This page has been updated and moved. Its new location is <http://dplinux.sund.ac.uk/~manga/refer/convfact.html>.

Unit Conversion

Page last updated 11/3/1997

This page shows the data used in the unit conversion forms but it also has other conversions which are too obscure to go on the forms. The form for converting each class of unit can be obtained by clicking on the title of the section.

Notation

To represent a lot of the numbers I have used scientific notation. For instance the number 1300 is represented as 1.3E3. The 'E' can be read as 'times ten to the power of'.

Each unit is written out in full before its abbreviation is used. Some units use ^ in the abbreviation, for instance m^3. This means cubic metres or 'metres to the power of 3'.

After some of the conversion factors is another conversion in brackets. This is the conversion for the same measuring system. For instance "foot (ft) to m: 3.048E-1 (12 in)" says that as well as one foot being 0.3048m it is also exactly 12in.

How to use the conversion factors

Taking the exmaple of inch (in) to metre (m), the conversion factor is 2.54E-2 (or 0.0254):

- 12in in metres is 12*0.0254 = 0.305m

Converting the other way round is easy too - just divide by the conversion factor:

- 3m in inches is 3/0.0254 = 118in

To convert between (say) centimetres (cm) and inches (in) both conversion factors have to be used:

- 5cm in metres is 5*1E-2 = 0.05m
- 0.05m in inches is 0.05/2.54E-2 = 1.97in
- Therefore 5cm = 1.97in

Distance

millimetre (mm) to metre (m): 1E-3
centimetre (cm) to m: 1E-2
kilometre (km) to m: 1E3

inch (in) to m: 2.54E-2
foot (ft) to m: 3.048E-1 (12 in)
yard (yd) to m: 0.9144 exactly (3 ft)
fathom to m: 1.8288 (2 yd)
chain to m: 2.01168E1 (22 yd)
furlong to m: 2.01168E2 (10 chains, 220 yd)
cable - not precisely defined, 608ft (1/10 UK nautical mile) or 720 ft (120 fathoms)
mile to m: 1.609344E3 (1760 yd)
nautical mile (UK) to m: 1.853184E3 (6080 ft)

nautical mile (international) (n mile) to m: 1.852E3
league - not precisely defined, about 3 miles

astronomic(al) unit (AU) to m: 1.49597870E11
light year (l.y.) to m: 9.4607E15
parsec (pc) to m: 3.0857E16

Area

mm^2 to m^2: 1E-6
cm^2 to m^2: 1E-4
hectare to m^2: 1E4
km^2 to m^2: 1E6

in^2 to m^2: 6.4516E-4
ft^2 to m^2: 9.290304E-2 (144 in^2)
yd^2 to m^2: 8.3612736E-1 (9 ft^2)
rood to m^2: 1.01171E3 (1210 yd^2)
acre to m^2: 4.0468564224E3 (4840 yd^2)
mile^2 to m^2: 2.58998811E6 (640 acres)

Volume

mm^3 to m^3: 1E-9
cm^3 / ml to m^3: 1E-6
dm^3 / l to m^3: 1E-3
km^3 to m^3: 1E9

in^3 to m^3: 1.6387064E-5
ft^3 to m^3: 2.8316846E-2 (1728 in^3)
yd^3 to m^3: 7.64554858E-1 (27 ft^3)
mile^3 to m^3: 4.168181825E9 (5451776000 yd^3)

UK
minim (UKmin) to m^3: 5.91939E-8
fluid drachm (UK fl dr) to m^3: 3.55163E-6 (60 UKmin)
fluid ounce (UK fl oz) to m^3: 2.84131E-5 (8 UK fl dr)
gill to m^3: 1.42065E-4 (5 UK fl oz)

pint (UKpt) to m^3: 5.68261E-4 (4 gill)
quart (UKqt) to m^3: 1.13652E-3 (2 UKpt)
gallon (UKgal) to m^3: 4.54609E-3 (4 UKqt)
peck to m^3: 9.09218E-3 (2 UKgal)
bushel to m^3: 3.63687E-2 (4 peck)

US (liquid)
minim (USmin) to m^3: 6.16115E-8
fluid dram (US fl dr) to m^3: 3.69669E-6 (60 USmin)
liquid ounce (US liq oz) to m^3: 2.95735E-5 (8 US fl dr)
gill (gi) to m^3: 1.18294E-4 (4 US liq oz)
liquid pint (US liq pt) to m^3: 4.73176E-4 (4 gi)
liquid quart (US liq qt) to m^3: 9.46353E-4 (2 US liq pt)
gallon (USgal) to m^3: 3.785411784E-3 (4 US liq qt)
barrel to m^3: 1.58987E-1 (42 USgal)

US (dry)
dry pint (dry pt) to m^3: 5.50610E-4
dry quart (dry qt) to m^3: 1.10122E-3 (2 dry pt)
peck (pk) to m^3: 8.80977E-3 (8 dry qt)
bushel (bu) to m^3: 3.52391E-2 (4 pk)
dry barrel (bbl) to m^3: 1.15627E-1 (210 dry pt?)

Mass

milligram (mg) to kilogram (kg): 1E-6
gram (g) to kg: 1E-3
tonne to kg: 1E3 (1 megagram or Mg)

UK (Avoirdupois)
dram (dr) to kg: 1.77185E-3 (7000/256 grain)
ounce (oz) to kg: 2.83495E-2 (16 dr)
pound (lb) to kg: 0.45359237 exactly (16 oz and 7000 grain)
stone to kg: 6.35029 (14 lb)
slug (also gee pound) to kg: 1.45939E1
quarter (qr) to kg: 1.27006E1 (2 stone)
hundredweight (cwt) to kg: 5.08023E1 (4 qr and 112 lb)
ton (UK) (UKton) to kg: 1.016047E3 (20 cwt and 1.12 short ton)

US
dram (dr) to kg: 1.77185E-3 (as UK)
ounce (oz) to kg: 2.83495E-2 (as UK)
pound (lb) to kg: 0.45359237 (as UK)
short hundredweight (sh cwt) to kg: 4.53592E1 (100 lb)
short ton (sh tn / USton) to kg: 9.07185E2 (20 sh cwt)

Apothecaries
grain (gr in UK, no US symbol) to kg: 6.479891E-5 (1/7000 lb)
scruple to kg: 1.29598E-3 (20 grain)
drachm (dram in US) to kg: 3.88793E-3 (3 scruple)

apothecaries ounce (oz apoth in UK, oz ap in US) to kg: 3.11035E-2 (8 drachm and 1 oz tr)

Troy
grain to kg: as Apothecaries
pennyweight (dwt) to kg: 1.55517E-3 (24 grain)
troy ounce (oz tr) to kg: 3.11035E-2 (20 dwt)
troy pound (lb tr) to kg: 3.73242E-1 (12 oz tr)

Speed

km/h to m/s: 2.77778E-1
mph to m/s: 4.4704E-1
knots (international) (kn) to m/s: 5.14444E-1

Temperature

Kelvin (K): x K
= (x-273.15) °C
= (5/4)(x-273.15) °Réaumur
= (9/5)x-459.67 °F
= (9/5)x °Rankine
Celcius (also centigrade) (°C): x °C
= (x+273.15) K
= (5/4)x °Réaumur
= (1.8x+32) °F
= (1.8x+459.67) °Rankine
Réaumur (°R): x °Réaumur
= (4/5)x °C
Fahrenheit (°F): x °F
= (5/9)(x+459.67) K
= (5/9)(x-32) °C
= (25/36)(x-32) °Réaumur
= (x+459.67) °Rankine
Rankine (°R): x °Rankine
= (5/9)x K
= (5/9)(x-491.67) °C
= (25/36)(x-491.67) °Réaumur
= (x-459.67) °F

Pressure

1 pascal (Pa) is equal to one newton per square metre (Nm^-2 or kgm^-1s^-2)
pound-force per square foot (lbf/ft^2) to Pa: 4.78803E1
millimetre of mercury (mmHg) to Pa: 1.33322E2 (1.00000 torr)
torr to Pa: 1.33322E2 (=101325/760) (1.00000 mmHg)
inch of water (inH20) to Pa: 2.49089E2
inch of mercury (inHg) to Pa: 3.38639E3

pound-force per square inch (lbf/in^2) to Pa: 6.89476E3 (144 lbf/ft^2)
bar to Pa: 1E5
standard atmosphere (atm) to Pa: 1.01325E5 (760 torr)

Energy

1 joule (J) is equal to one newton metre (N.m)
electronvolt (eV) to J: 1.6021892E-19 (1*e**1V)
erg to J: 1E-7
foot pound-force (ft.lbf) to J: 1.35582
calorie (cal) to J: 4.1868
kilogram-force metre (kgf.m) to J: 9.80665
British Thermal Unit (Btu) to J: 1.05506E3
watt hour (W.h) to J: 3.6E3
kilowatt hour (kW.h) to J: 3.6E6
therm to J: 1.05506E8 (1E5 Btu)

Power

1 watt (W) is equal to one joule per second (J/s or m^2kgs^-3)
foot pound-force per second (ft.lbf/s) to W: 1.35582
kilogram-force metre per second (kgf.m/s) to W: 9.80665
horsepower (metric) to W: 7.35499E2 (75 kgf.m/s)
horsepower (hp) to W: 7.45700E2 (550 ft.lbf/s)

Force

dyne (dyn) to newton (N): 1E-5
poundal (pdl) to N: 1.38255E-1
pound-force (lbf) to N: 4.44822
kilogram-force (kgf) or kilopond (kp) to N: 9.80665
sthène (sn) to N: 1E3

Radiation

Activity
becquerel (Bq) is the SI unit of activity (of radionuclide), (equivalently s^-1)
curie (Ci) to Bq: 3.7E10 (37 GBq)

Dose
sievert (Sv) is the SI unit of dose equivalent (equivalently m^2/s^2, J/kg, Nm/kg)
rem to Sv: 1E-2 (rem is Röntgen Equivalent Man)

Exposure
coulomb per kilogram (C/kg) is the SI unit of radiation exposure
röntgen to C/kg: 2.58E-4