

Weights and Measures
Metric Conversion Factors
(Symbols of SI units, multiples, and submultiples are given
in parentheses in the right hand column)

Multiply	By	To Obtain
LENGTH		
centimetre	0.03280840	foot
centimetre	0.3937008	inch
fathom	1.8288*	metre (m)
foot	0.3048*	metre (m)
foot	30.48*	centimetre (cm)
foot	304.8*	millimetre (mm)
inch	0.0254*	metre (m)
inch	2.54*	centimetre (cm)
inch	25.4*	millimetre (mm)
kilometre	0.6213712	mile (U.S. statute)
metre	39.37008	inch
metre	0.5468066	fathom
metre	3.280840	foot
metre	0.1988388	rod
metre	1.093613	yard
metre	0.0006213712	mile (U.S. statute)
microinch	0.0254*	micrometre (micron)
micrometre (micron)	39.37008	microinch
mile (U.S. statute)	1609.344*	metre (m)
mile (U.S. statute)	1.609344*	kilometre (km)
millimetre	0.003280840	foot
millimetre	0.03937008	inch
rod	5.0292*	metre (m)
yard	0.9144*	metre (m)

AREA		
acre	4046.856	metre ² (m ²)
acre	0.4046856	hectare
centimetre ²	0.1550003	inch ²
centimetre ²	0.001076391	foot ²
foot ²	0.09290304*	metre ² (m ²)
foot ²	929.0304*	centimetre ² (cm ²)
foot ²	92.903.04*	millimetre ² (mm ²)
hectare	2.471054	acre
inch ²	645.16*	millimetre ² (mm ²)
inch ²	6.4516*	centimetre ² (cm ²)
inch ²	0.00064516*	metre ² (m ²)
metre ²	1550.003	inch ²
metre ²	10.763910	foot ²
metre ²	1.195990	yard ²
metre ²	0.0002471054	acre
millimetre ²	0.00001076391	foot ²
millimetre ²	0.001550003	inch ²
yard ²	0.8361274	metre ² (m ²)
centimetre ³	0.06102376	inch ³
foot ³	0.02831685	metre ³ (m ³)
foot ³	28.31685	litre
gallon (U.K. liquid)	0.00546092	metre ³ (m ³)
gallon (U.K. liquid)	4.546092	litre
gallon (U.S. liquid)	0.003785412	metre ³ (m ³)
gallon (U.S. liquid)	3.785412	litre
inch ³	16,387.06	millimetre ³ (mm ³)
inch ³	16.38706	centimetre ³ (cm ³)
inch ³	0.00001638706	metre ³ (m ³)
litre	0.001*	metre ³ (m ³)
litre	0.2199692	gallon (U.K. liquid)
litre	0.2641720	gallon (U.S. liquid)

litre	0.03531466	foot ³
metre ³	219.9692	gallon (U.K. liquid)
metre ³	264.1720	gallon (U.S. liquid)
metre ³	35.31466	foot ³
metre ³	1.307951	yard ³
metre ³	1000.*	litre
metre ³	61,023.76	inch ³
millimetre ³	0.00006102376	inch ³
yard ³	0.7645549	metre ³ (m ³)

VELOCITY, ACCELERATION, and FLOW

centimetre/second	1.968504	foot/minute
centimetre/second	0.03280840	foot/second
centimetre/minute	0.3937008	inch/minute
foot/hour	0.00008466667	metre/second (m/s)
foot/hour	0.00508*	metre/minute
foot/hour	0.3048*	metre/hour
foot/minute	0.508*	centimetre/second
foot/minute	18.288*	metre/hour
foot/minute	0.3048*	metre/minute
foot/minute	0.00508*	metre/second (m/s)
foot/second	30.48*	centimetre/second
foot/second	18.288*	metre/minute
foot/second	0.3048*	metre/second (m/s)
foot/second ²	0.3048*	metre/second ² (m/s ²)
foot ³ /minute	28.31685	litre/minute
foot ³ /minute	0.0004719474	metre ³ /second (m ³ /s)
gallon (U.S. liquid)/min.	0.003785412	metre ³ /minute
gallon (U.S. liquid)/min.	0.00006309020	metre ³ /second (m ³ /s)
gallon (U.S. liquid)/min.	0.06309020	litre/second
gallon (U.S. liquid)/min.	3.785412	litre/minute
gallon (U.K. liquid)/min.	0.004546092	metre ³ /minute
gallon (U.K. liquid)/min.	0.00007576820	metre ³ /second (m ³ /s)
inch/minute	25.4*	millimetre/minute

inch/minute	2.54*	centimetre/minute
inch/minute	0.0254*	metre/minute
inch/second ²	0.0254*	metre/second ² (m/s ²)
kilometre/hour	0.6213712	mile/hour (U.S. statute)
litre/minute	0.03531466	foot ³ /minute
litre/minute	0.2641720	gallon (U.S. liquid)/minute
litre/second	15.85032	gallon (U.S. liquid)/minute
mile/hour	1.609344*	kilometre/hour
millimetre/minute	0.03937008	inch/minute
metre/second	1,811.02	foot/hour
metre/second	196.8504	foot/minute
metre/second	3.280840	foot/second
metre/second ²	3.280840	foot/second ²
metre/second ²	39.37008	inch/second ²
metre/minute	3.280840	foot/minute
metre/minute	0.05468067	foot/second
metre/minute	39.37008	inch/minute
metre/hour	3.280840	foot/hour
metre/hour	0.05468067	foot/minute
metre ³ /second	2118.880	foot ³ /minute
metre ³ /second	13,198.15	gallon (U.K. liquid)/minute
metre ³ /second	15,850.32	gallon (U.S. liquid)/minute
metre ³ /minute	219.9692	gallon (U.K. liquid)/minute
metre ³ /minute	264.1720	gallon (U.S. liquid)/minute

MASS and DENSITY

grain (1/7000 lb avoirdupois)	0.06479891	gram (g)
gram	15.43236	grain
gram	0.001*	kilogram (kg)
gram	0.03527397	ounce (avoirdupois)
gram	0.03215074	ounce (troy)
gram/centimetre ³	0.03612730	pound/inch ³
hundredweight (long)	50.80235	kilogram (kg)

hundredweight (short)	45.35924	kilogram (kg)
kilogram	1000.*	gram (g)
kilogram	35.27397	ounce (avoirdupois)
kilogram	32.15074	ounce (troy)
kilogram	2.204622	pound (avoirdupois)
kilogram	0.06852178	slug
kilogram	0.0009842064	ton (long)
kilogram	0.001102311	ton (short)
kilogram	0.001*	ton (metric)
kilogram	0.001*	tonne
kilogram	0.01968413	hundredweight (long)
kilogram	0.02204622	hundredweight (short)
kilogram/metre ³	0.06242797	pound/foot ³
kilogram/metre ³	0.01002242	pound/gallon (U.K. liquid)
kilogram/metre ³	0.008345406	pound/gallon (U.S. liquid)
ounce (avoirdupois)	28.34952	gram (g)
ounce (avoirdupois)	0.02834952	kilogram (kg)
ounce (troy)	31.10348	gram (g)
ounce (troy)	0.03110348	kilogram (kg)
pound (avoirdupois)	0.4535924	kilogram (kg)
pound/foot ³	16.01846	kilogram/metre ³ (kg/m ³)
pound/inch ³	27.67990	gram/centimetre ³ (g/cm ³)
pound/gal (U.S. liquid)	119.8264	kilogram/metre ³ (kg/m ³)
pound/gal (U.K. liquid)	99.77633	kilogram/metre ³ (kg/m ³)
slug	14.59390	kilogram (kg)
ton (long 2240 lb)	1016.047	kilogram (kg)
ton (short 2000 lb)	907.1847	kilogram (kg)
ton (metric)	1000.*	kilogram (kg)
tonne	1000.*	kilogram (kg)
FORCE and FORCE/LENGTH		
dyne	0.00001*	newton (N)
kilogram-force	9.806650*	newton (N)
kilopond	9.806650*	newton (N)

newton	0.1019716	kilogram-force
newton	0.1019716	kilopond
newton	0.2248089	pound-force
newton	100,000.*	dyne
newton	7.23301	poundal
newton	3.596942	ounce-force
newton/metre	0.005710148	pound/inch
newton/metre	0.06852178	pound/foot
ounce-force	0.2780139	newton (N)
pound-force	4.448222	newton(N)
poundal	0.1382550	newton (N)
pound/inch	175.1268	newton/metre (N/m)
pound/foot	14.59390	newton/metre (N/m)

BENDING MOMENT or TORQUE

dyne-centimetre	0.0000001*	newton-metre (N· m)
kilogram-metre	9.806650*	newton-metre (N· m)
ounce-inch	7.061552	newton-millimetre
ounce-inch	0.007061552	newton-metre (N· m)
newton-metre	0.7375621	pound-foot
newton-metre	10,000,000.*	dyne-centimetre
newton-metre	0.1019716	kilogram-metre
newton-metre	141.6119	ounce-inch
newton-millimetre	0.1416119	ounce-inch
pound-foot	1.355818	newton-metre (N· m)

MOMENT OF INERTIA and SECTION MODULUS

moment of inertia (kg· m ²)	23.73036	pound-foot ²
moment of inertia (kg· m ²)	3417.171	pound-inch ²
moment of inertia (lb· ft ²)	0.04214011	kilogram-metre ² (kg· m ²)
moment of inertia (lb· inch ²)	0.0002926397	kilogram-metre ² (kg· m ²)
moment of section (foot ⁴)	0.008630975	metre ⁴ (m ⁴)
moment of section (inch ⁴)	41.62314	centimetre ⁴
moment of section (metre ⁴)	115.8618	foot ⁴

moment of section (centimetre ⁴)	0.02402510	inch ⁴
section modulus (foot ³)	0.02831685	metre ³ (m ³)
section modulus (inch ³)	0.00001638706	metre ³ (m ³)
section modulus (metre ³)	35.31466	foot ³
section modulus (metre ³)	61,023.76	Inch ³
MOMENTUM		
kilogram-metre/second	7.233011	pound-foot/second
kilogram-metre/second	86.79614	pound-inch/second
pound-foot/second	0.1382550	kilogram-metre/second (kg· m/s)
pound-inch/second	0.01152125	kilogram-metre/second (kg· m/s)
PRESSURE and STRESS		
atmosphere (14.6959 lb/inch ²)	101,325.	Pascal (Pa)
bar	100,000.*	Pascal (Pa)
bar	14.50377	pound/inch ²
bar	100,000.*	Newton/metre ² (N/m ²)
hectobar	0.6474898	ton (long)/inch ²
kilogram/centimetre ²	14.22334	pound/inch ²
kilogram/metre ²	9.806650*	newton/metre ² (N/m ²)
kilogram/metre ²	9.806650*	pascal (Pa)
kilogram/metre ²	0.2048161	pound/foot ²
kilonewton/metre ²	0.1450377	pound/inch ²
newton/centimetre ²	1.450377	pound/inch ²
newton/metre ²	0.00001*	bar
newton/metre ²	1.0*	Pascal (Pa)
newton/metre ²	0.0001450377	pound/inch ²
newton/metre ²	0.1019716	kilogram/metre ²
newton/millimetre ²	145.0377	pound/inch ²
pascal	0.00000986923	atmosphere
pascal	0.00001*	bar
pascal	0.1019716	kilogram/metre ²
pascal	1.0*	Newton/metre ² (N/m ²)
pascal	0.02088543	pound/foot ²
pascal	0.0001450377	pound/inch ²

pound/foot ²	4.882429	kilogram/metre ²
pound/foot ²	47.88026	pascal (Pa)
pound/inch ²	0.06894757	bar
pound/inch ²	0.07030697	kilogram/centimetre ²
pound/inch ²	0.6894757	newton/centimetre ²
pound/inch ²	6.894757	kilonewton/metre ²
pound/inch ²	6894.757	newton/metre ² (N/m ²)
pound/inch ²	0.006894757	newton/millimetre ² (N/mm ²)
pound/inch ²	6894.757	pascal (Pa)
ton (long)/inch ²	1.544426	hectobar

ENERGY and WORK

Btu (International Table)	1055.056	joule (J)
Btu (mean)	1055.87	joule (J)
calorie (mean)	4.19002	joule (J)
foot-pound	1.355818	joule (J)
foot-poundal	0.04214011	joule (J)
joule	0.0009478170	Btu (International Table)
joule	0.0009470863	Btu (mean)
joule	0.2386623	calorie (mean)
joule	0.7375621	foot-pound
joule	23.73036	foot-poundal
joule	0.9998180	joule (International U.S.)
joule	0.9999830	joule (U.S. legal, 1948)
joule (International U.S.)	1.000182	joule (J)
joule (U.S. legal, 1948)	1.000017	joule (J)
joule	.0002777778	watt-hour
watt-hour	3600.*	joule (J)

POWER

Btu (International Table)/hour	0.2930711	watt (W)
foot-pound/hour	0.0003766161	watt (W)
foot-pound/minute	0.02259697	watt (W)
horsepower (550 ft-lb/s)	0.7456999	kilowatt (kW)

horsepower (550 ft-lb/s)	745.6999	watt (W)
horsepower (electric)	746.*	watt (W)
horsepower (metric)	735.499	watt (W)
horsepower (U.K.)	745.70	watt (W)
kilowatt	1.341022	horsepower (550 ft-lb/s)
watt	2655.224	foot-pound/hour
watt	44.25372	foot-pound/minute
watt	0.001341022	horsepower (550 ft-lb/s)
watt	0.001340483	horsepower (electric)
watt	0.001359621	horsepower (metric)
watt	0.001341022	horsepower (U.K.)
watt	3.412141	Btu (International Table)/hour

VISCOSITY

centipoise	0.001*	pascal-second (PA · s)
centistoke	0.000001*	metre ² /second (m ² /s)
metre ² /second	1,000,000.*	centistoke
metre ² /second	10,000.*	stoke
pascal-second	1000.*	centipoise
pascal-second	10.*	poise
poise	0.1*	pascal-second (Pa· s)
stoke	0.0001*	metre ² /second (m ² /s)

TEMPERATURE

To Convert From	By	To Obtain
temperature Celsius, tC	temperature Kelvin, tK	$tK = tC + 273.15$
temperature Fahrenheit, tF	temperature Kelvin, tK	$tK = (tF + 459.67) / 1.8$
temperature Celsius, tC	temperature Fahrenheit, tF	$tF = 1.8 tC + 32$
temperature Fahrenheit, tF	temperature Celsius, tc	$tC = (tF - 32) / 1.8$
temperature Kelvin, tK	temperature Celsius, tC	$tC = tK - 273.15$
temperature Kelvin, tK	temperature Fahrenheit, tF	$tF = 1.8 tK - 459.67$
temperature Kelvin, tK	temperature Rankine, tR	$tR = 9/5 tK$
temperature Rankine, tR	temperature Kelvin, tK	$tK = 5/9 tR$

* Where an asterisk is show, the figure is exact.