

## APPENDIX B

## Conversion Factors and Constants

B-1. Introduction. Table B-1 presents conversion factors for units of measure commonly used in the study of navigation. Table B-2 presents standard physical constants and properties.

Table B-1  
Conversion Factors

Multiply	By	To Obtain
<u>Length</u>		
feet	0.3048000	meters
miles (British nautical)	6,080.	feet
miles (Int. naut.)	6,076.1155	feet
miles (U.S. statute)	5,280.	feet
miles (U.S. statute)	1.609344	kilometers
miles (U.S. statute)	1,609.347	meters
fathoms	6.	feet
meters	3.2808399	feet
kilometers	3,281.	feet
miles (International nautical)	1,852.	meters
kilometers	1,000.	meters
yards	0.91440	meters
<u>Area</u>		
square meters	10.76391042	square feet
<u>Volume</u>		
cubic feet	28.31685	liters
barrels (U.S. oil)	42.	gallons (U.S.)
barrels (U.S. oil)	158.9873	liters
cubic feet	7.4805195	gallons (U.S. liquid)
liters	0.0010000	cubic meters
gallons (U.S. liquid)	3.785412	liters
<u>Velocity</u>		
knots	1.6878099	feet per second
knots	1.8532	kilometers per hour
knots	1.1507794	miles (U.S. statute)/hour
knots (international)	0.514444	meters per second
feet per second	1.09728	kilometers per hour
miles (U.S. statute) per hour	1.4666667	feet per second

Table B-1 (Continued)

Multiply	By	To Obtain
miles (U.S. statute) per hour meters/second	1.609344 2.2369363	kilometers per hour miles (U.S. statute)/hour
		<u>Weight</u>
kilograms	2.2046225	pounds
tons (long)	2,240.	pounds
tons (short)	2,000.	pounds
tons (metric)	1,000.	kilograms
tons (short, 2,000 pounds)	907.1847	kilograms
tons (long, 2,240 pounds)	1,016.047	kilograms
pounds (avdp)	0.4535924	kilograms
tons (long)	1.0160469	tons (metric)
tons (metric)	2,204.6226	pounds (avdp)
tons (metric)	2,679.2289	pounds (apot, troy)
		<u>Power</u>
horsepower	550.	foot-pounds per second
horsepower (550 foot-pounds per second)	745.7	watts
Btu (International Table)/second	1,055.056	watts
foot-pounds/second	1.355818	watts
		<u>Force</u>
pound (force)	4.448222	newtons
kilogram (force)	9.80665	newtons
ton (force) (long)	9,964.016332	newtons
		<u>Energy</u>
foot-pound	1.355818	joules
Btu (International Table)	1,055.056	joules
Btu	777.649	foot-pounds
		<u>Pressure</u>
pounds per square foot	47.88025964	newtons/square meter
pounds per square foot	47.88025964	pascal
pounds per square inch	6,894.757	newtons/square meter
atmosphere	101,325.0	newtons/square meter (pascals)

Table B-1 (Concluded)

Multiply	By	To Obtain
<u>Mass</u>		
slugs	14.59390	kilograms
slugs	32.1737	pounds (avdp)
slugs/cubic foot	515.379	kilograms/cubic meter
<u>Unit Weight</u>		
pounds per cubic foot	16.0184633	kilograms per cubic meter
pounds per cubic foot	157.087460	newtons/cubic meter
grams/cubic centimeter	62.427961	pounds per cubic foot
<u>Angles</u>		
radians	57.295779531	degrees
radians	57° 17' 44.80625"	degrees
degrees	0.017453292519943	radians

Table B-2  
Standard Physical Constants and Properties

Multiply	By	To Obtain
<u>Gravitational Acceleration</u>		
International standard value (sea level, 45-deg latitude)	32.1737 ft/sec <sup>2</sup>	9.80665 m/sec <sup>2</sup>
<u>Water Properties (59 °F, 3.5 percent salinity)</u>		
Density, slugs/ft <sup>3</sup>	Fresh 1.9384	Salt 1.9905
Density, kg/m <sup>3</sup>	999.00	1,025.87
Unit density, lb/ft <sup>3</sup>	62.366	64.043
Unit volume, ft <sup>3</sup> /long ton	35.917	34.977

Air Properties (59 °F, sea level)

Density, slugs/ft <sup>3</sup>	0.002378
Unit density, lb/ft <sup>3</sup>	0.076509