz 7000 grains
1 bushel	= 1.244 cu ft
1 short ton	= 2000 lb