Conversion Factors [8]

1 Introduction

Sections 8 and 9 give factors for converting values of quantities expressed in various units — predominantly units outside the SI that are unacceptable for use with it — to values expressed either in (a) SI units, (b) units that are accepted for use with the SI (especially units that better reflect the nature of the unconverted units), (c) units formed from such accepted units and SI units, or (d) decimal multiples or submultiples of the units of (a) to (c) that yield numerical values of convenient magnitudes.

An example of (d) is the following: the values of quantities expressed in ångströms, such as the wavelengths of visible laser radiations, are usually converted to values expressed in nanometers, not meters. More generally, if desired, one can eliminate powers of 10 that appear in converted values as a result of using the conversion factors (or simply factors for brevity) of Secs. 8 and 9 by selecting an appropriate SI prefix (see Sec. 3).

2 Notation

The factors given in Secs. 8 and 9 are written as a number equal to or greater than 1 and less than 10, with 6 or fewer decimal places. The number is followed by the letter E, which stands for exponent, a plus (+) or minus (−) sign, and two digits which indicate the power of 10 by which the number is multiplied.

Examples: 3.523 907 E−02 means $3.523\,907 \times 10^{-2} = 0.035\,239\,07$

3.386 389 E+03 means $3.386\,389 \times 10^{3} = 3386.389$

A factor in boldface is exact. All other factors have been rounded to the significant digits given in accordance with accepted practice (see ISO 31-0 and ANSI/IEEE Std. 268-1992).
Where less than six digits after the decimal place are given, the unit does not warrant a greater number of digits in its conversion. However, for the convenience of the user, this practice is not followed for all such units, including the cord, cup, quad, and teaspoon.

3 Use of conversion factors

Each entry in Secs. 8 and 9 is to be interpreted as in these two examples:

To convert from	to	Multiply by	
atmosphere, standard (atm)	pascal (Pa)	**1.013 25**	**E+05**
cubic foot per second (ft^3/s)	cubic meter per second (m^3/s)	2.831 685	E−02

means 1 atm = 101 325 Pa (exactly);
1 ft^3/s = 0.028 316 85 m^3/s.

Thus to express, for example, the pressure p = 11.8 standard atmospheres (atm) in pascals (Pa), write

$$p = 11.8 \text{ atm} \times 101\,325 \text{ Pa/atm}$$

and obtain the converted numerical value $11.8 \times 101\,325 = 1\,195\,635$ and the converted value p = 1.20 MPa.

[8] Adapted from Appendix B of NIST Special Publication 811.

Notes:

1 Guidance on rounding converted numerical values of quantities is given in Sec. 7.2.

2 If the value of a quantity is expressed in a unit of the center column of Sec. 8 or 9 and it is necessary to express it in the corresponding unit of the first column, *divide* by the factor.

The factors for derived units not included in Secs. 8 and 9 can readily be found from the factors given.

Examples: To find the factor for converting values in lb · ft/s to values in kg · m/s, obtain from Sec. 8 or 9

1 lb = 4.535 924 E−01 kg
1 ft = **3.048 E−01** m

and substitute these values into the unit lb · ft/s to obtain

$$1 \text{ lb} \cdot \text{ft/s} = 0.453\,592\,4 \text{ kg} \times 0.3048 \text{ m/s}$$
$$= 0.138\,255\,0 \text{ kg} \cdot \text{m/s}$$

and the factor is 1.382 550 E−01.

To find the factor for converting values in (avoirdupois) oz · in^2 to values in kg · m^2, obtain from Sec. 8 or 9

1 oz = 2.834 952 E−02 kg
1 in^2 = **6.4516 E−04** m^2

and substitute these values into the unit oz · in^2 to obtain

$$1 \text{ oz} \cdot \text{in}^2 = 0.028\,349\,52 \text{ kg} \times 0.000\,645\,16 \text{ m}^2$$
$$= 0.000\,018\,289\,98 \text{ kg} \cdot \text{m}^2$$

and the factor is 1.828 998 E−05.

4 Organization of entries and style

In Sec. 8 the units for which factors are given are listed alphabetically, while in Sec 9 the same units are listed alphabetically within the following alphabetized list of kinds of quantities and fields of science:

ACCELERATION

ANGLE

AREA AND SECOND MOMENT OF AREA

CAPACITY (see VOLUME)

DENSITY (that is, MASS DENSITY — (see MASS DIVIDED BY VOLUME)

ELECTRICITY and MAGNETISM

ENERGY (includes WORK)

ENERGY DIVIDED BY AREA TIME

FLOW (see MASS DIVIDED BY TIME or VOLUME DIVIDED BY TIME)

FORCE

FORCE DIVIDED BY AREA (see PRESSURE)

FORCE DIVIDED BY LENGTH

HEAT

- Available Energy
- Coefficient of Heat Transfer
- Density of Heat
- Density of Heat Flow Rate
- Fuel Consumption
- Heat Capacity and Entropy
- Heat Flow Rate
- Specific Heat Capacity and Specific Entropy
- Thermal Conductivity
- Thermal Diffusivity
- Thermal Insulance
- Thermal Resistance
- Thermal Resistivity

LENGTH

LIGHT

MASS and MOMENT OF INERTIA

MASS DENSITY (see MASS DIVIDED BY VOLUME)

MASS DIVIDED BY AREA

MASS DIVIDED BY CAPACITY (see MASS DIVIDED BY VOLUME)

MASS DIVIDED BY LENGTH

MASS DIVIDED BY TIME (includes FLOW)

MASS DIVIDED BY VOLUME (includes MASS DENSITY and MASS CONCENTRATION)

MOMENT OF FORCE or TORQUE

MOMENT OF FORCE or TORQUE, DIVIDED BY LENGTH

PERMEABILITY

POWER

PRESSURE or STRESS (FORCE DIVIDED BY AREA)

RADIOLOGY

SPEED (see VELOCITY)

STRESS (see PRESSURE)

TEMPERATURE

TEMPERATURE INTERVAL

TIME

TORQUE (see MOMENT OF FORCE)

VELOCITY (includes SPEED)

VISCOSITY, DYNAMIC

VISCOSITY, KINEMATIC

VOLUME (includes CAPACITY)

VOLUME DIVIDED BY TIME (includes FLOW)

WORK (see ENERGY)

In Secs. 8 and 9, the units in the left-hand columns are written as they are often used customarily; the rules and style conventions recommended in NIST SP 811 are not necessarily observed. Further, many are obsolete and some are not consistent with good technical practice. The corresponding units in the center columns are, however, written in accordance with the rules and style conventions recommended in NIST SP 811.

5 Factor for converting motor vehicle efficiency

The efficiency of motor vehicles in the United States is commonly expressed in miles per U.S. gallon, while in most other countries it is expressed in liters per one hundred kilometers. To convert fuel economy stated in miles per U.S. gallon to fuel consumption expressed in L/(100 km), divide 235.215 by the numerical value of the stated fuel economy. Thus 24 miles per gallon corresponds to 9.8 L/(100 km).

6 U.S. survey foot and mile

The U.S. Metric Law of 1866 gave the relationship 1 m = 39.37 in (in is the unit symbol for the inch). From 1893 until 1959, the yard was defined as being exactly equal to (3600/3937) m, and thus the foot was defined as being exactly equal to (1200/3937) m.

In 1959 the definition of the yard was changed to bring the U.S. yard and the yard used in other countries into agreement. Since then the yard has been defined as exactly equal to 0.9144 m, and thus the foot has been defined as exactly equal to 0.3048 m. At the same time it was decided that any data expressed in feet derived from geodetic surveys within the United States would continue to bear the relationship as defined in 1893, namely, 1 ft = (1200/3937) m (ft is the unit symbol for the foot). The name of this foot is ‘‘U.S. survey foot,’’ while the name of the new foot defined in 1959 is ‘‘international foot.’’ The two are related to each other through the expression 1 international foot = 0.999 998 U.S. survey foot exactly.

In Secs. 8 and 9, the factors given are based on the international foot unless otherwise indicated. Users of this table may also find the following summary of exact relationships helpful, where for convenience the symbols *ft* and *mi*, that is, ft and mi in italic type, indicate that it is the *U.S. survey foot* or *U.S. survey mile* that is meant rather than the international foot (ft) or international mile (mi), and where rd is the unit symbol for the rod and fur is the unit symbol for the furlong.

1 *ft* = (1200/3937) m
1 ft = 0.3048 m
1 ft = 0.999 998 *ft*
1 rd, pole, or perch = $16\frac{1}{2}$ *ft*
40 rd = 1 fur = 660 *ft*
8 fur = 1 U.S. survey mile (also called ''statute mile'') = 1 *mi* = 5280 *ft*
1 fathom = 6 *ft*
1 international mile = 1 mi = 5280 ft
272 1/4 ft^2 = 1 rd^2
160 rd^2 = 1 acre = 43 560 ft^2
640 acre = 1 mi^2

7 Rules for rounding numbers and converted numerical values of quantities

Rules or rounding numbers are discussed in ISO 31-0. ANSI/IEEE Std. 268-1992 gives rules for rounding the converted numerical values of quantities whose values expressed in units that are not accepted for use with the SI (primarily customary or inch-pound units) are converted to values expressed in acceptable units. The principal rules for rounding numbers are given in Sec. 7.1, and the basic principle for rounding converted numerical values of quantities in Sec. 7.2. The cited references should be consulted for additional details.

7.1 Rounding numbers

To replace a number having a given number of digits with a number (called the rounded number) having a smaller number of digits, one may follow these rules:

(1) If the digits to be discarded begin with a digit less than 5, the digit preceding the 5 is not changed.

Example: 6.974 951 5 rounded to 3 digits is 6.97

(2) If the digits to be discarded begin with a 5 and at least one of the following digits is greater than 0, the digit preceding the 5 is increased by 1.

Examples: 6.974 951 5 rounded to 2 digits is 7.0

6.974 951 5 rounded to 5 digits is 6.9750

(3) If the digits to be discarded begin with a 5 and all of the following digits are 0, the digit preceding the 5 is unchanged if it is even and increased by 1 if it is odd. (Note that this means that the final digit is always even.)

Examples: 6.974 951 5 rounded to 7 digits is 6.974 952

6.974 950 5 rounded to 7 digits is 6.974 950

7.2 Rounding converted numerical values of quantities

The use of the factors given in Secs. 8 and 9 to convert values of quantities was demonstrated in Sec. 3. In most cases the product of the unconverted numerical value and the factor will be a numerical value with a number of digits that exceeds the number of significant digits (see Sec. 9) of the unconverted numerical value. Proper conversion procedure requires rounding this converted numerical value to the number of significant digits that is consistent with the maximum possible rounding error of the unconverted numerical value.

Example: To express the value $l = 36$ ft in meters, use the factor **3.048 E−01** from Sec. B.8 or Sec. B.9 and write

$$l = 36 \text{ ft} \times 0.3048 \text{ m/ft} = 10.9728 \text{ m} = 11.0 \text{ m}.$$

The final result, $l = 11.0$ m, is based on the following reasoning: The numerical value ''36'' has two significant digits, and thus a relative maximum possible rounding error (abbreviated RE in this *Guide* for simplicity) of $\pm 0.5/36 = \pm 1.4$ % because it could have resulted from rounding the number 35.5, 36.5, or any number between 35.5 and 36.5. To be consistent with this RE, the converted numerical value ''10.9728'' is rounded to 11.0 or three significant digits because the number 11.0 has an RE of $\pm 0.05/11.0 = \pm 0.45$ %. Although this ± 0.45 % RE is one-third of the ± 1.4 % RE of the unconverted numerical value ''36,'' if the converted numerical value ''10.9728'' had been rounded to 11 or two significant digits, information contained in the unconverted numerical value ''36'' would have been lost. This is because the RE of the numerical value ''11'' is $\pm 0.5/11 = \pm 4.5$ %, which is three times the ± 1.4 % RE of the unconverted numerical value ''36.'' This example therefore shows that when selecting the number of digits to retain in the numerical value of a converted quantity, one must often choose between discarding information or providing unwarranted information. Consideration of the end use of the converted value can often help one decide which choice to make.

Note: Consider that one had been told initially that the value $l = 36$ ft had been rounded to the nearest inch. Then in this case, since l is known to within ± 1 in, the RE of the numerical value ''36'' is $\pm 1 \text{ in}/(36 \text{ ft} \times 12 \text{ in/ft}) = \pm 0.23$ %. Although this is less than the ± 0.45 % RE of the number 11.0, it is comparable to it. Therefore, the result $l = 11.0$ m is still given as the converted value. (Note that the numerical value ''10.97'' would give excessive unwarranted information because it has an RE that is one-fifth of ± 0.23 %.)

Factors in **boldface** are exact

To convert from	to	Multiply by	
abampere	ampere (A)	**1.0**	**E+01**
abcoulomb	coulomb (C)	**1.0**	**E+01**
abfarad	farad (F)	**1.0**	**E+09**
abhenry	henry (H)	**1.0**	**E−09**
abmho	siemens (S)	**1.0**	**E+09**
abohm	ohm (Ω)	**1.0**	**E−09**
abvolt	volt (V)	**1.0**	**E−08**
acceleration of free fall, standard (g_n)	meter per second squared (m/s^2)	**9.806 65**	**E+00**
acre (based on U.S. survey foot)[9]	square meter (m^2)	4.046 873	E+03
acre foot (based on U.S. survey foot)[9]	cubic meter (m^3)	1.233 489	E+03
ampere hour (A · h)	coulomb (C)	**3.6**	**E+03**
ångström (Å)	meter (m)	**1.0**	**E−10**
ångström (Å)	nanometer (nm)	**1.0**	**E−01**
are (a)	square meter (m^2)	**1.0**	**E+02**
astronomical unit (AU)	meter (m)	1.495 979	E+11
atmosphere, standard (atm)	pascal (Pa)	**1.013 25**	**E+05**
atmosphere, standard (atm)	kilopascal (kPa)	**1.013 25**	**E+02**
atmosphere, technical (at)[10]	pascal (Pa)	**9.806 65**	**E+04**
atmosphere, technical (at)[10]	kilopascal (kPa)	**9.806 65**	**E+01**
bar (bar)	pascal (Pa)	**1.0**	**E+05**
bar (bar)	kilopascal (kPa)	**1.0**	**E+02**
barn (b)	square meter (m^2)	**1.0**	**E−28**
barrel [for petroleum, 42 gallons (U.S.)](bbl)	cubic meter (m^3)	1.589 873	E−01
barrel [for petroleum, 42 gallons (U.S.)](bbl)	liter (L)	1.589 873	E+02
biot (Bi)	ampere (A)	**1.0**	**E+01**
British thermal unit$_{IT}$ (Btu_{IT})[11]	joule (J)	1.055 056	E+03
British thermal unit$_{th}$ (Btu_{th})[11]	joule (J)	1.054 350	E+03
British thermal unit (mean) (Btu)	joule (J)	1.055 87	E+03
British thermal unit (39 °F) (Btu)	joule (J)	1.059 67	E+03
British thermal unit (59 °F) (Btu)	joule (J)	1.054 80	E+03
British thermal unit (60 °F) (Btu)	joule (J)	1.054 68	E+03
British thermal unit$_{IT}$ foot per hour square foot degree Fahrenheit [Btu_{IT} · ft/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.730 735	E+00
British thermal unit$_{th}$ foot per hour square foot degree Fahrenheit [Btu_{th} · ft/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.729 577	E+00
British thermal unit$_{IT}$ inch per hour square foot degree Fahrenheit [Btu_{IT} · in/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.442 279	E−01
British thermal unit$_{th}$ inch per hour square foot degree Fahrenheit [Btu_{th} · in/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.441 314	E−01
British thermal unit$_{IT}$ inch per second square foot degree Fahrenheit [Btu_{IT} · in/(s · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	5.192 204	E+02

[9] See Sec. 6.

[10] One technical atmosphere equals one kilogram-force per square centimeter (1 at = 1 kgf/cm^2).

[11] The Fifth International Conference on the Properties of Steam (London, July 1956) defined the International Table calorie as 4.1868 J. Therefore the exact conversion factor for the International Table Btu is 1.055 055 852 62 kJ. Note that the notation for International Table used in this listing is subscript ''IT''. Similarily, the notation for thermochemical is subscript ''th.'' Further, the thermochemical Btu, Btu_{th}, is based on the thermochemical calorie, cal_{th}, where cal_{th} = 4.184 J exactly.

To convert from	to	Multiply by	
British thermal unit$_{th}$ inch per second square foot degree Fahrenheit [$Btu_{th} \cdot in/(s \cdot ft^2 \cdot °F)$]	watt per meter kelvin [$W/(m \cdot K)$]	5.188 732	E+02
British thermal unit$_{IT}$ per cubic foot (Btu_{IT}/ft^3)	joule per cubic meter (J/m^3)	3.725 895	E+04
British thermal unit$_{th}$ per cubic foot (Btu_{th}/ft^3)	joule per cubic meter (J/m^3)	3.723 403	E+04
British thermal unit$_{IT}$ per degree Fahrenheit ($Btu_{IT}/°F$)	joule per kelvin (J/k)	1.899 101	E+03
British thermal unit$_{th}$ per degree Fahrenheit ($Btu_{th}/°F$)	joule per kelvin (J/k)	1.897 830	E+03
British thermal unit$_{IT}$ per degree Rankine ($Btu_{IT}/°R$)	joule per kelvin (J/k)	1.899 101	E+03
British thermal unit$_{th}$ per degree Rankine ($Btu_{th}/°R$)	joule per kelvin (J/k)	1.897 830	E+03
British thermal unit$_{IT}$ per hour (Btu_{IT}/h)	watt (W)	2.930 711	E−01
British thermal unit$_{th}$ per hour (Btu_{th}/h)	watt (W)	2.928 751	E−01
British thermal unit$_{IT}$ per hour square foot degree Fahrenheit [$Btu_{IT}/(h \cdot ft^2 \cdot °F)$]	watt per square meter kelvin [$W/(m^2 \cdot K)$]	5.678 263	E+00
British thermal unit$_{th}$ per hour square foot degree Fahrenheit [$Btu_{th}/(h \cdot ft^2 \cdot °F)$]	watt per square meter kelvin [$W/(m^2 \cdot K)$]	5.674 466	E+00
British thermal unit$_{th}$ per minute (Btu_{th}/min)	watt (W)	1.757 250	E+01
British thermal unit$_{IT}$ per pound (Btu_{IT}/lb)	joule per kilogram (J/kg)	**2.326**	**E+03**
British thermal unit$_{th}$ per pound (Btu_{th}/lb)	joule per kilogram (J/kg)	2.324 444	E+03
British thermal unit$_{IT}$ per pound degree Fahrenheit [$Btu_{IT}/(lb \cdot °F)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.1868**	**E+03**
British thermal unit$_{th}$ per pound degree Fahrenheit [$Btu_{th}/(lb \cdot °F)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.184**	**E+03**
British thermal unit$_{IT}$ per pound degree Rankine [$Btu_{IT}/(lb \cdot °R)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.1868**	**E+03**
British thermal unit$_{th}$ per pound degree Rankine [$Btu_{th}/(lb \cdot °R)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.184**	**E+03**
British thermal unit$_{IT}$ per second (Btu_{IT}/s)	watt (W)	1.055 056	E+03
British thermal unit$_{th}$ per second (Btu_{th}/s)	watt (W)	1.054 350	E+03
British thermal unit$_{IT}$ per second square foot degree Fahrenheit [$Btu_{IT}/(s \cdot ft^2 \cdot °F)$]	watt per square meter kelvin [$W/(m^2 \cdot K)$]	2.044 175	E+04
British thermal unit$_{th}$ per second square foot degree Fahrenheit [$Btu_{th}/(s \cdot ft^2 \cdot °F)$]	watt per square meter kelvin [$W/(m^2 \cdot K)$]	2.042 808	E+04
British thermal unit$_{IT}$ per square foot (Btu_{IT}/ft^2)	joule per square meter (J/m^2)	1.135 653	E+04
British thermal unit$_{th}$ per square foot (Btu_{th}/ft^2)	joule per square meter (J/m^2)	1.134 893	E+04
British thermal unit$_{IT}$ per square foot hour [$(Btu_{IT}/(ft^2 \cdot h)$]	watt per square meter (W/m^2)	3.154 591	E+00
British thermal unit$_{th}$ per square foot hour [$Btu_{th}/(ft^2 \cdot h)$]	watt per square meter (W/m^2)	3.152 481	E+00
British thermal unit$_{th}$ per square foot minute [$Btu_{th}/(ft^2 \cdot min)$]	watt per square meter (W/m^2)	1.891 489	E+02
British thermal unit$_{IT}$ per square foot second [$(Btu_{IT}/(ft^2 \cdot s)$]	watt per square meter (W/m^2)	1.135 653	E+04
British thermal unit$_{th}$ per square foot second [$Btu_{th}/(ft^2 \cdot s)$]	watt per square meter (W/m^2)	1.134 893	E+04
British thermal unit$_{th}$ per square inch second [$Btu_{th}/(in^2 \cdot s)$]	watt per square meter (W/m^2)	1.634 246	E+06

To convert from	to	Multiply by	
bushel (U.S.) (bu)	cubic meter (m^3)	3.523 907	E−02
bushel (U.S.) (bu)	liter (L)	3.523 907	E+01
$calorie_{IT}$ (cal_{IT})[11]	joule (J)	**4.1868**	**E+00**
$calorie_{th}$ (cal_{th})[11]	joule (J)	**4.184**	**E+00**
calorie (cal) (mean)	joule (J)	4.190 02	E+00
calorie (15 °C) (cal_{15})	joule (J)	4.185 80	E+00
calorie (20 °C) (cal_{20})	joule (J)	4.181 90	E+00
$calorie_{IT}$, kilogram (nutrition)[12]	joule (J)	**4.1868**	**E+03**
$calorie_{th}$, kilogram (nutrition)[12]	joule (J)	**4.184**	**E+03**
calorie (mean), kilogram (nutrition)[12]	joule (J)	4.190 02	E+03
$calorie_{th}$ per centimeter second degree Celsius [$cal_{th}/(cm \cdot s \cdot °C)$]	watt per meter kelvin [$W/(m \cdot K)$]	**4.184**	**E+02**
$calorie_{IT}$ per gram (cal_{IT}/g)	joule per kilogram (J/kg)	**4.1868**	**E+03**
$calorie_{th}$ per gram (cal_{th}/g)	joule per kilogram (J/kg)	**4.184**	**E+03**
$calorie_{IT}$ per gram degree Celsius [$cal_{IT}/(g \cdot °C)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.1868**	**E+03**
$calorie_{th}$ per gram degree Celsius [$cal_{th}/(g \cdot °C)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.184**	**E+03**
$calorie_{IT}$ per gram kelvin [$cal_{IT}/(g \cdot K)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.1868**	**E+03**
$calorie_{th}$ per gram kelvin [$cal_{th}/(g \cdot K)$]	joule per kilogram kelvin [$J/(kg \cdot K)$]	**4.184**	**E+03**
$calorie_{th}$ per minute (cal_{th}/min)	watt (W)	6.973 333	E−02
$calorie_{th}$ per second (cal_{th}/s)	watt (W)	**4.184**	**E+00**
$calorie_{th}$ per square centimeter (cal_{th}/cm^2)	joule per square meter (J/m^2)	**4.184**	**E+04**
$calorie_{th}$ per square centimeter minute [$cal_{th}/(cm^2 \cdot min)$]	watt per square meter (W/m^2)	6.973 333	E+02
$calorie_{th}$ per square centimeter second [$cal_{th}/(cm^2 \cdot s)$]	watt per square meter (W/m^2)	**4.184**	**E+04**
candela per square inch (cd/in^2)	candela per square meter (cd/m^2)	1.550 003	E+03
carat, metric	kilogram (kg)	**2.0**	**E−04**
carat, metric	gram (g)	**2.0**	**E−01**
centimeter of mercury (0 °C)[13]	pascal (Pa)	1.333 22	E+03
centimeter of mercury (0 °C)[13]	kilopascal (kPa)	1.333 22	E+00
centimeter of mercury, conventional (cmHg)[13]	pascal (Pa)	1.333 224	E+03
centimeter of mercury, conventional (cmHg)[13]	kilopascal (kPa)	1.333 224	E+00
centimeter of water (4 °C)[13]	pascal (Pa)	9.806 38	E+01
centimeter of water, conventional (cmH_2O)[13]	pascal (Pa)	**9.806 65**	**E+01**
centipoise (cP)	pascal second (Pa · s)	**1.0**	**E−03**
centistokes (cSt)	meter squared per second (m^2/s)	**1.0**	**E−06**
chain (based on U.S. survey foot) (ch)[9]	meter (m)	2.011 684	E+01
circular mil	square meter (m^2)	5.067 075	E−10
circular mil	square millimeter (mm^2)	5.067 075	E−04
clo	square meter kelvin per watt ($m^2 \cdot K/W$)	1.55	E−01
cord (128 ft^3)	cubic meter (m^3)	3.624 556	E+00
cubic foot (ft^3)	cubic meter (m^3)	2.831 685	E−02
cubic foot per minute (ft^3/min)	cubic meter per second (m^3/s)	4.719 474	E−04
cubic foot per minute (ft^3/min)	liter per second (L/s)	4.719 474	E−01
cubic foot per second (ft^3/s)	cubic meter per second (m^3/s)	2.831 685	E−02

[12] The kilogram calorie or ''large calorie'' is an obsolete term used for the kilocalorie, which is the calorie used to express the energy content of foods. However, in practice, the prefix ''kilo'' is usually omitted.

[13] Conversion factors for mercury manometer pressure units are calculated using the standard value for the acceleration of gravity and the density of mercury at the stated temperature. Additional digits are not justified because the definitions of the units do not take into account the compressibility of mercury or the change in density caused by the revised practical temperature scale, ITS-90. Similar comments also apply to water manometer pressure units. Conversion factors for conventional mercury and water manometer pressure units are based on ISO 31-3.

To convert from	to	Multiply by	
cubic inch (in^3)[14]	cubic meter (m^3)	1.638 706	E−05
cubic inch per minute (in^3/min)	cubic meter per second (m^3/s)	2.731 177	E−07
cubic mile (mi^3)	cubic meter (m^3)	4.168 182	E+09
cubic yard (yd^3)	cubic meter (m^3)	7.645 549	E−01
cubic yard per minute (yd^3/min)	cubic meter per second (m^3/s)	1.274 258	E−02
cup (U.S.)	cubic meter (m^3)	2.365 882	E−04
cup (U.S.)	liter (L)	2.365 882	E−01
cup (U.S.)	milliliter (mL)	2.365 882	E+02
curie (Ci)	becquerel (Bq)	**3.7**	**E+10**
darcy[15]	meter squared (m^2)	9.869 233	E−13
day (d)	second (s)	**8.64**	**E+04**
day (sidereal)	second (s)	8.616 409	E+04
debye (D)	coulomb meter (C · m)	3.335 641	E−30
degree (angle) (°)	radian (rad)	1.745 329	E−02
degree Celsius (temperature) (°C)	kelvin (K)	T/K = t/°C + **273.15**	
degree Celsius (temperature interval) (°C)	kelvin (K)	**1.0**	**E+00**
degree centigrade (temperature)[16]	degree Celsius (°C)	t/°C ≈ t/deg. cent.	
degree centigrade (temperature interval)[16]	degree Celsius (°C)	1.0	E+00
degree Fahrenheit (temperature) (°F)	degree Celsius (°C)	t/°C = (t/°F − **32**)/**1.8**	
degree Fahrenheit (temperature) (°F)	kelvin (K)	T/K = (t/°F + **459.67**)/**1.8**	
degree Fahrenheit (temperature interval) (°F)	degree Celsius (°C)	5.555 556	E−01
degree Fahrenheit (temperature interval) (°F)	kelvin (K)	5.555 556	E−01
degree Fahrenheit hour per British thermal unit$_{IT}$ (°F · h/Btu_{IT})	kelvin per watt (K/W)	1.895 634	E+00
degree Fahrenheit hour per British thermal unit$_{th}$ (°F · h/Btu_{th})	kelvin per watt (K/W)	1.896 903	E+00
degree Fahrenheit hour square foot per British thermal unit$_{IT}$ (°F · h · ft^2/Btu_{IT})	square meter kelvin per watt (m^2 · K/W)	1.761 102	E−01
degree Fahrenheit hour square foot per British thermal unit$_{th}$ (°F · h · ft^2/Btu_{th})	square meter kelvin per watt (m^2 · K/W)	1.762 280	E−01
degree Fahrenheit hour square foot per British thermal unit$_{IT}$ inch [°F · h · ft^2/(Btu_{IT} · in)]	meter kelvin per watt (m · K/W)	6.933 472	E+00
degree Fahrenheit hour square foot per British thermal unit$_{th}$ inch [°F · h · ft^2/(Btu_{th} · in)]	meter kelvin per watt (m · K/W)	6.938 112	E+00
degree Fahrenheit second per British thermal unit$_{IT}$ (°F · s/Btu_{IT})	kelvin per watt (K/W)	5.265 651	E−04
degree Fahrenheit second per British thermal unit$_{th}$ (°F · s/Btu_{th})	kelvin per watt (K/W)	5.269 175	E−04
degree Rankine (°R)	kelvin (K)	T/K = (T/°R)/**1.8**	
degree Rankine (temperature interval) (°R)	kelvin (K)	5.555 556	E−01
denier	kilogram per meter (kg/m)	1.111 111	E−07
denier	gram per meter (g/m)	1.111 111	E−04
dyne (dyn)	newton (N)	**1.0**	**E−05**
dyne centimeter (dyn · cm)	newton meter (N · m)	**1.0**	**E−07**
dyne per square centimeter (dyn/cm^2)	pascal (Pa)	**1.0**	**E−01**
electronvolt (eV)	joule (J)	1.602 177	E−19
EMU of capacitance (abfarad)	farad (F)	**1.0**	**E+09**
EMU of current (abampere)	ampere (A)	**1.0**	**E+01**
EMU of electric potential (abvolt)	volt (V)	**1.0**	**E−08**
EMU of inductance (abhenry)	henry (H)	**1.0**	**E−09**

[14] The exact conversion factor is 1.638 706 4 E−05.

[15] The darcy is a unit for expressing the permeability of porous solids, not area.

[16] The centigrade temperature scale is obsolete; the degree centigrade is only approximately equal to the degree Celsius.

To convert from	to	Multiply by	
EMU of resistance (abohm)	ohm (Ω)	**1.0**	**E−09**
erg (erg)	joule (J)	**1.0**	**E−07**
erg per second (erg/s)	watt (W)	**1.0**	**E−07**
erg per square centimeter second [1obrkt&1ru|/(cm^2 · s)]	watt per square meter (W/m^2)	**1.0**	**E−03**
ESU of capacitance (statfarad)	farad (F)	1.112 650	E−12
ESU of current (statampere)	ampere (A)	3.335 641	E−10
ESU of electric potential (statvolt)	volt (V)	2.997 925	E+02
ESU of inductance (stathenry)	henry (H)	8.987 552	E+11
ESU of resistance (statohm)	ohm (Ω)	8.987 552	E+11
faraday (based on carbon 12)	coulomb (C)	9.648 531	E+04
fathom (based on U.S. survey foot)[9]	meter (m)	1.828 804	E+00
fermi	meter (m)	**1.0**	**E−15**
fermi	femtometer (fm)	**1.0**	**E+00**
fluid ounce (U.S.) (fl oz)	cubic meter (m^3)	2.957 353	E−05
fluid ounce (U.S.) (fl oz)	milliliter (mL)	2.957 353	E+01
foot (ft)	meter (m)	**3.048**	**E−01**
foot (U.S. survey) (ft)[9]	meter (m)	3.048 006	E−01
footcandle	lux (lx)	1.076 391	E+01
footlambert	candela per square meter (cd/m^2)	3.426 259	E+00
foot of mercury, conventional (ftHg)[13]	pascal (Pa)	4.063 666	E+04
foot of mercury, conventional (ftHg)[13]	kilopascal (kPa)	4.063 666	E+01
foot of water (39.2 °F)[13]	pascal (Pa)	2.988 98	E+03
foot of water (39.2 °F)[13]	kilopascal (kPa)	2.988 98	E+00
foot of water, conventional (ftH_2O)[13]	pascal (Pa)	2.989 067	E+03
foot of water, conventional (ftH_2O)[13]	kilopascal (kPa)	2.989 067	E+00
foot per hour (ft/h)	meter per second (m/s)	8.466 667	E−05
foot per minute (ft/min)	meter per second (m/s)	**5.08**	**E−03**
foot per second (ft/s)	meter per second (m/s)	**3.048**	**E−01**
foot per second squared (ft/s^2)	meter per second squared (m/s^2)	**3.048**	**E−01**
foot poundal	joule (J)	4.214 011	E−02
foot pound-force (ft · lbf)	joule (J)	1.355 818	E+00
foot pound-force per hour (ft · lbf/h)	watt (W)	3.766 161	E−04
foot pound-force per minute (ft · lbf/min)	watt (W)	2.259 697	E−02
foot pound-force per second (ft · lbf/s)	watt (W)	1.355 818	E+00
foot to the fourth power (ft^4)[17]	meter to the fourth power (m^4)	8.630 975	E−03
franklin (Fr)	coulomb (C)	3.335 641	E−10
gal (Gal)	meter per second squared (m/s^2)	**1.0**	**E−02**
gallon [Canadian and U.K. (Imperial)] (gal)	cubic meter (m^3)	**4.546 09**	**E−03**
gallon [Canadian and U.K. (Imperial)] (gal)	liter (L)	**4.546 09**	**E+00**
gallon (U.S.) (gal)	cubic meter (m^3)	3.785 412	E−03
gallon (U.S.) (gal)	liter (L)	3.785 412	E+00
gallon (U.S.) per day (gal/d)	cubic meter per second (m^3/s)	4.381 264	E−08
gallon (U.S.) per day (gal/d)	liter per second (L/s)	4.381 264	E−05
gallon (U.S.) per horsepower hour [gal/(hp · h)]	cubic meter per joule (m^3/J)	1.410 089	E−09
gallon (U.S.) per horsepower hour [gal/(hp · h)]	liter per joule (L/J)	1.410 089	E−06
gallon (U.S.) per minute (gpm) (gal/min)	cubic meter per second (m^3/s)	6.309 020	E−05
gallon (U.S.) per minute (gpm) (gal/min)	liter per second (L/s)	6.309 020	E−02

[17] This is a unit for the quantity second moment of area, which is sometimes called the ''moment of section'' or ''area moment of inertia'' of a plane section about a specified axis.

To convert from	to	Multiply by	
gamma (γ)	tesla (T)	**1.0**	**E−09**
gauss (Gs, G)	tesla (T)	**1.0**	**E−04**
gilbert (Gi)	ampere (A)	7.957 747	E−01
gill [Canadian and U.K. (Imperial)] (gi)	cubic meter (m^3)	1.420 653	E−04
gill [Canadian and U.K. (Imperial)] (gi)	liter (L)	1.420 653	E−01
gill (U.S.) (gi)	cubic meter (m^3)	1.182 941	E−04
gill (U.S.) (gi)	liter (L)	1.182 941	E−01
gon (also called grade) (gon)	radian (rad)	1.570 796	E−02
gon (also called grade) (gon)	degree (angle) (°)	**9.0**	**E−01**
grain (gr)	kilogram (kg)	**6.479 891**	**E−05**
grain (gr)	milligram (mg)	**6.479 891**	**E+01**
grain per gallon (U.S.) (gr/gal)	kilogram per cubic meter (kg/m^3)	1.711 806	E−02
grain per gallon (U.S.) (gr/gal)	milligram per liter (mg/L)	1.711 806	E+01
gram-force per square centimeter (gf/cm^2)	pascal (Pa)	**9.806 65**	**E+01**
gram per cubic centimeter (g/cm^3)	kilogram per cubic meter (kg/m^3)	**1.0**	**E+03**
hectare (ha)	square meter (m^2)	**1.0**	**E+04**
horsepower (550 ft · lbf/s) (hp)	watt (W)	7.456 999	E+02
horsepower (boiler)	watt (W)	9.809 50	E+03
horsepower (electric)	watt (W)	**7.46**	**E+02**
horsepower (metric)	watt (W)	7.354 988	E+02
horsepower (U.K.)	watt (W)	7.4570	E+02
horsepower (water)	watt (W)	7.460 43	E+02
hour (h)	second (s)	**3.6**	**E+03**
hour (sidereal)	second (s)	3.590 170	E+03
hundredweight (long, 112 lb)	kilogram (kg)	5.080 235	E+01
hundredweight (short, 100 lb)	kilogram (kg)	4.535 924	E+01
inch (in)	meter (m)	**2.54**	**E−02**
inch (in)	centimeter (cm)	**2.54**	**E+00**
inch of mercury (32 °F)[13]	pascal (Pa)	3.386 38	E+03
inch of mercury (32 °F)[13]	kilopascal (kPa)	3.386 38	E+00
inch of mercury (60 °F)[13]	pascal (Pa)	3.376 85	E+03
inch of mercury (60 °F)[13]	kilopascal (kPa)	3.376 85	E+00
inch of mercury, conventional (inHg)[13]	pascal (Pa)	3.386 389	E+03
inch of mercury, conventional (inHg)[13]	kilopascal (kPa)	3.386 389	E+00
inch of water (39.2 °F)[13]	pascal (Pa)	2.490 82	E+02
inch of water (60 °F)[13]	pascal (Pa)	2.4884	E+02
inch of water, conventional (inH_2O)[13]	pascal (Pa)	2.490 889	E+02
inch per second (in/s)	meter per second (m/s)	**2.54**	**E−02**
inch per second squared (in/s^2)	meter per second squared (m/s^2)	**2.54**	**E−02**
inch to the fourth power (in^4)[17]	meter to the fourth power (m^4)	4.162 314	E−07
kayser (K)	reciprocal meter (m^{-1})	**1.0**	**E+02**
kelvin (K)	degree Celsius (°C)	$t/°C = T/K - $	**273.15**
kilocalorie$_{IT}$ ($kcal_{IT}$)	joule (J)	**4.1868**	**E+03**
kilocalorie$_{th}$ ($kcal_{th}$)	joule (J)	**4.184**	**E+03**
kilocalorie (mean) (kcal)	joule (J)	4.190 02	E+03
kilocalorie$_{th}$ per minute ($kcal_{th}$/min)	watt (W)	6.973 333	E+01
kilocalorie$_{th}$ per second ($kcal_{th}$/s)	watt (W)	**4.184**	**E+03**
kilogram-force (kgf)	newton (N)	**9.806 65**	**E+00**
kilogram-force meter (kgf · m)	newton meter (N · m)	**9.806 65**	**E+00**

To convert from	to	Multiply by	
kilogram-force per square centimeter (kgf/cm^2)	pascal (Pa)	**9.806 65**	**E+04**
kilogram-force per square centimeter (kgf/cm^2)	kilopascal (kPa)	**9.806 65**	**E+01**
kilogram-force per square meter (kgf/m^2)	pascal (Pa)	**9.806 65**	**E+00**
kilogram-force per square millimeter (kgf/mm^2)	pascal (Pa)	**9.806 65**	**E+06**
kilogram-force per square millimeter (kgf/mm^2)	megapascal (MPa)	**9.806 65**	**E+00**
kilogram-force second squared per meter ($kgf \cdot s^2/m$)	kilogram (kg)	**9.806 65**	**E+00**
kilometer per hour (km/h)	meter per second (m/s)	2.777 778	E−01
kilopond (kilogram-force) (kp)	newton (N)	**9.806 65**	**E+00**
kilowatt hour ($kW \cdot h$)	joule (J)	**3.6**	**E+06**
kilowatt hour ($kW \cdot h$)	megajoule (MJ)	**3.6**	**E+00**
kip (1 kip=1000 lbf)	newton (N)	4.448 222	E+03
kip (1 kip=1000 lbf)	kilonewton (kN)	4.448 222	E+00
kip per square inch (ksi) (kip/in^2)	pascal (Pa)	6.894 757	E+06
kip per square inch (ksi) (kip/in^2)	kilopascal (kPa)	6.894 757	E+03
knot (nautical mile per hour)	meter per second (m/s)	5.144 444	E−01
lambert[18]	candela per square meter (cd/m^2)	3.183 099	E+03
langley (cal_{th}/cm^2)	joule per square meter (J/m^2)	**4.184**	**E+04**
light year (l.y.)[19]	meter (m)	9.460 73	E+15
liter (L)[20]	cubic meter (m^3)	**1.0**	**E−03**
lumen per square foot (lm/ft^2)	lux (lx)	1.076 391	E+01
maxwell (Mx)	weber (Wb)	**1.0**	**E−08**
mho	siemens (S)	**1.0**	**E+00**
microinch	meter (m)	**2.54**	**E−08**
microinch	micrometer (μm)	**2.54**	**E−02**
micron (μ)	meter (m)	**1.0**	**E−06**
micron (μ)	micrometer (μm)	**1.0**	**E+00**
mil (0.001 in)	meter (m)	**2.54**	**E−05**
mil (0.001 in)	millimeter (mm)	**2.54**	**E−02**
mil (angle)	radian (rad)	9.817 477	E−04
mil (angle)	degree (°)	**5.625**	**E−02**
mile (mi)	meter (m)	**1.609 344**	**E+03**
mile (mi)	kilometer (km)	**1.609 344**	**E+00**
mile (based on U.S. survey foot) (mi)[9]	meter (m)	1.609 347	E+03
mile (based on U.S. survey foot) (mi)[9]	kilometer (km)	1.609 347	E+00
mile, nautical[21]	meter (m)	**1.852**	**E+03**
mile per gallon (U.S.) (mpg) (mi/gal)	meter per cubic meter (m/m^3)	4.251 437	E+05
mile per gallon (U.S.) (mpg) (mi/gal)	kilometer per liter (km/L)	4.251 437	E−01
mile per gallon (U.S.) (mpg) (mi/gal)[22]	liter per 100 kilometer (L/100 km)	divide 235.215 by number of miles per gallon	
mile per hour (mi/h)	meter per second (m/s)	**4.4704**	**E−01**
mile per hour (mi/h)	kilometer per hour (km/h)	**1.609 344**	**E+00**

[18] The exact conversion factor is $10^4/\pi$.

[19] This conversion factor is based on 1 d = 86 400 s; and 1 Julian century = 36 525 d. (See *The Astronomical Almanac for the Year 1995*, page K6, U.S. Government Printing Office, Washington, DC, 1994).

[20] In 1964 the General Conference on Weights and Measures reestablished the name ''liter'' as a special name for the cubic decimeter. Between 1901 and 1964 the liter was slightly larger (1.000 028 dm^3); when one uses high-accuracy volume data of that time, this fact must be kept in mind.

[21] The value of this unit, 1 nautical mile = 1852 m, was adopted by the First International Extraordinary Hydrographic Conference, Monaco, 1929, under the name ''International nautical mile.''

[22] See Sec. 5.

To convert from	to	Multiply by	
mile per minute (mi/min)	meter per second (m/s)	**2.682 24**	**E+01**
mile per second (mi/s)	meter per second (m/s)	**1.609 344**	**E+03**
millibar (mbar)	pascal (Pa)	**1.0**	**E+02**
millibar (mbar)	kilopascal (kPa)	**1.0**	**E−01**
millimeter of mercury, conventional ($mmHg$)[13]	pascal (Pa)	1.333 224	E+02
millimeter of water, conventional (mmH_2O)[13]	pascal (Pa)	**9.806 65**	**E+00**
minute (angle) (')	radian (rad)	2.908 882	E−04
minute (min)	second (s)	**6.0**	**E+01**
minute (sidereal)	second (s)	5.983 617	E+01
oersted (Oe)	ampere per meter (A/m)	7.957 747	E+01
ohm centimeter ($\Omega \cdot cm$)	ohm meter ($\Omega \cdot m$)	**1.0**	**E−02**
ohm circular-mil per foot	ohm meter ($\Omega \cdot m$)	1.662 426	E−09
ohm circular-mil per foot	ohm square millimeter per meter ($\Omega \cdot mm^2/m$)	1.662 426	E−03
ounce (avoirdupois) (oz)	kilogram (kg)	2.834 952	E−02
ounce (avoirdupois) (oz)	gram (g)	2.834 952	E+01
ounce (troy or apothecary) (oz)	kilogram (kg)	3.110 348	E−02
ounce (troy or apothecary) (oz)	gram (g)	3.110 348	E+01
ounce [Canadian and U.K. fluid (Imperial)] (fl oz)	cubic meter (m^3)	2.841 306	E−05
ounce [Canadian and U.K. fluid (Imperial)] (fl oz)	milliliter (mL)	2.841 306	E+01
ounce (U.S. fluid) (fl oz)	cubic meter (m^3)	2.957 353	E−05
ounce (U.S. fluid) (fl oz)	millimeter (mL)	2.957 353	E+01
ounce (avoirdupois)-force (ozf)	newton (N)	2.780 139	E−01
ounce (avoirdupois)-force inch (ozf · in)	newton meter (N · m)	7.061 552	E−03
ounce (avoirdupois)-force inch (ozf · in)	millinewton meter (mN · m)	7.061 552	E+00
ounce (avoirdupois) per cubic inch (oz/in^3)	kilogram per cubic meter (kg/m^3)	1.729 994	E+03
ounce (avoirdupois) per gallon [Canadian and U.K. (Imperial)] (oz/gal)	kilogram per cubic meter (kg/m^3)	6.236 023	E+00
ounce (avoirdupois) per gallon [Canadian and U.K. (Imperial)] (oz/gal)	gram per liter (g/L)	6.236 023	E+00
ounce (avoirdupois) per gallon (U.S.) (oz/gal)	kilogram per cubic meter (kg/m^3)	7.489 152	E+00
ounce (avoirdupois) per gallon (U.S.) (oz/gal)	gram per liter (g/L)	7.489 152	E+00
ounce (avoirdupois) per square foot (oz/ft^2)	kilogram per square meter (kg/m^2)	3.051 517	E−01
ounce (avoirdupois) per square inch (oz/in^2)	kilogram per square meter (kg/m^2)	4.394 185	E+01
ounce (avoirdupois) per square yard (oz/yd^2)	kilogram per square meter (kg/m^2)	3.390 575	E−02
parsec (pc)	meter (m)	3.085 678	E+16
peck (U.S.) (pk)	cubic meter (m^3)	8.809 768	E−03
peck (U.S.) (pk)	liter (L)	8.809 768	E+00
pennyweight (dwt)	kilogram (kg)	1.555 174	E−03
pennyweight (dwt)	gram (g)	1.555 174	E+00
perm (0 °C)	kilogram per pascal second square meter [$kg/(Pa \cdot s \cdot m^2)$]	5.721 35	E−11
perm (23 °C)	kilogram per pascal second square meter [$kg/(Pa \cdot s \cdot m^2)$]	5.745 25	E−11
perm inch (0 °C)	kilogram per pascal second meter [$kg/(Pa \cdot s \cdot m)$]	1.453 22	E−12
perm inch (23 °C)	kilogram per pascal second meter [$kg/(Pa \cdot s \cdot m)$]	1.459 29	E−12

To convert from	to	Multiply by	
phot (ph)	lux (lx)	**1.0**	**E+04**
pica (computer) (1/6 in)	meter (m)	4.233 333	E−03
pica (computer) (1/6 in)	millimeter (mm)	4.233 333	E+00
pica (printer's)	meter (m)	4.217 518	E−03
pica (printer's)	millimeter (mm)	4.217 518	E+00
pint (U.S. dry) (dry pt)	cubic meter (m^3)	5.506 105	E−04
pint (U.S. dry) (dry pt)	liter (L)	5.506 105	E−01
pint (U.S. liquid) (liq pt)	cubic meter (m^3)	4.731 765	E−04
pint (U.S. liquid) (liq pt)	liter (L)	4.731 765	E−01
point (computer) (1/72 in)	meter (m)	3.527 778	E−04
point (computer) (1/72 in)	millimeter (mm)	3.527 778	E−01
point (printer's)	meter (m)	3.514 598	E−04
point (printer's)	millimeter (mm)	3.514 598	E−01
poise (P)	pascal second (Pa · s)	**1.0**	**E−01**
pound (avoirdupois) (lb)[23]	kilogram (kg)	4.535 924	E−01
pound (troy or apothecary) (lb)	kilogram (kg)	3.732 417	E−01
poundal	newton (N)	1.382 550	E−01
poundal per square foot	pascal (Pa)	1.488 164	E+00
poundal second per square foot	pascal second (Pa · s)	1.488 164	E+00
pound foot squared (lb · ft^2)	kilogram meter squared (kg · m^2)	4.214 011	E−02
pound-force (lbf)[24]	newton (N)	4.448 222	E+00
pound-force foot (lbf · ft)	newton meter (N · m)	1.355 818	E+00
pound-force foot per inch (lbf · ft/in)	newton meter per meter (N · m/m)	5.337 866	E+01
pound-force inch (lbf · in)	newton meter (N · m)	1.129 848	E−01
pound-force inch per inch (lbf · in/in)	newton meter per meter (N · m/m)	4.448 222	E+00
pound-force per foot (lbf/ft)	newton per meter (N/m)	1.459 390	E+01
pound-force per inch (lbf/in)	newton per meter (N/m)	1.751 268	E+02
pound-force per pound (lbf/lb) (thrust to mass ratio)	newton per kilogram (N/kg)	**9.806 65**	**E+00**
pound-force per square foot (lbf/ft^2)	pascal (Pa)	4.788 026	E+01
pound-force per square inch (psi) (lbf/in^2)	pascal (Pa)	6.894 757	E+03
pound-force per square inch (psi) (lbf/in^2)	kilopascal (kPa)	6.894 757	E+00
pound-force second per square foot (lbf · s/ft^2)	pascal second (Pa · s)	4.788 026	E+01
pound-force second per square inch (lbf · s/in^2)	pascal second (Pa · s)	6.894 757	E+03
pound inch squared (lb · in^2)	kilogram meter squared (kg · m^2)	2.926 397	E−04
pound per cubic foot (lb/ft^3)	kilogram per cubic meter (kg/m^3)	1.601 846	E+01
pound per cubic inch (lb/in^3)	kilogram per cubic meter (kg/m^3)	2.767 990	E+04
pound per cubic yard (lb/yd^3)	kilogram per cubic meter (kg/m^3)	5.932 764	E−01
pound per foot (lb/ft)	kilogram per meter (kg/m)	1.488 164	E+00
pound per foot hour [lb/(ft · h)]	pascal second (Pa · s)	4.133 789	E−04
pound per foot second [lb/(ft · s)]	pascal second (Pa · s)	1.488 164	E+00
pound per gallon [Canadian and U.K. (Imperial)] (lb/gal)	kilogram per cubic meter (kg/m^3)	9.977 637	E+01
pound per gallon [Canadian and U.K. (Imperial)] (lb/gal)	kilogram per liter (kg/L)	9.977 637	E−02
pound per gallon (U.S.) (lb/gal)	kilogram per cubic meter (kg/m^3)	1.198 264	E+02
pound per gallon (U.S.) (lb/gal)	kilogram per liter (kg/L)	1.198 264	E−01
pound per horsepower hour [lb/(hp · h)]	kilogram per joule (kg/J)	1.689 659	E−07
pound per hour (lb/h)	kilogram per second (kg/s)	1.259 979	E−04

[23] The exact conversion factor is 4.535 923 7 E−01. All units in Secs. 8 and 9 that contain the pound refer to the avoirdupois pound.

[24] If the local value of the acceleration of free fall is taken as $g_n = 9.806\ 65\ m/s^2$ (the standard value), the exact conversion factor is 4.448 221 615 260 5 E+00.

To convert from	to	Multiply by	
pound per inch (lb/in)	kilogram per meter (kg/m)	1.785 797	E+01
pound per minute (lb/min)	kilogram per second (kg/s)	7.559 873	E−03
pound per second (lb/s)	kilogram per second (kg/s)	4.535 924	E−01
pound per square foot (lb/ft^2)	kilogram per square meter (kg/m^2)	4.882 428	E+00
pound per square inch (*not* pound-force) (lb/in^2)	kilogram per square meter (kg/m^2)	7.030 696	E+02
pound per yard (lb/yd)	kilogram per meter (kg/m)	4.960 546	E−01
psi (pound-force per square inch) (lbf/in^2)	pascal (Pa)	6.894 757	E+03
psi (pound-force per square inch) (lbf/in^2)	kilopascal (kPa)	6.894 757	E+00
quad (10^{15} Btu$_{IT}$)[11]	joule (J)	1.055 056	E+18
quart (U.S. dry) (dry qt)	cubic meter (m^3)	1.101 221	E−03
quart (U.S. dry) (dry qt)	liter (L)	1.101 221	E+00
quart (U.S. liquid) (liq qt)	cubic meter (m^3)	9.463 529	E−04
quart (U.S. liquid) (liq qt)	liter (L)	9.463 529	E−01
rad (absorbed dose) (rad)	gray (Gy)	**1.0**	**E−02**
rem (rem)	sievert (Sv)	**1.0**	**E−02**
revolution (r)	radian (rad)	6.283 185	E+00
revolution per minute (rpm) (r/min)	radian per second (rad/s)	1.047 198	E−01
rhe	reciprocal pascal second [(Pa · s)$^{-1}$]	**1.0**	**E+01**
rod (based on U.S. survey foot) (rd)[9]	meter (m)	5.029 210	E+00
roentgen (R)	coulomb per kilogram (C/kg)	**2.58**	**E−04**
rpm (revolution per minute) (r/min)	radian per second (rad/s)	1.047 198	E−01
second (angle) (")	radian (rad)	4.848 137	E−06
second (sidereal)	second (s)	9.972 696	E−01
shake	second (s)	**1.0**	**E−08**
shake	nanosecond (ns)	**1.0**	**E+01**
slug (slug)	kilogram (kg)	1.459 390	E+01
slug per cubic foot (slug/ft^3)	kilogram per cubic meter (kg/m^3)	5.153 788	E+02
slug per foot second [slug/(ft · s)]	pascal second (Pa · s)	4.788 026	E+01
square foot (ft^2)	square meter (m^2)	**9.290 304**	**E−02**
square foot per hour (ft^2/h)	square meter per second (m^2/s)	**2.580 64**	**E−05**
square foot per second (ft^2/s)	square meter per second (m^2/s)	**9.290 304**	**E−02**
square inch (in^2)	square meter (m^2)	**6.4516**	**E−04**
square inch (in^2)	square centimeter (cm^2)	**6.4516**	**E+00**
square mile (mi^2)	square meter (m^2)	2.589 988	E+06
square mile (mi^2)	square kilometer (km^2)	2.589 988	E+00
square mile (based on U.S. survey foot) (mi^2)[9]	square meter (m^2)	2.589 998	E+06
square mile (based on U.S. survey foot) (mi^2)[9]	square kilometer (km^2)	2.589 998	E+00
square yard (yd^2)	square meter (m^2)	8.361 274	E−01
statampere	ampere (A)	3.335 641	E−10
statcoulomb	coulomb (C)	3.335 641	E−10
statfarad	farad (F)	1.112 650	E−12
stathenry	henry (H)	8.987 552	E+11
statmho	siemens (S)	1.112 650	E−12
statohm	ohm (Ω)	8.987 552	E+11
statvolt	volt (V)	2.997 925	E+02
stere (st)	cubic meter (m^3)	**1.0**	**E+00**
stilb (sb)	candela per square meter (cd/m^2)	**1.0**	**E+04**
stokes (St)	meter squared per second (m^2/s)	**1.0**	**E−04**

To convert from	to	Multiply by	
tablespoon	cubic meter (m^3)	1.478 676	E−05
tablespoon	milliliter (mL)	1.478 676	E+01
teaspoon	cubic meter (m^3)	4.928 922	E−06
teaspoon	milliliter (mL)	4.928 922	E+00
tex	kilogram per meter (kg/m)	**1.0**	**E−06**
therm (EC)[25]	joule (J)	**1.055 06**	**E+08**
therm (U.S.)[25]	joule (J)	**1.054 804**	**E+08**
ton, assay (AT)	kilogram (kg)	2.916 667	E−02
ton, assay (AT)	gram (g)	2.916 667	E+01
ton-force (2000 lbf)	newton (N)	8.896 443	E+03
ton-force (2000 lbf)	kilonewton (kN)	8.896 443	E+00
ton, long (2240 lb)	kilogram (kg)	1.016 047	E+03
ton, long, per cubic yard	kilogram per cubic meter (kg/m^3)	1.328 939	E+03
ton, metric (t)	kilogram (kg)	**1.0**	**E+03**
tonne (called ‘‘metric ton’’ in U.S.) (t)	kilogram (kg)	**1.0**	**E+03**
ton of refrigeration (12 000 Btu_{IT}/h)	watt (W)	3.516 853	E+03
ton of TNT (energy equivalent)[26]	joule (J)	**4.184**	**E+09**
ton, register	cubic meter (m^3)	2.831 685	E+00
ton, short (2000 lb)	kilogram (kg)	9.071 847	E+02
ton, short, per cubic yard	kilogram per cubic meter (kg/m^3)	1.186 553	E+03
ton, short, per hour	kilogram per second (kg/s)	2.519 958	E−01
torr (Torr)	pascal (Pa)	1.333 224	E+02
unit pole	weber (Wb)	1.256 637	E−07
watt hour (W · h)	joule (J)	**3.6**	**E+03**
watt per square centimeter (W/cm^2)	watt per square meter (W/m^2)	**1.0**	**E+04**
watt per square inch (W/in^2)	watt per square meter (W/m^2)	1.550 003	E+03
watt second (W · s)	joule (J)	**1.0**	**E+00**
yard (yd)	meter (m)	**9.144**	**E−01**
year (365 days)	second (s)	**3.1536**	**E+07**
year (sidereal)	second (s)	3.155 815	E+07
year (tropical)	second (s)	3.155 693	E+07

[25] The therm (EC) is legally defined in the Council Directive of 20 December 1979, Council of the European Communities (now the European Union, EU). The therm (U.S.) is legally defined in the Federal Register of July 27, 1968. Although the therm (EC), which is based on the International Table Btu, is frequently used by engineers in the United States, the therm (U.S.) is the legal unit used by the U.S. natural gas industry.

[26] Defined (not measured) value.

Factors in **boldface** are exact

To convert from	to	Multiply by	
ACCELERATION			
acceleration of free fall, standard (g_n)	meter per second squared (m/s^2)	**9.806 65**	**E+00**
foot per second squared (ft/s^2)	meter per second squared (m/s^2)	**3.048**	**E−01**
gal (Gal)	meter per second squared (m/s^2)	**1.0**	**E−02**
inch per second squared (in/s^2)	meter per second squared (m/s^2)	**2.54**	**E−02**
ANGLE			
degree (°)	radian (rad)	1.745 329	E−02
gon (also called grade) (gon)	radian (rad)	1.570 796	E−02
gon (also called grade) (gon)	degree (°)	**9.0**	**E−01**
mil	radian (rad)	9.817 477	E−04
mil	degree (°)	**5.625**	**E−02**
minute (')	radian (rad)	2.908 882	E−04
revolution (r)	radian (rad)	6.283 185	E+00
second (")	radian (rad)	4.848 137	E−06
AREA AND SECOND MOMENT OF AREA			
acre (based on U.S. survey foot)[9]	square meter (m^2)	4.046 873	E+03
are (a)	square meter (m^2)	**1.0**	**E+02**
barn (b)	square meter (m^2)	**1.0**	**E−28**
circular mil	square meter (m^2)	5.067 075	E−10
circular mil	square millimeter (mm^2)	5.067 075	E−04
foot to the fourth power (ft^4)[17]	meter to the fourth power (m^4)	8.630 975	E−03
hectare (ha)	square meter (m^2)	**1.0**	**E+04**
inch to the fourth power (in^4)[17]	meter to the fourth power (m^4)	4.162 314	E−07
square foot (ft^2)	square meter (m^2)	**9.290 304**	**E−02**
square inch (in^2)	square meter (m^2)	**6.4516**	**E−04**
square inch (in^2)	square centimeter (cm^2)	**6.4516**	**E+00**
square mile (mi^2)	square meter (m^2)	2.589 988	E+06
square mile (mi^2)	square kilometer (km^2)	2.589 988	E+00
square mile (based on U.S. survey foot) (mi^2)[9]	square meter (m^2)	2.589 998	E+06
square mile (based on U.S. survey foot) (mi^2)[9]	square kilometer (km^2)	2.589 998	E+00
square yard (yd^2)	square meter (m^2)	8.361 274	E−01
CAPACITY (see VOLUME)			
DENSITY (that is, MASS DENSITY — see MASS DIVIDED BY VOLUME)			
ELECTRICITY and MAGNETISM			
abampere	ampere (A)	**1.0**	**E+01**
abcoulomb	coulomb (C)	**1.0**	**E+01**
abfarad	farad (F)	**1.0**	**E+09**
abhenry	henry (H)	**1.0**	**E−09**
abmho	siemens (S)	**1.0**	**E+09**
abohm	ohm (Ω)	**1.0**	**E−09**
abvolt	volt (V)	**1.0**	**E−08**
ampere hour (A · h)	coulomb (C)	**3.6**	**E+03**

To convert from	to	Multiply by	
biot (Bi)	ampere (A)	**1.0**	**E+01**
EMU of capacitance (abfarad)	farad (F)	**1.0**	**E+09**
EMU of current (abampere)	ampere (A)	**1.0**	**E+01**
EMU of electric potential (abvolt)	volt (V)	**1.0**	**E−08**
EMU of inductance (abhenry)	henry (H)	**1.0**	**E−09**
EMU of resistance (abohm)	ohm (Ω)	**1.0**	**E−09**
ESU of capacitance (statfarad)	farad (F)	1.112 650	E−12
ESU of current (statampere)	ampere (A)	3.335 641	E−10
ESU of electric potential (statvolt)	volt (V)	2.997 925	E+02
ESU of inductance (stathenry)	henry (H)	8.987 552	E+11
ESU of resistance (statohm)	ohm (Ω)	8.987 552	E+11
faraday (based on carbon 12)	coulomb (C)	9.648 531	E+04
franklin (Fr)	coulomb (C)	3.335 641	E−10
gamma (γ)	tesla (T)	**1.0**	**E−09**
gauss (Gs, G)	tesla (T)	**1.0**	**E−04**
gilbert (Gi)	ampere (A)	7.957 747	E−01
maxwell (Mx)	weber (Wb)	**1.0**	**E−08**
mho	siemens (S)	**1.0**	**E+00**
oersted (Oe)	ampere per meter (A/m)	7.957 747	E+01
ohm centimeter (Ω · cm)	ohm meter (Ω · m)	**1.0**	**E−02**
ohm circular-mil per foot	ohm meter (Ω · m)	1.662 426	E−09
ohm circular-mil per foot	ohm square millimeter per meter ($\Omega \cdot mm^2/m$)	1.662 426	E−03
statampere	ampere (A)	3.335 641	E−10
statcoulomb	coulomb (C)	3.335 641	E−10
statfarad	farad (F)	1.112 650	E−12
stathenry	henry (H)	8.987 552	E+11
statmho	siemens (S)	1.112 650	E−12
statohm	ohm (Ω)	8.987 552	E+11
statvolt	volt (V)	2.997 925	E+02
unit pole	weber (Wb)	1.256 637	E−07

ENERGY (includes WORK)

British thermal unit$_{IT}$ (Btu$_{IT}$)[11]	joule (J)	1.055 056	E+03
British thermal unit$_{th}$ (Btu$_{th}$)[11]	joule (J)	1.054 350	E+03
British thermal unit (mean) (Btu)	joule (J)	1.055 87	E+03
British thermal unit (39 °F) (Btu)	joule (J)	1.059 67	E+03
British thermal unit (59 °F) (Btu)	joule (J)	1.054 80	E+03
British thermal unit (60 °F) (Btu)	joule (J)	1.054 68	E+03
calorie$_{IT}$ (cal$_{IT}$)[11]	joule (J)	**4.1868**	**E+00**
calorie$_{th}$ (cal$_{th}$)[11]	joule (J)	**4.184**	**E+00**
calorie (mean) (cal)	joule (J)	4.190 02	E+00
calorie (15 °C) (cal$_{15}$)	joule (J)	4.185 80	E+00
calorie (20 °C) (cal$_{20}$)	joule (J)	4.181 90	E+00
calorie$_{IT}$, kilogram (nutrition)[12]	joule (J)	**4.1868**	**E+03**
calorie$_{th}$, kilogram (nutrition)[12]	joule (J)	**4.184**	**E+03**
calorie (mean), kilogram (nutrition)[12]	joule (J)	4.190 02	E+03
electronvolt (eV)	joule (J)	1.602 177	E−19
erg (erg)	joule (J)	**1.0**	**E−07**
foot poundal	joule (J)	4.214 011	E−02
foot pound-force (ft · lbf)	joule (J)	1.355 818	E+00
kilocalorie$_{IT}$ (kcal$_{IT}$)	joule (J)	**4.1868**	**E+03**
kilocalorie$_{th}$ (kcal$_{th}$)	joule (J)	**4.184**	**E+03**
kilocalorie (mean) (kcal)	joule (J)	4.190 02	E+03

To convert from	to	Multiply by	
kilowatt hour (kW · h)	joule (J)	**3.6**	**E+06**
kilowatt hour (kW · h)	megajoule (MJ)	**3.6**	**E+00**
quad (10^{15} Btu_{IT})[11]	joule (J)	1.055 056	E+18
therm (EC)[25]	joule (J)	**1.055 06**	**E+08**
therm (U.S.)[25]	joule (J)	**1.054 804**	**E+08**
ton of TNT (energy equivalent)[26]	joule (J)	**4.184**	**E+09**
watt hour (W · h)	joule (J)	**3.6**	**E+03**
watt second (W · s)	joule (J)	**1.0**	**E+00**

ENERGY DIVIDED BY AREA TIME

erg per square centimeter second |1obrkt&1ru|/(cm^2 · s)]	watt per square meter (W/m^2)	**1.0**	**E−03**
watt per square centimeter (W/cm^2)	watt per square meter (W/m^2)	**1.0**	**E+04**
watt per square inch (W/in^2)	watt per square meter (W/m^2)	1.550 003	E+03

FLOW (see MASS DIVIDED BY TIME or VOLUME DIVIDED BY TIME)

FORCE

dyne (dyn)	newton (N)	**1.0**	**E−05**
kilogram-force (kgf)	newton (N)	**9.806 65**	**E+00**
kilopond (kilogram-force) (kp)	newton (N)	**9.806 65**	**E+00**
kip (1 kip=1000 lbf)	newton (N)	4.448 222	E+03
kip (1 kip=1000 lbf)	kilonewton (kN)	4.448 222	E+00
ounce (avoirdupois)-force (ozf)	newton (N)	2.780 139	E−01
poundal	newton (N)	1.382 550	E−01
pound-force (lbf)[24]	newton (N)	4.448 222	E+00
pound-force per pound (lbf/lb) (thrust to mass ratio)	newton per kilogram (N/kg)	**9.806 65**	**E+00**
ton-force (2000 lbf)	newton (N)	8.896 443	E+03
ton-force (2000 lbf)	kilonewton (kN)	8.896 443	E+00

FORCE DIVIDED BY AREA (see PRESSURE)

FORCE DIVIDED BY LENGTH

pound-force per foot (lbf/ft)	newton per meter (N/m)	1.459 390	E+01
pound-force per inch (lbf/in)	newton per meter (N/m)	1.751 268	E+02

HEAT

Available Energy

British thermal $unit_{IT}$ per cubic foot (Btu_{IT}/ft^3)	joule per cubic meter (J/m^3)	3.725 895	E+04
British thermal $unit_{th}$ per cubic foot (Btu_{th}/ft^3)	joule per cubic meter (J/m^3)	3.723 403	E+04
British thermal $unit_{IT}$ per pound (Btu_{IT}/lb)	joule per kilogram (J/kg)	**2.326**	**E+03**
British thermal $unit_{th}$ per pound (Btu_{th}/lb)	joule per kilogram (J/kg)	2.324 444	E+03
$calorie_{IT}$ per gram (cal_{IT}/g)	joule per kilogram (J/kg)	**4.1868**	**E+03**
$calorie_{th}$ per gram (cal_{th}/g)	joule per kilogram (J/kg)	**4.184**	**E+03**

Coefficient of Heat Transfer

British thermal $unit_{IT}$ per hour square foot degree Fahrenheit [Btu_{IT}/(h · ft^2 · °F)]	watt per square meter kelvin [W/(m^2 · K)]	5.678 263	E+00
British thermal $unit_{th}$ per hour square foot degree Fahrenheit [Btu_{th}/(h · ft^2 · °F)]	watt per square meter kelvin [W/(m^2 · K)]	5.674 466	E+00
British thermal $unit_{IT}$ per second square foot degree Fahrenheit [Btu_{IT}/(s · ft^2 · °F)]	watt per square meter kelvin [W/(m^2 · K)]	2.044 175	E+04
British thermal $unit_{th}$ per second square foot degree Fahrenheit [Btu_{th}/(s · ft^2 · °F)]	watt per square meter kelvin [W/(m^2 · K)]	2.042 808	E+04

To convert from	to	Multiply by	
Density of Heat			
British thermal unit$_{IT}$ per square foot (Btu_{IT}/ft^2)	joule per square meter (J/m^2)	1.135 653	E+04
British thermal unit$_{th}$ per square foot (Btu_{th}/ft^2)	joule per square meter (J/m^2)	1.134 893	E+04
calorie$_{th}$ per square centimeter (cal_{th}/cm^2)	joule per square meter (J/m^2)	**4.184**	**E+04**
langley (cal_{th}/cm^2)	joule per square meter (J/m^2)	**4.184**	**E+04**
Density of Heat Flow Rate			
British thermal unit$_{IT}$ per square foot hour [$Btu_{IT}/(ft^2 \cdot h)$]	watt per square meter (W/m^2)	3.154 591	E+00
British thermal unit$_{th}$ per square foot hour [$Btu_{th}/(ft^2 \cdot h)$]	watt per square meter (W/m^2)	3.152 481	E+00
British thermal unit$_{th}$ per square foot minute [$Btu_{th}/(ft^2 \cdot min)$]	watt per square meter (W/m^2)	1.891 489	E+02
British thermal unit$_{IT}$ per square foot second [$Btu_{IT}/(ft^2 \cdot s)$]	watt per square meter (W/m^2)	1.135 653	E+04
British thermal unit$_{th}$ per square foot second [$Btu_{th}/(ft^2 \cdot s)$]	watt per square meter (W/m^2)	1.134 893	E+04
British thermal unit$_{th}$ per square inch second [$Btu_{th}/(in^2 \cdot s)$]	watt per square meter (W/m^2)	1.634 246	E+06
calorie$_{th}$ per square centimeter minute [$cal_{th}/(cm^2 \cdot min)$]	watt per square meter (W/m^2)	6.973 333	E+02
calorie$_{th}$ per square centimeter second [$cal_{th}/(cm^2 \cdot s)$]	watt per square meter (W/m^2)	**4.184**	**E+04**
Fuel Consumption			
gallon (U.S.) per horsepower hour [$gal/(hp \cdot h)$]	cubic meter per joule (m^3/J)	1.410 089	E−09
gallon (U.S.) per horsepower hour [$gal/(hp \cdot h)$]	liter per joule (L/J)	1.410 089	E−06
mile per gallon (U.S.) (mpg) (mi/gal)	meter per cubic meter (m/m^3)	4.251 437	E+05
mile per gallon (U.S.) (mpg) (mi/gal)	kilometer per liter (km/L)	4.251 437	E−01
mile per gallon (U.S.) (mpg) (mi/gal)[22]	liter per 100 kilometer (L/100 km)	divide 235.215 by number of miles per gallon	
pound per horsepower hour [$lb/(hp \cdot h)$]	kilogram per joule (kg/J)	1.689 659	E−07
Heat Capacity and Entropy			
British thermal unit$_{IT}$ per degree Fahrenheit ($Btu_{IT}/°F$)	joule per kelvin (J/k)	1.899 101	E+03
British thermal unit$_{th}$ per degree Fahrenheit ($Btu_{th}/°F$)	joule per kelvin (J/k)	1.897 830	E+03
British thermal unit$_{IT}$ per degree Rankine ($Btu_{IT}/°R$)	joule per kelvin (J/k)	1.899 101	E+03
British thermal unit$_{th}$ per degree Rankine ($Btu_{th}/°R$)	joule per kelvin (J/k)	1.897 830	E+03
Heat Flow Rate			
British thermal unit$_{IT}$ per hour (Btu_{IT}/h)	watt (W)	2.930 711	E−01
British thermal unit$_{th}$ per hour (Btu_{th}/h)	watt (W)	2.928 751	E−01
British thermal unit$_{th}$ per minute (Btu_{th}/min)	watt (W)	1.757 250	E+01
British thermal unit$_{IT}$ per second (Btu_{IT}/s)	watt (W)	1.055 056	E+03
British thermal unit$_{th}$ per second (Btu_{th}/s)	watt (W)	1.054 350	E+03
calorie$_{th}$ per minute (cal_{th}/min)	watt (W)	6.973 333	E−02
calorie$_{th}$ per second (cal_{th}/s)	watt (W)	**4.184**	**E+00**
kilocalorie$_{th}$ per minute ($kcal_{th}/min$)	watt (W)	6.973 333	E+01
kilocalorie$_{th}$ per second ($kcal_{th}/s$)	watt (W)	**4.184**	**E+03**
ton of refrigeration (12 000 Btu_{IT}/h)	watt (W)	3.516 853	E+03

To convert from	to	Multiply by	
Specific Heat Capacity and Specific Entropy			
British thermal unit$_{IT}$ per pound degree Fahrenheit [Btu$_{IT}$/(lb · °F)]	joule per kilogram kelvin [J/(kg · K)]	**4.1868**	**E+03**
British thermal unit$_{th}$ per pound degree Fahrenheit [Btu$_{th}$/(lb · °F)]	joule per kilogram kelvin [J/(kg · K)]	**4.184**	**E+03**
British thermal unit$_{IT}$ per pound degree Rankine [Btu$_{IT}$/(lb · °R)]	joule per kilogram kelvin [J/(kg · K)]	**4.1868**	**E+03**
British thermal unit$_{th}$ per pound degree Rankine [Btu$_{th}$/(lb · °R)]	joule per kilogram kelvin [J/(kg · K)]	**4.184**	**E+03**
calorie$_{IT}$ per gram degree Celsius [cal$_{IT}$/(g · °C)]	joule per kilogram kelvin [J/(kg · K)]	**4.1868**	**E+03**
calorie$_{th}$ per gram degree Celsius [cal$_{th}$/(g · °C)]	joule per kilogram kelvin [J/(kg · K)]	**4.184**	**E+03**
calorie$_{IT}$ per gram kelvin [cal$_{IT}$/(g · K)]	joule per kilogram kelvin [J/(kg · K)]	**4.1868**	**E+03**
calorie$_{th}$ per gram kelvin [cal$_{th}$/(g · K)]	joule per kilogram kelvin [J/(kg · K)]	**4.184**	**E+03**
Thermal Conductivity			
Britsh thermal unit$_{IT}$ foot per hour square foot degree Fahrenheit [Btu$_{IT}$ · ft/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.730 735	E+00
Britsh thermal unit$_{th}$ foot per hour square foot degree Fahrenheit [Btu$_{th}$ · ft/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.729 577	E+00
Britsh thermal unit$_{IT}$ inch per hour square foot degree Fahrenheit [Btu$_{IT}$ · in/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.442 279	E−01
Britsh thermal unit$_{th}$ inch per hour square foot degree Fahrenheit [Btu$_{th}$ · in/(h · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	1.441 314	E−01
Britsh thermal unit$_{IT}$ inch per second square foot degree Fahrenheit [Btu$_{IT}$ · in/(s · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	5.192 204	E+02
Britsh thermal unit$_{th}$ inch per second square foot degree Fahrenheit [Btu$_{th}$ · in/(s · ft^2 · °F)]	watt per meter kelvin [W/(m · K)]	5.188 732	E+02
calorie$_{th}$ per centimeter second degree Celsius [cal$_{th}$/(cm · s · °C)]	watt per meter kelvin [W/(m · K)]	**4.184**	**E+02**
Thermal Diffusivity			
square foot per hour (ft^2/h)	square meter per second (m^2/s)	**2.580 64**	**E−05**
Thermal Insulance			
clo	square meter kelvin per watt (m^2 · K/W)	1.55	E−01
degree Fahrenheit hour square foot per British thermal unit$_{IT}$ (°F · h · ft^2/Btu$_{IT}$)	square meter kelvin per watt (m^2 · K/W)	1.761 102	E−01
degree Fahrenheit hour square foot per British thermal unit$_{th}$ (°F · h · ft^2/Btu$_{th}$)	square meter kelvin per watt (m^2 · K/W)	1.762 280	E−01
Thermal Resistance			
degree Fahrenheit hour per British thermal unit$_{IT}$ (°F · h/Btu$_{IT}$)	kelvin per watt (K/W)	1.895 634	E+00
degree Fahrenheit hour per British thermal unit$_{th}$ (°F · h/Btu$_{th}$)	kelvin per watt (K/W)	1.896 903	E+00
degree Fahrenheit second per British thermal unit$_{IT}$ (°F · s/Btu$_{IT}$)	kelvin per watt (K/W)	5.265 651	E−04
degree Fahrenheit second per British thermal unit$_{th}$ (°F · s/Btu$_{th}$)	kelvin per watt (K/W)	5.269 175	E−04
Thermal Resistivity			
degree Fahrenheit hour square foot per British thermal unit$_{IT}$ inch [°F · h · ft^2/(Btu$_{IT}$ · in)]	meter kelvin per watt (m · K/W)	6.933 472	E+00
degree Fahrenheit hour square foot per British thermal unit$_{th}$ inch [°F · h · ft^2/(Btu$_{th}$ · in)]	meter kelvin per watt (m · K/W)	6.938 112	E+04

To convert from	to	Multiply by	
LENGTH			
ångström (Å)	meter (m)	**1.0**	**E−10**
ångström (Å)	nanometer (nm)	**1.0**	**E−01**
astronomical unit (AU)	meter (m)	1.495 979	E+11
chain (based on U.S. survey foot) (ch)[9]	meter (m)	2.011 684	E+01
fathom (based on U.S. survey foot)[9]	meter (m)	1.828 804	E+00
fermi	meter (m)	**1.0**	**E−15**
fermi	femtometer (fm)	**1.0**	**E+00**
foot (ft)	meter (m)	**3.048**	**E−01**
foot (U.S. survey) (ft)[9]	meter (m)	3.048 006	E−01
inch (in)	meter (m)	**2.54**	**E−02**
inch (in)	centimeter (cm)	**2.54**	**E+00**
kayser (K)	reciprocal meter (m^{-1})	**1**	**E+02**
light year (l.y.)[19]	meter (m)	9.460 73	E+15
microinch	meter (m)	**2.54**	**E−08**
microinch	micrometer (μm)	**2.54**	**E−02**
micron (μ)	meter (m)	**1.0**	**E−06**
micron (μ)	micrometer (μm)	**1.0**	**E+00**
mil (0.001 in)	meter (m)	**2.54**	**E−05**
mil (0.001 in)	millimeter (mm)	**2.54**	**E−02**
mile (mi)	meter (m)	**1.609 344**	**E+03**
mile (mi)	kilometer (km)	**1.609 344**	**E+00**
mile (based on U.S. survey foot) (mi)[9]	meter (m)	1.609 347	E+03
mile (based on U.S. survey foot) (mi)[9]	kilometer (km)	1.609 347	E+00
mile, nautical[21]	meter (m)	**1.852**	**E+03**
parsec (pc)	meter (m)	3.085 678	E+16
pica (computer) (1/6 in)	meter (m)	4.233 333	E−03
pica (computer) (1/6 in)	millimeter (mm)	4.233 333	E+00
pica (printer's)	meter (m)	4.217 518	E−03
pica (printer's)	millimeter (mm)	4.217 518	E+00
point (computer) (1/72 in)	meter (m)	3.527 778	E−04
point (computer) (1/72 in)	millimeter (mm)	3.527 778	E−01
point (printer's)	meter (m)	3.514 598	E−04
point (printer's)	millimeter (mm)	3.514 598	E−01
rod (based on U.S. survey foot) (rd)[9]	meter (m)	5.029 210	E+00
yard (yd)	meter (m)	**9.144**	**E−01**
LIGHT			
candela per square inch (cd/in^2)	candela per square meter (cd/m^2)	1.550 003	E+03
footcandle	lux (lx)	1.076 391	E+01
footlambert	candela per square meter (cd/m^2)	3.426 259	E+00
lambert[18]	candela per square meter (cd/m^2)	3.183 099	E+03
lumen per square foot (lm/ft^2)	lux (lx)	1.076 391	E+01
phot (ph)	lux (lx)	**1.0**	**E+04**
stilb (sb)	candela per square meter (cd/m^2)	**1.0**	**E+04**
MASS and MOMENT OF INERTIA			
carat, metric	kilogram (kg)	**2.0**	**E−04**
carat, metric	gram (g)	**2.0**	**E−01**
grain (gr)	kilogram (kg)	**6.479 891**	**E−05**
grain (gr)	milligram (mg)	**6.479 891**	**E+01**
hundredweight (long, 112 lb)	kilogram (kg)	5.080 235	E+01
hundredweight (short, 100 lb)	kilogram (kg)	4.535 924	E+01

To convert from	to	Multiply by	
kilogram-force second squared per meter ($kgf \cdot s^2/m$)	kilogram (kg)	**9.806 65**	**E+00**
ounce (avoirdupois) (oz)	kilogram (kg)	2.834 952	E−02
ounce (avoirdupois) (oz)	gram (g)	2.834 952	E+01
ounce (troy or apothecary) (oz)	kilogram (kg)	3.110 348	E−02
ounce (troy or apothecary) (oz)	gram (g)	3.110 348	E+01
pennyweight (dwt)	kilogram (kg)	1.555 174	E−03
pennyweight (dwt)	gram (g)	1.555 174	E+00
pound (avoirdupois) (lb)[23]	kilogram (kg)	4.535 924	E−01
pound (troy or apothecary) (lb)	kilogram (kg)	3.732 417	E−01
pound foot squared ($lb \cdot ft^2$)	kilogram meter squared ($kg \cdot m^2$)	4.214 011	E−02
pound inch squared ($lb \cdot in^2$)	kilogram meter squared ($kg \cdot m^2$)	2.926 397	E−04
slug (slug)	kilogram (kg)	1.459 390	E+01
ton, assay (AT)	kilogram (kg)	2.916 667	E−02
ton, assay (AT)	gram (g)	2.916 667	E+01
ton, long (2240 lb)	kilogram (kg)	1.016 047	E+03
ton, metric (t)	kilogram (kg)	**1.0**	**E+03**
tonne (called ''metric ton'' in U.S.) (t)	kilogram (kg)	**1.0**	**E+03**
ton, short (2000 lb)	kilogram (kg)	9.071 847	E+02

MASS DENSITY (see MASS DIVIDED BY VOLUME)

MASS DIVIDED BY AREA

ounce (avoirdupois) per square foot (oz/ft^2)	kilogram per square meter (kg/m^2)	3.051 517	E−01
ounce (avoirdupois) per square inch (oz/in^2)	kilogram per square meter (kg/m^2)	4.394 185	E+01
ounce (avoirdupois) per square yard (oz/yd^2)	kilogram per square meter (kg/m^2)	3.390 575	E−02
pound per square foot (lb/ft^2)	kilogram per square meter (kg/m^2)	4.882 428	E+00
pound per square inch (*not* pound force) (lb/in^2)	kilogram per square meter (kg/m^2)	7.030 696	E+02

MASS DIVIDED BY CAPACITY (see MASS DIVIDED BY VOLUME)

MASS DIVIDED BY LENGTH

denier	kilogram per meter (kg/m)	1.111 111	E−07
denier	gram per meter (g/m)	1.111 111	E−04
pound per foot (lb/ft)	kilogram per meter (kg/m)	1.488 164	E+00
pound per inch (lb/in)	kilogram per meter (kg/m)	1.785 797	E+01
pound per yard (lb/yd)	kilogram per meter (kg/m)	4.960 546	E−01
tex	kilogram per meter (kg/m)	**1.0**	**E−06**

MASS DIVIDED BY TIME (includes FLOW)

pound per hour (lb/h)	kilogram per second (kg/s)	1.259 979	E−04
pound per minute (lb/min)	kilogram per second (kg/s)	7.559 873	E−03
pound per second (lb/s)	kilogram per second (kg/s)	4.535 924	E−01
ton, short, per hour	kilogram per second (kg/s)	2.519 958	E−01

MASS DIVIDED BY VOLUME (includes MASS DENSITY and MASS CONCENTRATION)

grain per gallon (U.S.) (gr/gal)	kilogram per cubic meter (kg/m^3)	1.711 806	E−02
grain per gallon (U.S.) (gr/gal)	milligram per liter (mg/L)	1.711 806	E+01
gram per cubic centimeter (g/cm^3)	kilogram per cubic meter (kg/m^3)	**1.0**	**E+03**
ounce (avoirdupois) per cubic inch (oz/in^3)	kilogram per cubic meter (kg/m^3)	1.729 994	E+03
ounce (avoirdupois) per gallon [Canadian and U.K. (Imperial)] (oz/gal)	kilogram per cubic meter (kg/m^3)	6.236 023	E+00
ounce (avoirdupois) per gallon [Canadian and U.K. (Imperial)] (oz/gal)	gram per liter (g/L)	6.236 023	E+00
ounce (avoirdupois) per gallon (U.S.) (oz/gal)	kilogram per cubic meter (kg/m^3)	7.489 152	E+00
ounce (avoirdupois) per gallon (U.S.) (oz/gal)	gram per liter (g/L)	7.489 152	E+00

To convert from	to	Multiply by	
pound per cubic foot (lb/ft^3)	kilogram per cubic meter (kg/m^3)	1.601 846	E+01
pound per cubic inch (lb/in^3)	kilogram per cubic meter (kg/m^3)	2.767 990	E+04
pound per cubic yard (lb/yd^3)	kilogram per cubic meter (kg/m^3)	5.932 764	E−01
pound per gallon [Canadian and U.K. (Imperial)] (lb/gal)	kilogram per cubic meter (kg/m^3)	9.977 637	E+01
pound per gallon [Canadian and U.K. (Imperial)] (lb/gal)	kilogram per liter (kg/L)	9.977 637	E−02
pound per gallon (U.S.) (lb/gal)	kilogram per cubic meter (kg/m^3)	1.198 264	E+02
pound per gallon (U.S.) (lb/gal)	kilogram per liter (kg/L)	1.198 264	E−01
slug per cubic foot (slug/ft^3)	kilogram per cubic meter (kg/m^3)	5.153 788	E+02
ton, long, per cubic yard	kilogram per cubic meter (kg/m^3)	1.328 939	E+03
ton, short, per cubic yard	kilogram per cubic meter (kg/m^3)	1.186 553	E+03

MOMENT OF FORCE or TORQUE

dyne centimeter (dyn · cm)	newton meter (N · m)	**1.0**	**E−07**
kilogram-force meter (kgf · m)	newton meter (N · m)	**9.806 65**	**E+00**
ounce (avoirdupois)-force inch (ozf · in)	newton meter (N · m)	7.061 552	E−03
ounce (avoirdupois)-force inch (ozf · in)	millinewton meter (mN · m)	7.061 552	E+00
pound-force foot (lbf · ft)	newton meter (N · m)	1.355 818	E+00
pound-force inch (lbf · in)	newton meter (N · m)	1.129 848	E−01

MOMENT OF FORCE or TORQUE, DIVIDED BY LENGTH

pound-force foot per inch (lbf · ft/in)	newton meter per meter (N · m/m)	5.337 866	E+01
pound-force inch per inch (lbf · in/in)	newton meter per meter (N · m/m)	4.448 222	E+00

PERMEABILITY

darcy[15]	meter squared (m^2)	9.869 233	E−13
perm (0 °C)	kilogram per pascal second square meter [kg/(Pa · s · m^2)]	5.721 35	E−11
perm (23 °C)	kilogram per pascal second square meter [kg/(Pa · s · m^2)]	5.745 25	E−11
perm inch (0 °C)	kilogram per pascal second meter [kg/(Pa · s · m)]	1.453 22	E−12
perm inch (23 °C)	kilogram per pascal second meter [kg/(Pa · s · m)]	1.459 29	E−12

POWER

erg per second (erg/s)	watt (W)	**1.0**	**E−07**
foot pound-force per hour (ft · lbf/h)	watt (W)	3.766 161	E−04
foot pound-force per minute (ft · lbf/min)	watt (W)	2.259 697	E−02
foot pound-force per second (ft · lbf/s)	watt (W)	1.355 818	E+00
horsepower (550 ft · lbf/s)	watt (W)	7.456 999	E+02
horsepower (boiler)	watt (W)	9.809 50	E+03
horsepower (electric)	watt (W)	**7.46**	**E+02**
horsepower (metric)	watt (W)	7.354 988	E+02
horsepower (U.K.)	watt (W)	7.4570	E+02
horsepower (water)	watt (W)	7.460 43	E+02

PRESSURE or STRESS (FORCE DIVIDED BY AREA)

atmosphere, standard (atm)	pascal (Pa)	**1.013 25**	**E+05**
atmosphere, standard (atm)	kilopascal (kPa)	**1.013 25**	**E+02**
atmosphere, technical (at)[10]	pascal (Pa)	**9.806 65**	**E+04**
atmosphere, technical (at)[10]	kilopascal (kPa)	**9.806 65**	**E+01**
bar (bar)	pascal (Pa)	**1.0**	**E+05**
bar (bar)	kilopascal (kPa)	**1.0**	**E+02**

To convert from	to	Multiply by	
centimeter of mercury (0 °C)[13]	pascal (Pa)	1.333 22	E+03
centimeter of mercury (0 °C)[13]	kilopascal (kPa)	1.333 22	E+00
centimeter of mercury, conventional (cmHg)[13]	pascal (Pa)	1.333 224	E+03
centimeter of mercury, conventional (cmHg)[13]	kilopascal (kPa)	1.333 224	E+00
centimeter of water (4 °C)[13]	pascal (Pa)	9.806 38	E+01
centimeter of water, conventional (cmH_2O)[13]	pascal (Pa)	**9.806 65**	**E+01**
dyne per square centimeter (dyn/cm^2)	pascal (Pa)	**1.0**	**E−01**
foot of mercury, conventional (ftHg)[13]	pascal (Pa)	4.063 666	E+04
foot of mercury, conventional (ftHg)[13]	kilopascal (kPa)	4.063 666	E+01
foot of water (39.2 °F)[13]	pascal (Pa)	2.988 98	E+03
foot of water (39.2 °F)[13]	kilopascal (kPa)	2.988 98	E+00
foot of water, conventional (ftH_2O)[13]	pascal (Pa)	2.989 067	E+03
foot of water, conventional (ftH_2O)[13]	kilopascal (kPa)	2.989 067	E+00
gram-force per square centimeter (gf/cm^2)	pascal (Pa)	**9.806 65**	**E+01**
inch of mercury (32 °F)[13]	pascal (Pa)	3.386 38	E+03
inch of mercury (32 °F)[13]	kilopascal (kPa)	3.386 38	E+00
inch of mercury (60 °F)[13]	pascal (Pa)	3.376 85	E+03
inch of mercury (60 °F)[13]	kilopascal (kPa)	3.376 85	E+00
inch of mercury, conventional (inHg)[13]	pascal (Pa)	3.386 389	E+03
inch of mercury, conventional (inHg)[13]	kilopascal (kPa)	3.386 389	E+00
inch of water (39.2 °F)[13]	pascal (Pa)	2.490 82	E+02
inch of water (60 °F)[13]	pascal (Pa)	2.4884	E+02
inch of water, conventional (inH_2O)[13]	pascal (Pa)	2.490 889	E+02
kilogram-force per square centimeter (kgf/cm^2)	pascal (Pa)	**9.806 65**	**E+04**
kilogram-force per square centimeter (kgf/cm^2)	kilopascal (kPa)	**9.806 65**	**E+01**
kilogram-force per square meter (kgf/m^2)	pascal (Pa)	**9.806 65**	**E+00**
kilogram-force per square millimeter (kgf/mm^2)	pascal (Pa)	**9.806 65**	**E+06**
kilogram-force per square millimeter (kgf/mm^2)	megapascal (MPa)	**9.806 65**	**E+00**
kip per square inch (ksi) (kip/in^2)	pascal (Pa)	6.894 757	E+06
kip per square inch (ksi) (kip/in^2)	kilopascal (kPa)	6.894 757	E+03
millibar (mbar)	pascal (Pa)	**1.0**	**E+02**
millibar (mbar)	kilopascal (kPa)	**1.0**	**E−01**
millimeter of mercury, conventional (mmHg)[13]	pascal (Pa)	1.333 224	E+02
millimeter of water, conventional (mmH_2O)[13]	pascal (Pa)	**9.806 65**	**E+00**
poundal per square foot	pascal (Pa)	1.488 164	E+00
pound-force per square foot (lbf/ft^2)	pascal (Pa)	4.788 026	E+01
pound-force per square inch (psi) (lbf/in^2)	pascal (Pa)	6.894 757	E+03
pound-force per square inch (psi) (lbf/in^2)	kilopascal (kPa)	6.894 757	E+00
psi (pound-force per square inch) (lbf/in^2)	pascal (Pa)	6.894 757	E+03
psi (pound-force per square inch) (lbf/in^2)	kilopascal (kPa)	6.894 757	E+00
torr (Torr)	pascal (Pa)	1.333 224	E+02

RADIOLOGY

curie (Ci)	becquerel (Bq)	**3.7**	**E+10**
rad (absorbed dose) (rad)	gray (Gy)	**1.0**	**E−02**
rem (rem)	sievert (Sv)	**1.0**	**E−02**
roentgen (R)	coulomb per kilogram (C/kg)	**2.58**	**E−04**

SPEED (see VELOCITY)

STRESS (see PRESSURE)

To convert from	to	Multiply by	
TEMPERATURE			
degree Celsius (°C)	kelvin (K)	$T/\mathrm{K} = t/°\mathrm{C} + \mathbf{273.15}$	
degree centigrade[16]	degree Celsius (°C)	$t/°\mathrm{C} \approx t$ /deg. cent.	
degree Fahrenheit (°F)	degree Celsius (°C)	$t/°\mathrm{C} = (t/°\mathrm{F} - \mathbf{32})/\mathbf{1.8}$	
degree Fahrenheit (°F)	kelvin (K)	$T/\mathrm{K} = (t/°\mathrm{F} + \mathbf{459.67})/\mathbf{1.8}$	
degree Rankine (°R)	kelvin (K)	$T/\mathrm{K} = (T/°\mathrm{R})/\mathbf{1.8}$	
kelvin (K)	degree Celsius (°C)	$t/°\mathrm{C} = T/\mathrm{K} - \mathbf{273.15}$	
TEMPERATURE INTERVAL			
degree Celsius (°C)	kelvin (K)	**1.0**	**E+00**
degree centigrade[16]	degree Celsius (°C)	1.0	E+00
degree Fahrenheit (°F)	degree Celsius (°C)	5.555 556	E−01
degree Fahrenheit (°F)	kelvin (K)	5.555 556	E−01
degree Rankine (°R)	kelvin (K)	5.555 556	E−01
TIME			
day (d)	second (s)	**8.64**	**E+04**
day (sidereal)	second (s)	8.616 409	E+04
hour (h)	second (s)	**3.6**	**E+03**
hour (sidereal)	second (s)	3.590 170	E+03
minute (min)	second (s)	**6.0**	**E+01**
minute (sidereal)	second (s)	5.983 617	E+01
second (sidereal)	second (s)	9.972 696	E−01
shake	second (s)	**1.0**	**E−08**
shake	nanosecond (ns)	**1.0**	**E+01**
year (365 days)	second (s)	**3.1536**	**E+07**
year (sidereal)	second (s)	3.155 815	E+07
year (tropical)	second (s)	3.155 693	E+07
TORQUE (see MOMENT OF FORCE)			
VELOCITY (includes SPEED)			
foot per hour (ft/h)	meter per second (m/s)	8.466 667	E−05
foot per minute (ft/min)	meter per second (m/s)	**5.08**	**E−03**
foot per second (ft/s)	meter per second (m/s)	**3.048**	**E−01**
inch per second (in/s)	meter per second (m/s)	**2.54**	**E−02**
kilometer per hour (km/h)	meter per second (m/s)	2.777 778	E−01
knot (nautical mile per hour)	meter per second (m/s)	5.144 444	E−01
mile per hour (mi/h)	meter per second (m/s)	**4.4704**	**E−01**
mile per hour (mi/h)	kilometer per hour (km/h)	**1.609 344**	**E+00**
mile per minute (mi/min)	meter per second (m/s)	**2.682 24**	**E+01**
mile per second (mi/s)	meter per second (m/s)	**1.609 344**	**E+03**
revolution per minute (rpm) (r/min)	radian per second (rad/s)	1.047 198	E−01
rpm (revolution per minute) (r/min)	radian per second (rad/s)	1.047 198	E−01
VISCOSITY, DYNAMIC			
centipoise (cP)	pascal second (Pa · s)	**1.0**	**E−03**
poise (P)	pascal second (Pa · s)	**1.0**	**E−01**
poundal second per square foot	pascal second (Pa · s)	1.488 164	E+00
pound-force second per square foot ($\mathrm{lbf \cdot s/ft^2}$)	pascal second (Pa · s)	4.788 026	E+01
pound-force second per square inch ($\mathrm{lbf \cdot s/in^2}$)	pascal second (Pa · s)	6.894 757	E+03
pound per foot hour [lb/(ft · h)]	pascal second (Pa · s)	4.133 789	E−04
pound per foot second [lb/(ft · s)]	pascal second (Pa · s)	1.488 164	E+00
rhe	reciprocal pascal second [$(\mathrm{Pa \cdot s})^{-1}$]	**1.0**	**E+01**
slug per foot second [slug/(ft · s)]	pascal second (Pa · s)	4.788 026	E+01

To convert from	to	Multiply by	
VISCOSITY, KINEMATIC			
centistokes (cSt)	meter squared per second (m^2/s)	**1.0**	**E−06**
square foot per second (ft^2/s)	meter squared per second (m^2/s)	**9.290 304**	**E−02**
stokes (St)	meter squared per second (m^2/s)	**1.0**	**E−04**
VOLUME (includes CAPACITY)			
acre-foot (based on U.S. survey foot)[9]	cubic meter (m^3)	1.233 489	E+03
barrel [for petroleum, 42 gallons (U.S.)](bbl)	cubic meter (m^3)	1.589 873	E−01
barrel [for petroleum, 42 gallons (U.S.)](bbl)	liter (L)	1.589 873	E+02
bushel (U.S.) (bu)	cubic meter (m^3)	3.523 907	E−02
bushel (U.S.) (bu)	liter (L)	3.523 907	E+01
cord (128 ft^3)	cubic meter (m^3)	3.624 556	E+00
cubic foot (ft^3)	cubic meter (m^3)	2.831 685	E−02
cubic inch (in^3)[14]	cubic meter (m^3)	1.638 706	E−05
cubic mile (mi^3)	cubic meter (m^3)	4.168 182	E+09
cubic yard (yd^3)	cubic meter (m^3)	7.645 549	E−01
cup (U.S.)	cubic meter (m^3)	2.365 882	E−04
cup (U.S.)	liter (L)	2.365 882	E−01
cup (U.S.)	milliliter (mL)	2.365 882	E+02
fluid ounce (U.S.) (fl oz)	cubic meter (m^3)	2.957 353	E−05
fluid ounce (U.S.) (fl oz)	milliliter (mL)	2.957 353	E+01
gallon [Canadian and U.K. (Imperial)] (gal)	cubic meter (m^3)	**4.546 09**	**E−03**
gallon [Canadian and U.K. (Imperial)] (gal)	liter (L)	**4.546 09**	**E+00**
gallon (U.S.) (gal)	cubic meter (m^3)	3.785 412	E−03
gallon (U.S.) (gal)	liter (L)	3.785 412	E+00
gill [Canadian and U.K. (Imperial)] (gi)	cubic meter (m^3)	1.420 653	E−04
gill [Canadian and U.K. (Imperial)] (gi)	liter (L)	1.420 653	E−01
gill (U.S.) (gi)	cubic meter (m^3)	1.182 941	E−04
gill (U.S.) (gi)	liter (L)	1.182 941	E−01
liter (L)[20]	cubic meter (m^3)	**1.0**	**E−03**
ounce [Canadian and U.K. fluid (Imperial)] (fl oz)	cubic meter (m^3)	2.841 306	E−05
ounce [Canadian and U.K. fluid (Imperial)] (fl oz)	milliliter (mL)	2.841 306	E+01
ounce (U.S. fluid) (fl oz)	cubic meter (m^3)	2.957 353	E−05
ounce (U.S. fluid) (fl oz)	milliliter (mL)	2.957 353	E+01
peck (U.S.) (pk)	cubic meter (m^3)	8.809 768	E−03
peck (U.S.) (pk)	liter (L)	8.809 768	E+00
pint (U.S. dry) (dry pt)	cubic meter (m^3)	5.506 105	E−04
pint (U.S. dry) (dry pt)	liter (L)	5.506 105	E−01
pint (U.S. liquid) (liq pt)	cubic meter (m^3)	4.731 765	E−04
pint (U.S. liquid) (liq pt)	liter (L)	4.731 765	E−01
quart (U.S. dry) (dry qt)	cubic meter (m^3)	1.101 221	E−03
quart (U.S. dry) (dry qt)	liter (L)	1.101 221	E+00
quart (U.S. liquid) (liq qt)	cubic meter (m^3)	9.463 529	E−04
quart (U.S. liquid) (liq qt)	liter (L)	9.463 529	E−01
stere (st)	cubic meter (m^3)	**1.0**	**E+00**
tablespoon	cubic meter (m^3)	1.478 676	E−05
tablespoon	milliliter (mL)	1.478 676	E+01
teaspoon	cubic meter (m^3)	4.928 922	E−06
teaspoon	milliliter (mL)	4.928 922	E+00
ton, register	cubic meter (m^3)	2.831 685	E+00

To convert from	to	Multiply by	
VOLUME DIVIDED BY TIME (includes FLOW)			
cubic foot per minute (ft^3/min)	cubic meter per second (m^3/s)	4.719 474	E−04
cubic foot per minute (ft^3/min)	liter per second (L/s)	4.719 474	E−01
cubic foot per second (ft^3/s)	cubic meter per second (m^3/s)	2.831 685	E−02
cubic inch per minute (in^3/min)	cubic meter per second (m^3/s)	2.731 177	E−07
cubic yard per minute (yd^3/min)	cubic meter per second (m^3/s)	1.274 258	E−02
gallon (U.S.) per day (gal/d)	cubic meter per second (m^3/s)	4.381 264	E−08
gallon (U.S.) per day (gal/d)	liter per second (L/s)	4.381 264	E−05
gallon (U.S.) per minute (gpm) (gal/min)	cubic meter per second (m^3/s)	6.309 020	E−05
gallon (U.S.) per minute (gpm) (gal/min)	liter per second (L/s)	6.309 020	E−02
WORK (see ENERGY)			