

HEATING VENTILATING AIR CONDITIONING GUIDE 1940

Mechanical equivalent of heat.....	J
Melting point.....	mp
Meter.....	m
Micron.....	μ (mu)
Miles per hour.....	mph
Minute.....	min
Molecular weight.....	mol. wt
Mol.....	mol
Ounce.....	oz
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 t
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).....	t 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).....	T or Θ (<i>capital theta</i>)
Thermal conductance ⁸ (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

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

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).....f⁴

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

(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

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

⁸Terms ending *ity* 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 46. 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 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

Watt-hour.....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	= 143.5 Btu per pound
1 Btu	= { 778 ft-lb 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 kilowatthour	= { 1.341 hp 56.88 Btu per minute 44,253 ft-lb per minute 3,969 Btu 3087 ft-lb 1.1627 whr 0.746 kw
1 kilowatt (1000 watts)	= { 42.42 Btu per minute 33,000 ft-lb per minute 550 ft-lb per second 33,475 Btu per hour 9.808 kw
1000 mean calorie }	
1 kilogram calorie }	
1 horsepower	
1 boiler horsepower	

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