

ภาคผนวก จ
มาตราชั่งวัดและการเปลี่ยนหน่วย

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(ดัดแปลงจาก Milne, 1995; Lalli & Parsons, 1997)

Metric prefixes

Number	Name	Prefix
10^{12} = 1,000,000,000,000	trillion	tera-
10^9 = 1,000,000,000	billion	giga-
10^6 = 1,000,000	million	mega-
10^3 = 1,000	thousand	kilo-
10^2 = 100	hundred	hecto-
10^1 = 10	ten	deka-
10^{-1} = 0.1	tenth	deci-
10^{-2} = 0.01	hundredth	centi-
10^{-3} = 0.001	thousandth	milli-
10^{-6} = 0.000001	millionth	micro-
10^{-9} = 0.000000001	billionth	nano-
10^{-12} = 0.000000000001	trillionth	pico-

Mass and weight

Unit	Equivalent	Mass (M) or weight (W)
1 milligram (1 mg)	= 0.001 gram (g)	M
1 gram (1 g)	= 1000 mg weighs 0.035 oz	M W
1 kilogram (1 kg)	= 1000 g weighs 2.21 pounds (lb)	M W
1 metric ton (= 1 tonne = 1 “long ton”)	= 1000 kg weighs 2,205 lb weighs 1.01 tons	M W W
1 ton (= 1 “short ton”)	= 2000 lb	W

Length

Unit	=	Equivalent
1 ångstrom (Å)	=	0.0001 micrometer
1 nanometer (nm)	=	10^{-9} meters
1 micrometer (1 μm)	=	0.001 millimeter or 10^{-3} mm or 10^{-6} meter
1 millimeter (1 mm)	=	1,000 micrometers or 0.1 centimeter or 0.001 meter
1 centimeter (1 cm)	=	10 millimeters or 0.39 inch
1 decimeter (1 dm)	=	0.1 meter
1 meter (1 m)	=	100 centimeters or 39.4 inches or 3.28 feet or 1.09 yards
1 kilometer (1 km)	=	1,000 meters or 3,280 feet or 1,093 yards or 0.62 statute mile
1 inch (1 in)	=	25.4 millimeters or 2.54 centimeters
1 foot (1 ft)	=	12 inches or 30.5 centimeters
1 yard (1 yd)	=	3 feet or 0.91 meter
1 fathom	=	6 feet or 1.83 meter
1 statute mile (1 mi)	=	5,280 feet or 1.609 kilometers or 0.87 nautical miles
1 nautical mile (1 nmi)	=	1.15 statute miles or 1 minute of latitude or 1.85 kilometers

Concentration

Unit	Equivalent		
	amount of substance	present in	amount of solution
1 part per billion (1 ppb)	= 1 nanogram	present in	1 gram (1 ng/g)
	1 microgram	present in	1 kilogram (1 $\mu\text{g}/\text{kg}$)
	= 0.001 parts per million (0.001 ppm)		
1 part per million (1 ppm)	= 1 microgram	present in	1 gram ($\mu\text{g}/\text{g}$)
	1 milligram	present in	1 kilogram (1 mg/kg)
	1,000 parts per billion (1,000 ppb)		
	0.001 parts per thousand (0.001 ppt or 0.001 ‰)		
1 part per thousand (1 ppt = 1 ‰)	= 1 milligram	present in	1 gram (1 mg/g)
	1 gram	present in	1 kilogram (1 g/kg)
	= 1,000 parts per million (1,000 ppm)		
Molar concentration (M)	=	gram molecular weight per liter	
$\mu\text{g liter}^{-1}$ ($\mu\text{g}/\text{L}$)	=	mg m^{-3}	
part per billion	=	$\mu\text{g liter}^{-1}$	
part per million	=	mg/L	
mg/L \div molecular weight	=	μm	= $\mu\text{mol}/\text{L}$

Energy and power

Unit	Equivalent	
1 calorie (1 cal; physics)	=	4.18 joules (J)
1 calorie (1 cal; diet)	=	1000 calories (physics)
1 kilocalorie (1 kcal)	=	1000 calories
1 watt (1 W)	=	1 joule per second (J/sec)
		0.24 calories per second (cal/sec)
1 kilowatt (1 kW)	=	1000 joules per second (J/sec)
	=	240 calories per second (cal/sec)
1 horsepower (1 hp)	=	746 watts

Volume

Unit	Equivalent
1 cubic centimeter (1 cc, 1 cm ³)	= 1 milliliter (1 ml)
1 liter (1 L)	= 1000 cubic centimeters or 1.06 quarts or 0.26 gallon
1 cubic meter (1 m ³)	= 10 ⁶ cubic centimeters or 1,000 liters or 264.2 gallons or 4.80 barrels (55-gallon)
1 cubic kilometer (1 km ³)	= 10 ⁹ cubic meters or 0.24 cubic miles
1 cubic inch (1 in ³)	= 16.4 cubic centimeters
1 cubic foot (1 ft ³)	= 28.32 liters or 7.48 gallons

Pressure

Unit	Equivalent
1 atmosphere (1 atm)	= 14.7 pounds per square inch (lb/in ²) 1.013 X 10 ⁵ newtons per square meter (n/m ²) 1.013 X 10 ⁵ pascals (pa) 1,013 millibars (mb) the pressure exerted by 10.06 meters of seawater

Area

Unit	Equivalent
1 square centimeter (1 cm ²)	= 100 mm ² or 0.16 in ²
1 square meter (1 m ²)	= 10 ⁴ cm ² or 10.76 ft ² or 1.19 yd ²
1 square kilometer (1 km ²)	= 10 ⁶ m ² or 0.39 mile ² or 247.10 acres
1 hectare (ha)	= 10000 m ²

Temperature

Conversion of Celsius to Fahrenheit (exact)	$^{\circ}\text{F} = 1.8 \text{ X } ^{\circ}\text{C} + 32$
(approximate, one you can do in your head)	$^{\circ}\text{F} = 2 \text{ X } ^{\circ}\text{C} + 30$