APPENDIX C

METRIC CONVERSION FACTORS
BASED ON THE INTERNATIONAL (SI) METRIC SYSTEM

To Convert From	To	Multiply By
Acceleration		
foot/second^2	meter/second^2 (m/s^2)	3.0480×10^{-1}
inch/second^2	meter/second^2 (m/s^2)	2.5400×10^{-2}
Area		
acre	meter^2 (m^2)	4.0469×10^{3}
foot^2	meter^2 (m^2)	9.2903×10^{-2}
inch^2	meter^2 (m^2)	6.4516×10^{-4}
mile^2 (U.S. Statute)	meter^2 (m^2)	2.5900×10^{6}
yard^2	meter^2 (m^2)	8.3613×10^{-1}
Energy (Work)		
foot-pound force	joule (J)	1.3558×10^{0}
foot-poundal	joule (J)	4.2140×10^{-2}
Force		
kip	newton (N)	4.4482×10^{3}
ounce force (avoir.)	newton (N)	2.7801×10^{-1}
pound force (avoir.)	newton (N)	4.4482×10^{0}
poundal	newton (N)	1.3826×10^{-1}

To Convert From	To	Multiply By
Force/Area (Pressure or Stress)		
atmosphere (normal)	pascal (Pa)	1.0133×10^{5}
foot of water (39.2°F)	pascal (Pa)	2.9890×10^{3}
inch of mercury (32°F)	pascal (Pa)	3.3864×10^{3}
inch of water (39.2°F)	pascal (Pa)	2.4908×10^{2}
kip/inch^2 (ksi)	pascal (Pa)	6.8948×10^{6}
poundal/foot^2	pascal (Pa)	1.4882×10^{0}
pound force/foot^2	pascal (Pa)	4.7880×10^{1}
pound force/inch^2 (psi)	pascal (Pa)	6.8948×10^{3}
Force/Length		
kip/foot	newton/meter (N/m)	1.4594×10^{4}
pound force/inch	newton/meter (N/m)	1.7513×10^{2}
pound force/foot	newton/meter (N/m)	1.4594×10^{1}
Length		
fathom	meter (m)	1.8288×10^{0}
foot	meter (m)	3.0480×10^{-1}
inch	meter (m)	2.5400×10^{-2}
inch	centimeter (cm)	2.5400×10^{0}
mile (U.S. statute)	meter (m)	1.6093×10^{3}
mile (U.S. nautical)	meter (m)	1.8520×10^{3}
yard	meter (m)	9.1440×10^{-1}

To Convert From	To	Multiply By
Mass		
Hundredweight (short)	kilogram (kg)	4.5359×10^{1}
ounce mass (avoir.)	kilogram (kg)	2.8350×10^{-2}
pound mass (avoir.)	kilogram (kg)	4.5359×10^{-1}
slug	kilogram (kg)	1.4594×10^{1}
ton (short)	kilogram (kg)	9.0718×10^{2}
ton (short)	metric ton (m ton)	9.0718×10^{-1}
Mass/Area		
ounce mass/foot^2	kilogram/meter^2 (kg/m^2)	3.0515×10^{-1}
ounce mass/inch^2	kilogram/meter^2 (kg/m^2)	4.3942×10^{1}
ounce mass/yard^2	kilogram/meter^2 (kg/m^2)	3.3906×10^{-2}
pound mass/foot^2	kilogram/meter^2 (kg/m^2)	4.8824×10^{0}
pound mass/inch^2	kilogram/meter^2 (kg/m^2)	7.0307×10^{2}
pound mass/yard^2	kilogram/meter^2 (kg/m^2)	5.4249×10^{-1}
tons (short)/foot^2	kilogram/meter^2 (kg/m^2)	9.7649×10^{3}
tons (short)/yard^2	kilogram/meter^2 (kg/m^2)	1.0850×10^{3}
Mass/Length		
pound mass/foot	kilogram/meter (kg/m)	1.4882×10^{0}
pound mass/inch	kilogram/meter (kg/m)	1.7858×10^{1}
pound mass/yard	kilogram/meter (kg/m)	4.9605×10^{-1}

To Convert From	To	Multiply By
Mass/Volume		
ounce (avoir.)/gallon (U.S. liq.)	kilogram/meter^3 (kg/m^3)	7.4892×10^0
ounce (avoir.) mass/inch^3	kilogram/meter^3 (kg/m^3)	1.7300×10^3
pound mass/foot^3	kilogram/meter^3 (kg/m^3)	1.6018×10^1
pound mass/inch^3	kilogram/meter^3 (kg/m^3)	2.7680×10^4
pound mass/gallon (U.S. liq.)	kilogram/meter^3 (kg/m^3)	1.1983×10^2
slug/foot^3	kilogram/meter^3 (kg/m^3)	5.1538×10^2
ton (short)/foot^3	kilogram/meter^3 (kg/m^3)	3.2037×10^4
ton (short)/yard^3	kilogram/meter^3 (kg/m^3)	1.1866×10^3
Moment or Torque		
kip force-foot	newton-meter (N.m)	1.3558×10^3
ounce force-inch	newton-meter (N.m)	7.0616×10^{-3}
pound force-inch	newton-meter (N.m)	1.1298×10^{-1}
pound force-foot	newton-meter (N.m)	1.3558×10^0
Power		
foot-pound force/hour	watt (W)	3.7662×10^{-4}
foot-pound force/minute	watt (W)	2.2597×10^{-2}
foot-pound force/second	watt (W)	1.3558×10^0
horsepower (550 ft-lb/sec)	watt (W)	7.4570×10^2
horsepower (boiler)	watt (W)	9.8095×10^3

To Convert From	To	Multiply By
Plane Angle		
degree (angle)	radian (rad)	1.7453×10^{-2}
minute (angle)	radian (rad)	2.9089×10^{-4}
second (angle)	radian (rad)	4.8481×10^{-6}
Section Property		
moment of inertia in^4	$meter^4$ (m^4)	4.1623×10^{-7}
section modulus in^3	$meter^3$ (m^3)	1.6387×10^{-5}
Temperature		
degree Celsius	kelvin (K)	$tk = tc + 273.15$
degree Fahrenheit	kelvin (K)	$tk = (t_F + 459.67)/1.8$
degree Fahrenheit	degree Celsius	$tc = (t_F - 32)/1.8$
Velocity		
foot/hour	meter/second (m/s)	8.4667×10^{-5}
foot/minute	meter/second (m/s)	5.0800×10^{-3}
inch/minute	meter/second (m/s)	4.2333×10^{-4}
knot	meter/second (m/s)	5.1444×10^{-1}
knot	kilometer/hour (km/hr)	1.8520×10^{0}
mile/hour (U.S. statute)	meter/second (m/s)	4.4704×10^{-1}
mile/hour (U.S. statute)	kilometer/hour (km/hr)	1.6093×10^{0}
mile/minute (U.S. statute)	meter/second (m/s)	2.6822×10^{1}

To Convert From	To	Multiply By
Volume (Capacity)		
acre-foot	meter^3 (m^3)	1.2335×10^{3}
barrel (oil, 42 gal.)	meter^3 (m^3)	1.5899×10^{-1}
board foot	meter^3 (m^3)	2.3597×10^{-3}
bushel (U.S.)	meter^3 (m^3)	3.5239×10^{-2}
foot^3	meter^3 (m^3)	2.8317×10^{-2}
gallon (U.S. dry)	meter^3 (m^3)	4.4049×10^{-3}
gallon (U.S. liquid)	meter^3 (m^3)	3.7854×10^{-3}
inch^3	meter^3 (m^3)	1.6387×10^{-5}
ounce (U.S. fluid)	meter^3 (m^3)	2.9573×10^{-5}
peck (U.S.)	meter^3 (m^3)	8.8098×10^{-3}
pint (U.S. dry)	meter^3 (m^3)	5.5061×10^{-4}
pint (U.S. liquid)	meter^3 (m^3)	4.7318×10^{-4}
quart (U.S. dry)	meter^3 (m^3)	1.1012×10^{-3}
quart (U.S. liquid)	meter^3 (m^3)	9.4635×10^{-4}
ton (register)	meter^3 (m^3)	2.8317×10^{0}
yard^3	meter^3 (m^3)	7.6455×10^{-1}
Volume/Time		
barrel/day	meter^3/second (m^3/s)	1.8401×10^{-6}
barrel/hour	meter^3/second (m^3/s)	4.4163×10^{-5}
barrel/minute	meter^3/second (m^3/s)	2.6498×10^{-3}
foot^3/hour	meter^3/second (m^3/s)	7.8658×10^{-6}

To Convert From	To	Multiply By
Volume/Time (continued)		
foot^3/minute	meter^3/second (m^3/s)	4.7195×10^{-4}
gallon (U.S. liquid)/day	meter^3/second (m^3/s)	4.3813×10^{-8}
gallon (U.S. liquid)/hour	meter^3/second (m^3/s)	1.0515×10^{-6}
gallon (U.S. liquid)/minute	meter^3/second (m^3/s)	6.3090×10^{-5}
inch^3/hour	meter^3/second (m^3/s)	4.5520×10^{-9}
inch^3/minute	meter^3/second (m^3/s)	2.7312×10^{-7}
yard^3/day	meter^3/second (m^3/s)	8.8490×10^{-6}
yard^3/hour	meter^3/second (m^3/s)	2.1238×10^{-4}
yard^3/minute	meter^3/second (m^3/s)	1.2743×10^{-2}

SI PREFIXES AND MULTIPLICATION FACTORS

Prefix	Symbol	Factor	Prefix	Symbol	Factor
tera	T	10^{12}	centi	c	10^{-2}
giga	G	10^{9}	milli	m	10^{-3}
mega	M	10^{6}	micro	μ	10^{-6}
kilo	k	10^{3}	nano	n	10^{-9}
hecto	h	10^{2}	pico	p	10^{-12}
deka	da	10^{1}	femto	f	10^{-15}
deci	d	10^{-1}	atto	a	10^{-18}

BASE AND SUPPLEMENTARY SI UNITS

Quantity	Name	Symbol	Formula
Length	meter	m	-
Mass	kilogram	kg	-
Temperature	kelvin	K	-
Time	second	s	-
Energy	joule	J	N.m
Force	newton	N	$kg.m/s^2$
Frequency	hertz	Hz	s^{-1}
Power	watt	W	J/s
Pressure	pascal	Pa	N/m^2
Work	joule	J	N.m