

13.1: Appendix B- Conversion Factors

Table B1 - Length

	m	cm	km
1 meter	1	10^2	10^{-3}
1 centimeter	10^{-2}	1	10^{-5}
1 kilometer	10^3	10^5	1
1 inch	2.540×10^{-2}	2.540	2.540×10^{-5}
1 foot	0.3048	30.48	3.048×10^{-4}
1 mile	1609	1.609×10^4	1.609
1 angstrom	10^{-10}	10^{-8}	10^{-13}
1 fermi	10^{-15}	10^{-13}	10^{-18}
1 light-year	9.460×10^{15}	9.460×10^{17}	9.460×10^{12}

	in	ft	mi
1 meter	39.37	3.281	6.214×10^{-4}
1 centimeter	0.3937	3.281×10^{-2}	6.214×10^{-6}
1 kilometer	3.937×10^4	3.281×10^{-4}	0.6214
1 inch	1	8.333×10^{-2}	1.578×10^{-5}
1 foot	12	1	1.894×10^{-4}
1 mile	6.336×10^4	5280	1

Area

$$1 \text{ cm}^2 = 0.155 \text{ in}^2$$

$$1 \text{ m}^2 = 104 \text{ cm}^2 = 10.76 \text{ ft}^2$$

$$1 \text{ in}^2 = 6.452 \text{ cm}^2$$

$$1 \text{ ft}^2 = 144 \text{ in}^2 = 0.0929 \text{ m}^2$$

Volume

$$1 \text{ liter} = 1000 \text{ cm}^3 = 10^{-3} \text{ m}^3 = 0.03531 \text{ ft}^3 = 61.02 \text{ in}^3$$

$$1 \text{ ft}^3 = 0.02832 \text{ m}^3 = 28.32 \text{ liters} = 7.477 \text{ gallons}$$

$$1 \text{ gallon} = 3.788 \text{ liters}$$

Table B2 - Time

	s	min	h	day	yr
1 second	1	1.667×10^{-2}	2.778×10^{-4}	1.157×10^{-5}	3.169×10^{-8}
1 minute	60	1	1.667×10^{-2}	6.944×10^{-4}	1.901×10^{-6}
1 hour	3600	60	1	4.167×10^{-2}	1.141×10^{-4}
1 day	8.640×10^4	1440	24	1	2.738×10^{-3}

	s	min	h	day	yr
1 year	3.156×10^7	5.259×10^5	8.766×10^3	365.25	1

Table B3 - Speed

	m/s	cm/s	ft/s	mi/h
1 meter/second	1	10^2	3.281	2.237
1 centimeter/second	10^{-2}	1	3.281×10^{-2}	2.237×10^{-2}
1 foot/second	0.3048	30.48	1	0.6818
1 mile/hour	0.4470	44.70	1.467	1

Acceleration

$$1 \text{ m/s}^2 = 100 \text{ cm/s}^2 = 3.281 \text{ ft/s}^2$$

$$1 \text{ cm/s}^2 = 0.01 \text{ m/s}^2 = 0.03281 \text{ ft/s}^2$$

$$1 \text{ ft/s}^2 = 0.3048 \text{ m/s}^2 = 30.48 \text{ cm/s}^2$$

$$1 \text{ mi/h} \cdot \text{s} = 1.467 \text{ ft/s}^2$$

Table B4 - Mass

	kg	g	slug	u
1 kilogram	1	10^3	6.852×10^{-2}	6.024×10^{26}
1 gram	10^{-3}	1	6.852×10^{-5}	6.024×10^{23}
1 slug	14.59	1.459×10^4	1	8.789×10^{27}
1 atomic mass unit	1.661×10^{-27}	1.661×10^{-24}	1.138×10^{-28}	1
1 metric ton	1000			

Table B5 - Force

	N	dyne	lb
1 newton	1	10^5	0.2248
1 dyne	10^{-5}	1	2.248×10^{-6}
1 pound	4.448	4.448×10^5	1

Table B6 - Pressure

*Where the acceleration due to gravity is 9.80665 m/s^2 and the temperature is 0°C

	Pa	dyne/cm ²	atm	cm Hg	lb/in ²
1 pascal	1	10	9.869×10^{-6}	7.501×10^{-4}	1.450×10^{-4}
1 dyne/centimeter ²	0.1	1	9.869×10^{-7}	7.501×10^{-5}	1.450×10^{-5}
1 atmosphere	1.013×10^5	1.013×10^6	1	76	14.70
1 centimeter mercury*	1.333×10^3	1.333×10^4	1.316×10^{-2}	1	0.1934
1 pound/inch ²	6.895×10^3	6.895×10^4	6.805×10^{-2}	5.171	1

	Pa	dyne/cm ²	atm	cm Hg	lb/in ²
1 bar	10 ⁵				
1 torr				1 (mm Hg)	

Table B7 - Work, Energy, Heat

	J	erg	ft • lb	eV	cal	Btu
1 joule	1	10 ⁷	0.7376	6.242 x 10 ¹⁸	0.2389	9.481 x 10 ⁻⁴
1 erg	10 ⁻⁷	1	7.376 x 10 ⁻⁸	6.242 x 10 ¹¹	2.389 x 10 ⁻⁸	9.481 x 10 ⁻¹¹
1 foot-pound	1.356	1.356 x 10 ⁷	1	8.464 x 10 ¹⁸	0.3239	1.285 x 10 ⁻³
1 electron-volt	1.602 x 10 ⁻¹⁹	1.602 x 10 ⁻¹²	1.182 x 10 ⁻¹⁹	1	3.827 x 10 ⁻²⁰	1.519 x 10 ⁻²²
1 calorie	4.186	4.186 x 10 ⁷	3.088	2.613 x 10 ¹⁹	1	3.968 x 10 ⁻³
1 British thermal unit	1.055 x 10 ³	1.055 x 10 ¹⁰	7.779 x 10 ²	6.585 x 10 ²¹	2.520 x 10 ²	1
1 kilowatt-hour	3.600 x 10 ⁶					

Power

$$1 \text{ W} = 1 \text{ J/s}$$

$$1 \text{ hp} = 746 \text{ W} = 550 \text{ ft} \cdot \text{lb/s}$$

$$1 \text{ Btu/h} = 0.293 \text{ W}$$

Angle

$$1 \text{ rad} = 57.30^\circ = \frac{180^\circ}{\pi}$$

$$1^\circ = 0.01745 \text{ rad} = \frac{\pi}{180 \text{ rad}}$$

$$1 \text{ revolution} = 360^\circ = 2\pi \text{ rad}$$

$$1 \text{ rev/min (rpm)} = 0.1047 \text{ rad/s}$$

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