

ENERGY - WORK - QUANTITY OF HEAT

Unit	J = 1 Mn	W h	kgf m	lbf ft	cal	Btu
J	1	0.27778×10^{-3}	0.101971621	0.7375621	0.238846	0.947817×10^{-3}
W h	3600	1	367.09786	2655224	859.8456	3.412141
kgf m	9.80665	2.7241×10^{-3}	1	7.233013	2.348279	9.294901×10^{-3}
lbf ft	1.355818	3.76616×10^{-3}	0.138255	1	0.323832	1.2851×10^{-3}
cal	4.1868	0.001163	0.42935	3.088024	1	3.968318×10^{-3}
Btu	1055.056	0.2933071	107.5858	778.16931	251.9959	1

1 pdl ft = 0.04214011 J 1 Centigrade Heat Unit (CHU) = 1.8 Btu 1 them = 105.506MJ
 1 thermie = 4.1855 MJ The calorie used is the International Steam Table Calorie

EQUIVALENT MERCURY OF WATER COLUMN PRESSURES

Unit	N m ⁻² (Pa)	(torr) mm Hg	in Hg	mm H ₂ O	in H ₂ O	atm
N m ⁻²	1	7.50062×10^{-3}	0.2953×10^{-3}	0.101974	4.01474×10^{-3}	9.86923×10^{-6}
mm Hg	133.322	1	0.03937	13.5955	0.535255	1.31579×10^{-3}
in Hg	3386.39	25.4	1	345.325	13.5955	0.033421
mm H ₂ O	9.80638	0.073554	0.002896	1	0.03937	0.096771×10^{-3}
in H ₂ O	249.082	1.86827	0.073554	25.4	1	0.002458
atm	101.325×10^3	760	29.9213	10.3326×10^3	406.794	1

1 mm Hg = 1 torr Mercury column values based on t = 0 °C, p = 760 mm Hg, g_n = 2.80665 m s⁻²

Water column values are based on t = 4 °C, p = 760 mm Hg, g_n = 2.80665 m s⁻²

The french abbreviation for water column is CE; the German equivalent is WS

For any other values of temperature and pressure and local values of 'g' the table values will require to be altered pn for Hg = 13595.1 kg m⁻³; on for water = 999.972 kg m⁻³

HEATING CALCULATIONS

Heating Sheet metal from 20 - 400° C in 5 minutes

$$P_{\text{theor}} = b \cdot l \cdot d \cdot p \cdot c \cdot \Delta T / t$$

P = heating power (kW)

b = width (m)

l = length (m)

d = thickness (m)

p = density (kg/m³)

c = specific heat capacity (kj/kgK)

ΔT = Temperature increase (K)

t = heating time

n = efficiency

m = mass (kg)

Data

b = 0.8

l = 2.0

d = 0.02

ΔT = 380

p = 7.8×10^3

c = 0.46

t = 300

n = 0.55