

## Appendix B

### Units and Conversion Factors

#### Length

*1 centimeter (cm)*  
= 0.3937 inches

*1 inch (in)*  
= 2.540 centimeters

*1 meter (m)*  
= 3.281 feet

*1 foot (ft) = 12 inches*  
= 0.3048 meters

*1 kilometer (km)*  
= 0.6214 miles

*1 mile = 5280 feet*  
= 1.609 kilometers

#### Area

*1 square centimeter (cm<sup>2</sup>)*  
= 0.1550 square inches

*1 square inch (in<sup>2</sup>)*  
= 6.452 square centimeters

*1 square meter (m<sup>2</sup>)*  
= 10.76 square feet

*1 square foot (ft<sup>2</sup>)*  
= 0.09290 square meters

*1 hectare (ha) = 10,000 square meters*  
= 2.471 acres

*1 acre = 43,560 square feet*  
= 0.4047 hectares

*1 square kilometer (km<sup>2</sup>) = 100 hectares*  
= 0.3861 square miles

*1 square mile = 640 acres*  
= 2.590 square kilometers

#### Volume

*1 cubic centimeter (cm<sup>3</sup>) = 1 milliliter (ml)*  
= 0.06102 cubic inches

*1 cubic inch (in<sup>3</sup>)*  
= 16.39 cubic centimeters

*1 liter (l) = 1,000 cubic centimeters*  
= 0.2642 gallons (liquid, U.S.)

*1 gallon (liquid, U.S.) = 231.0 cubic inches*  
= 3.785 liters

*1 cubic meter (m<sup>3</sup>) = 1,000 liters*  
= 35.31 cubic feet

*1 cubic foot (ft<sup>3</sup>) = 7.481 gallons (liquid, U.S.)*  
= 0.02832 cubic meters

*1 barrel (bbl) (oil, US) = 42 gallons (liquid, US)*  
= 159.0 liters

*1 cord (U.S.) = 128.0 cubic feet*  
= 3.625 cubic meters

*1 gram (g)*  
= 0.03527 ounces

*1 kilogram (kg)*  
= 2.205 pounds

*1 metric tonne (t) = 1,000 kilograms*  
= 1.1023 short tons (U.S.)

*1 joule (J)*  
= 0.2388 calories (International Table)

*1000 joules (J)*  
= 0.9479 Btu

*1 kilowatthour (kWh) = 3.600 x 10<sup>6</sup> joules*  
= 3,412 British thermal units

*1 watt (W) = 1 joule per second*  
= 3.412 British thermal units per hour

*1 kilowatt (kW)*  
= 0.9478 British thermal units per second  
= 1.341 horsepower (imperial)

*From Centigrade(°C) to Fahrenheit(°F):*  
 $(^{\circ}\text{C} \times 9/5) + 32 = ^{\circ}\text{F}$

## Weight

*1 ounce (oz)*  
= 28.35 grams

*1 pound (lb) = 16 ounces*  
= 0.4536 kilograms

*1 short ton (U.S.) = 2,000 pounds*  
= 0.9072 metric tonnes

## Energy

*1 calorie (International Table)*  
= 4.187 joules

*1 British thermal unit (Btu) = 252.0 calories*  
= 1055 joules

*1 quad = 1 x 10<sup>15</sup> British thermal units*  
= 2.931 x 10<sup>11</sup> kilowatthours

## Power

*1 British thermal unit per hour (Btu/h)*  
= 0.2931 watts

*1 British thermal unit per second (Btu/s)*  
= 1.055 kilowatts

*1 horsepower (hp) (imperial) = 0.7068 British thermal units per second*  
= 0.7457 kilowatts

## Temperature

*From Fahrenheit(°F) to Centigrade(°C):*  
 $(^{\circ}\text{F} - 32) \times 5/9 = ^{\circ}\text{C}$

### Prefixes in the International System of Units

Multiplier	Symbol	Prefix
$10^{18}$	E	exa
$10^{15}$	P	peta
$10^{12}$	T	tera
$10^9$	G	giga
$10^6$	M	mega
$10^3$	k	kilo
$10^2$	h	hecto
$10^1$	da	deca
$10^{-1}$	d	deci
$10^{-2}$	c	centi
$10^{-3}$	m	milli
$10^{-6}$	$\mu$	micro
$10^{-9}$	n	nano

### Approximate Carbon and Thermal Conversion Factors

Fuel	Density (kg/liter)	Carbon <sup>a</sup> (kg C/GJ)	Energy
Coal (bituminous)		24.4	20.5 MMBtu/ton 23.8MJ/kg
Oil (crude)	0.744	18.9	5.8 MMBtu/Bbl
Natural Gas	1000 cubic feet = 19.18 kg	13.6	1025 Btu/cf
Ethanol	0.792	17.8	26.8 MJ/kg
Wood	0.7-0.8	NA	18-20 MJ/kg

<sup>a</sup> 1 kilogram of carbon is equivalent to 3.667 kgs. Of carbon dioxide measures at full molecular weight