Karma (PTY) LTD Instrumentation & Control

CONVERSION FACTORS: METRIC AND IMPERIAL UNITS TO SI UNITS

SPECIFIC HEAT

(mass basis; heat/mass x degree temperature)

Unit	J (kg °C)$^{-1}$	kcal (kg °C)$^{-1}$	Btu (lb °F)$^{-1}$	ft (lbf °F)$^{-1}$	kgf m (kg °C)$^{-1}$
J (kg °C)$^{-1}$	1	0.238846 x 10^{-3}	0.238846 x 10^{-3}	0.185863	0.101972
kcal (kg °C)$^{-1}$	4186.8	1	1	778.169	426.935
Btu (lb °F)$^{-1}$	4186.8	1	1	778.169	426.935
ft (lbf °F)$^{-1}$	5.3803	0.00128507	0.00128507	1	0.54864
kgf m (kg °C)$^{-1}$	9.80665	0.00234228	0.00234228	1.82269	2

SPECIFIC HEAT CAPACITY

Bty = British thermal units (volume basis; heat/mass x degree temperature)

Unit	J m^{-3} °C^{-1}	Kcal m^{-3} °C	Btu ft^{-3} °F^{-1}
J m^{-3} °C^{-1}	1	0.238846 x 10^{-3}	0.0149107 x 10^{-3}
Kcal m^{-3} °C	4186.8	1	0.062428
Btu ft^{-3} °F^{-1}	67066.1	16.0185	1

CALORIFIC VALUE (MASS)

(mass basis; heat/mass) (specific energy, specific latent heat)

Unit	J kg^{-1}	Cal kg^{-1}	Btu lb^{-1}	Ft lbf lb^{-1}	kgf m kg^{-1}
J kg^{-1}	1	0.238846 x 10^{-3}	0.429923 x 10^{-3}	0.334558	0.101972
kcal kg^{-1}	4186.8	1	1.8	1400.7	426935
Btu lb^{-1}	2326	0.555556	1	778.169	237.186
ft lbf lb^{-1}	2.98907	0.713926 x 10^{-3}	1.28507 x 10^{-3}	1	0.3048
kgf m kg^{-1}	9.806665	2.34228 x 10^{-3}	4.2161 x 10^{-3}	3.28084	1

CALORIFIC VALUE (VOLUME)

(volume basis ; heat/volume)

Unit	J cm^{-3}	kcal m^{-3}	Btu ft^{-3}
J cm^{-3}	1	238.846	26.8392
kcal m^{-3}	0.004186	1	0.11237
Btu ft^{-3}	0.0372589	8.89915	1

For gases it is assumed that the values involved in conversion are measured under the same conditions of temperature and pressure.

THERMAL CONDUCTANCE

(heat/area x time x degree temperature)

Unit	W m^{-2} °C^{-1}	kcal m^{-3}/Cal m^{-1}	Btu ft^{-2} h^{-1} °F^{-1}	kcal m^{-2} h^{-1} °C^{-1}
W m^{-2} °C^{-1}	1	0.238846	0.17611	0.859845
cal m^{-2} s^{-1} °C^{-1}	4.1868	1	0.737338	3.6
Btu ft^{-2} h^{-1} °F^{-1}	5.67826	1.35623	1	4.88243
kcal m^{-2} h^{-1} °C^{-1}	1.163	0.277778	0.204816	1