

To convert from	To	Multiply by	To convert from	To	Multiply by
angstrom	meter (m)	1.000 000* E-10	hour (mean solar)	second (s)	3.600 000 E+03
atmosphere (normal)	newton/meter ²		inch	meter (m)	0.025 400 E+01
barrel (for petroleum, 42 gal)	meter ³ (m ³)	1.013 250* E+05	inch of mercury (60 F)	newton/meter ²	2.540 000* E-02
British thermal unit (International Table)	meter ³ (m ³)	1.559 873 E-01	inch of water (60 F)	(N/m ²)	3.376 85 E+03
Btu/lbm-deg F (c, heat capacity)	joule (J)	1.055 056 E+03	inch ²	(N/m ²)	2.488 4 E+02
Btu/lbm-deg F (c, heat capacity)	joule/kilogram-kelvin		inch ³	meter ³ (m ³)	6.451 600* E-04
Btu/hour	(J/kg · K)	4.186 800* E+03	kilocalorie	meter ³ (m ³)	1.638 706 E-05
Btu/second	watt (W)	2.930 711 E-01	kilogram-force (kgf)	joule (J)	4.186 800* E+03
Btu/ft ² -hr-deg F (heat transfer coefficient)	watt (W)	1.054 350 E+03	knot (international)	newton (N)	9.806 650* E+00
Btu/ft ² -hr-deg F (heat transfer coefficient)	joule/meter ² -second-kelvin		liter	meter/second (m/s)	5.144 44 E-01
Btu/ft ² -hr-deg F (heat flux)	(J/m ² · s · K)	5.678 264 E+00	micron	meter ³ (m ³)	1.000 000* E-03
Btu/ft ² -hr-deg F (heat flux)	joule/meter ² -second		mil	meter (m)	1.000 000* E-06
Btu/ft ² -hr-deg F (thermal conductivity)	(J/m ² · s)	3.154 591 E+00	mile (U.S. statute)	meter (m)	2.540 000* E-05
Btu/ft ² -hr-deg F (thermal conductivity)	joule/meter-second-kelvin		mile/hour	meter/second (m/s)	1.609 344* E+03
calorie (International Table)	(J/m · s · K)	1.730 735 E+00	millimeter of mercury (0 C)	newton/meter ²	4.470 400* E-01
cal/g-deg C	joule (J)	4.186 800* E+00	minute (angle)	(N/m ²)	1.333 224 E+02
centimeter	joule/kilogram-kelvin		minute (mean solar)	radian (rad)	2.908 882 E-04
centimeter of mercury (0 C)	(J/kg · K)	4.186 800* E+03	ohm (international of 1948)	second (s)	6.000 000 E+01
centimeter of mercury (0 C)	meter (m)	1.000 000* E-02	ounce-mass (avoirdupois)	ohm (Ω)	1.000 495 E+00
centimeter of water (4 C)	newton/meter ²	1.333 22 E+03	ounce (U.S. fluid)	kilogram (kg)	2.834 952 E-02
centimeter of water (4 C)	(N/m ²)	1.333 22 E+03	ounce (U.S. liquid)	meter ³ (m ³)	2.957 353 E-05
centipoise	newton/meter ²	9.806 38 E+01	pint (U.S. liquid)	meter ³ (m ³)	4.731 765 E-04
centipoise	newton-second/meter ²		poise (absolute viscosity)	newton-second/meter ²	1.000 000* E-01
centistoke	(N · s/m ²)	1.000 000* E-03	poundal	(N · s/m ²)	1.382 550 E-01
degree Celsius	meter ² /second (m ² /s)	1.000 000* E-06	pound-force (lbf avoirdupois)	newton (N)	4.448 222 E+00
degree Fahrenheit	kelvin (K)	$t_K = t_F + 273.15$	pound-force-second/foot ²	newton-second/meter ²	4.788 026 E+01
degree Rankine	kelvin (K)	$t_K = t_R/1.8$	pound-mass (lbm avoirdupois)	(N · s/m ²)	4.535 924 E-01
dyne	newton (N)	1.000 000* E-05	pound-mass/foot ³	kilogram (kg)	1.601 846 E+01
erg	joule (J)	1.000 000* E-07	pound-mass/foot-second	(kg/m ³)	1.488 164 E+00
farad (international of 1948)	farad (F)	9.995 05 E-01	psi	newton-second/meter ²	6.894 757 E+03
fluid ounce (U.S.)	meter ³ (m ³)	2.957 353 E-05	quart (U.S. liquid)	meter ³ (m ³)	9.463 529 E-04
foot	meter (m)	3.048 000* E-01	second (angle)	radian (rad)	4.848 137 E-06
foot (U.S. survey)	meter (m)	3.048 006 E-01	slug	kilogram (kg)	1.459 390 E+01
foot of water (39.2 F)	newton/meter ²	2.988 98 E+03	stoke (kinematic viscosity)	meter ² /second (m ² /s)	1.000 000* E-04
foot ²	meter ² (m ²)	9.290 304* E-02	ton (long, 2240 lbm)	meter/second (m/s)	1.016 047 E+03
foot/second ²	meter/second ² (m/s ²)	3.048 000* E-01	ton (short, 2000 lbm)	kilogram (kg)	9.071 847 E+02
foot ³ /hour	meter ² /second (m ² /s)	2.580 640* E-05	torr (mm Hg, 0 C)	newton/meter ²	1.333 22 E+02
foot-pound-force	joule (J)	1.355 818 E+00	volt (international of 1948)	(N/m ²)	1.000 330 E+00
foot ² /second	meter ² /second (m ² /s)	9.290 304* E-02	volt (absolute) (V)	volt (absolute) (V)	1.000 330 E+00
foot ³	meter ³ (m ³)	2.831 685 E-02	watt (international of 1948)	watt (W)	1.000 165 E+00
gallon (U.S. liquid)	meter ³ (m ³)	3.785 412 E-03	watt-hour	joule (J)	3.600 000* E+03
gram	kilogram (kg)	1.000 000* E-03	yard	meter (m)	9.144 000* E-01
horsepower (550 ft · lbf/s)	watt (W)	7.456 999 E+02			

* An asterisk after the sixth decimal place indicates the conversion factor is exact and all subsequent digits are zero.

ABBREVIATED GUIDE FOR USE OF THE SI*

Quantity	Unit	SI symbol	Prefix	SI symbol
<i>Base units</i>				
length	meter	m		
mass	kilogram	kg		
time	second	s		
electric current	ampere	A		
thermodynamic temperature	kelvin	K		
luminous intensity	candela	cd		
<i>Supplementary units</i>				
plane angle	radian	rad		
solid angle	steradian	sr		
<i>Derived units</i>				
acceleration	meter per second squared	m/s ²		
activity (of a radioactive source)	disintegration per second	(disintegration/s)		
angular acceleration	radian per second squared	rad/s ²		
angular velocity	radian per second	rad/s		
area	square meter	m ²		
density	kilogram per cubic meter	kg/m ³		
electric capacitance	farad	F		
electric field strength	volt per meter	A · s/V		
electric inductance	henry	V/m		
electric potential difference	volt	V · s/A		
electric resistance	ohm	W/A		
electromotive force	volt	V/A		
energy	joule	N · m		
entropy	joule per kelvin	J/K		
force	newton	kg · m/s ²		
frequency	hertz	(cycle)/s		
illumination	lux	lm/m ²		
luminance	candela per square meter	cd/m ²		
luminous flux	lumen	lm		
magnetic field strength	ampere per meter	cd · sr		
magnetic flux	weber	A/m		
magnetic flux density	tesla	V · s		
magnetomotive force	ampere	Wb/m ²		
power	watt	T		
pressure	newton per square meter	A		
quantity of electricity	coulomb	W		
quantity of heat	joule	I/s		
radiant intensity	watt per steradian	N/m ²		
specific heat	joule per kilogram-kelvin	A · s		
stress	newton per square meter	N · m		
thermal conductivity	watt per meter-kelvin	W/sr		
velocity	meter per second	J/kg · K		
viscosity, dynamic	newton-second per square meter	N/m ²		
viscosity, kinematic	square meter per second	m/s		
voltage	volt	N · s/m ²		
volume	cubic meter	m ² /s		
wavenumber	reciprocal meter	W/A		
work	joule	m ³		
		(wave)/m		
		N · m		
		J		

Multiple and submultiple units

1 000 000 000 000 = 10 ¹²	tera	T
1 000 000 000 = 10 ⁹	giga	G
1 000 000 = 10 ⁶	mega	M
1 000 = 10 ³	kilo	k
100 = 10 ²	hecto†	h
10 = 10 ¹	deka†	da
0.1 = 10 ⁻¹	deci†	d
0.01 = 10 ⁻²	centi†	c
0.001 = 10 ⁻³	milli	m
0.000 001 = 10 ⁻⁶	micro	μ
0.000 000 001 = 10 ⁻⁹	nano	n
0.000 000 000 001 = 10 ⁻¹²	pico	p
0.000 000 000 000 001 = 10 ⁻¹⁵	femto	f
0.000 000 000 000 000 001 = 10 ⁻¹⁸	atto	a

* This table was adapted by permission from the more extensive listing given in "Metric Practice Guide," ASTM E 380-70, available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103; \$1.25 plus postage and handling (minimum order \$3.00).

† Not recommended but occasionally used.

DIRECTIONS FOR USE

- Avoid use of prefixes in denominators (except kg).
- The use of hecto, deka, deci, and centi prefixes should be avoided except when used in areas and volumes.
- SI symbols are not capitalized unless the unit is derived from a proper name, e.g., Hz for H. R. Hertz. Unabbreviated units are not capitalized, e.g., hertz, newton, kelvin. Only T, G, M prefixes are capitalized.
- Except at the end of a sentence, SI units are not to be followed by periods.
- Four or more digits in a group should be separated in groups of three with no comma, e.g., 1 983 212.322 7, not 1,983,212.3227.
- With derived unit abbreviations, use center dot to denote multiplication and a slash for division, e.g., newton-second/meter² = N · s/m².