

CONVERSION TABLE

General Abbreviations

Ap	Apothecaries w.t.	galls	Gallons	Pt.	Pint
Av.	Average	Grs.	Grams	qt.	Quareer
Avior	Avoirdupois w.t.	hr.	Hour	Sec.	Second
avp		Imp	Imperial	Sq.	Square
Br.	British	Ins.	Inches	Sr.	Stone
Cu., C.	Cube, Cubic	Ibs.	Pounds	Tr.	Troy wt.
Cwt.	Hundred weight	liq.	Liquid	US	United States
Dr.	dram, drachm	Md.	Maund	Wt.	weight
Fl.	Fluid	Min.	Minute	Yds.	Yards
Ft.	Foot, Feet	Oz.	Ounce		

Metric System Symbols

a.	are	dm.	decimeter	Km.	Kilometre
cg.	Centigram	g., gm.	Gram	l.	litre
cl.	Centilitre	ha.	Hectare	M.	Metre
cm., C	Centimeter	hg.	Hectogram	M.g.	Miligram
dg.	Deeigram	hl.	Hectoliter	ml.	Millilitre
dkg.	Dekagram	hm.	Hectometer	M.m.	Millimetre
dkm.	Dekametre	kg., kgm.	Kilogram	q.	quintal
dlk.	Dekalitre	kilo.		t., T	metric ton .
dl.	deciliter	kl.	Kilolitre		

THE METRIC SYSTEM

The metric system is a system of weights and measure which was first adopted by France and is now almost universally used in the science and arts. The greater part of the population of the world works on the metric system. The metric is so called because it uses the 'metre' as the primary unit.

In the metric system there are three principal or primary units : the metre – the unit of length the litre (pronounced lee-ter) – the unit of capacity (usually liquid), and the Gram- the unit of weight or mass. Multiples of these units are obtained by pre fixing to the name of the principal units the Greek words deka or deca (10-ten times), hecto (100- hundred times), Kilo (1000- Thousand times), Myria (10,000- ten thousand times) and mega (1,000,000 times). The sub multiples or division are obtained by pre fixing the Latin words deci (1/10- one tenth), centi (1/100 – one hundredth, and milli (1/1000 – one thousandth). These pre-fixes form the key to the entire system.

$$1 \begin{array}{|l} \text{Metre} \\ \text{Gram} \\ \text{Litre} \end{array} = 10 \text{ Deci} \begin{array}{|l} \text{Metres} \\ \text{Grams} \\ \text{Litres} \end{array} = 100 \text{ centi} \begin{array}{|l} \text{Metres} \\ \text{Grams} \\ \text{Litres} \end{array} = 1000 \text{ milli} \begin{array}{|l} \text{Metres} \\ \text{Grams} \\ \text{Litres} \end{array}$$

$$1 \text{ Kilo} \begin{array}{|l} \text{Metre} \\ \text{Gram} \\ \text{Litre} \end{array} = 10 \text{ Hecto} \begin{array}{|l} \text{Metres} \\ \text{Grams} \\ \text{Litres} \end{array} = 100 \text{ Dekka} \begin{array}{|l} \text{Metres} \\ \text{Grams} \\ \text{Litres} \end{array} = 1000 \begin{array}{|l} \text{Metres} \\ \text{Grams} \\ \text{Litres} \end{array}$$

Metric numbers are written with the decimal Point (.) at the right of the figures denoting the units ; thus, the expression 18 metres 8 centimeters, is written -18.05 m., 58746 is read – 56 metres and 746 millimeters, 1 cm. 2.25 mm. is written as 1.225 cm. (the English System is a Fractions system while the Metric system is a 'decimal' System)

THE METRIC SYSTEM

Basic Standards: The standard relationship between English measure and Metric measure is as follows:-

1 Inch	=	25.4 Millimetres	= 2.54 cm. (exact)
1 Metre	=	39.37 inches	= 1.09 yards
1 litre	=	1.76 pints (imp)	= 0.22 Galls (Imp.)
1 Gallon (imp.)	=	4.546 litres	
1 gallon (US)	=	3.785 Litres	
1 Pound avp	=	0.4536 Kilograms.	
1 Kilogram	=	2.2046 pounds avp.	

The following fundamental standards or units are used in the metric system:-

For Length	Metre
For Mass	Kilogram or gram
For volume	Litre
For Force	Dyne or dyn
For work & energy	erg or dyne-cm.
For heat	gram-calorie or calorie
For power	watt

The metric system of units called the centimetre- gram- second (CGS) system is commonly used in scientific circles, and metre –kilogram-second (MKS) or metre-tonne-second (MTS) system is more generally used in engineering.

COMMERCIAL WEIGHTS OR UNITS OF MASS

British Units

Avoirdupois Units (avp)

Ordinary Commercial Weights

1 Dram	=	27.344 Grains
16 Drams	=	437.5 grains
	=	1 ounce (oz)
	=	0.911 oz . tr
16 ounces	=	7000 grains
	=	1 pounds (lb.)
	=	1.215 lbs. ap, tr.
	=	14.583 ozs. Tr.
14 pounds	=	1 stone
28 pounds	=	1 quarter (qr.)
4 quarters	=	1 Cwt.
	=	112 ibs.
20 cwts	=	1 ton
	=	2240 lbs.

Troy Units (tr) – Partly obsolete

fro gold and silver etc.

480 grains	=	1 oz. (Tr)
	=	1.097 ozs. avp
12 ounces	=	5760 grains
	=	1 lb. (tr)
	=	13.100 ozs. Avp.
	=	0.823 lb. avp.
175 lbs. troy	=	144 lbs. Avp
100 lbs. troy	=	82 lbs. avp.

An avp pound is heavier than a tr or ap pound, but an avp ounce is lighter than

A tr or ap ounce which are of the same weight.

The only recognized pound is the avoirdupois (avp) pound US and British pound are of the same weight.

Apothecaries Units (ap) – Dry- used for medicine.

20	Grains	=	1 scruple (scr)
3	scruples	=	60 grains
		=	1 drachm
8	drachms	=	480 grains
		=	1 ounce
12	ounces	=	5760 grains.
		=	1 pound

The apothecaries weights and measure are used by chemists in compounding medicines, but drugs and medicines are bought and sold by avoirdupois weight.

1 Pound avp	=	7000 grains	This weight of the “grains” is the same in all systems.
1 Pound tr or ap	=	5760 grains	
1 drachm (ap)	=	2.194 drams avp.	
1 dram (avp)	=	0.456 drachms ap.	

AMERICAN WEIGHTS AND MEASURES

The British systems of weights and measures are used in the United states and the following measures are different in capacity or weights although called by the same name : Ton ; Hundred weight; fluid Ounce; Gill; Pint ; Quart; Gallon (wet and dry); bushel; Peck; Dram.

American Units

1 US cwt.	= 100 pounds (avp)	= 1/20 US ton
1 US ton (short ton)	= 2000- pounds (avp)	= 20 US cwts.
1000 pounds (avp)	= 1 kip	
1 quintal US	= 0.4536 quintals metric	

Ton & Tonne explained

British ton is called “long ton”; US ton is called “short ton”; and “tonne” is metric ton, (also called tonneau or millier).

1Br. Ton = 1.120 US tons	1 US ton = 0.8939 Br. Tons
= 1.016 toonnes	= 0.9072 tonnes
= 2240 lbs. avp	= 2000 lbs. Avp
= 20 cwts. Br.	= 17.857 cwts. Br.
= 22.4 cwts. US	= 20 cwts . US
= 1016.06 kilograms	= 907.18 kilograms
2 tonne = 0.9842 Br. tone	
= 1.1023 US tone	
= 2204.6 lbs. Avp	
= 19.68 cwts Br.	1 shipping ton (merchandise) is
= 22.05 cwts US	42 cu. ft. in UK and 40 cu. ft. in US
= 1000 kilograms	

Metric Units of Weights

1 tonne	= 1,000,000 grams	= 1000 kilograms
1 quintal (q)	= 100,000 ”	= 100 ”
1 myriagram (mg)	= 10,000 ”	= 10 ”
1kilogram (kg)	= 1,000 ”	= 1 ”
1 hectogram (hg)	= 100 ”	= 1/10 ”
1 dekagram (dkg)	= 10 ”	= 1/100 ”
1 gram (g)	= 1 ”	= 1/1000 mg.
1 decigarm (dg)	= 1/10 ”	= 10 cg.
1 centigram (cg)	= 1/100 “	= 10 mg.
1 milligram (mg)	= 1/1000 “	
1 microgram	= 1/100,000 “	

The gram is the weight of one cubic centimeter or one milliliter of water ; the kilogram is the weight of one liter of water; and the one is the weight of one cubic meter of water.

The gram is used in weighing gold, silver, letters and small quantities of things. The kilogram is used by grocers and is the primary unit of mass. The tonne is used for heavy articles.

(Dekagram = decagram ; gram =- gramme; kilogram= kilogramme; milligram = milligramme. Metric ton is called tonne.) /

Grams	= grams	x 0.065	grams x 15.43 = grains
	= drachms ap	x 3.9	x 0.032 = oz. ap or tr
	= oz. ap	x 31.10	x 0.035 = oz. avp
	= oz. avp	x 28.35	kg. x 2.2 = ibs. Avp
	= ibs. Avp	x 453.6	Usually 1 grain is taken = 60 mg.
			and 1 oz. avp = 30 grams

Carat Weight – for precious stones

1. carat (metric)	= 3.086 grains	A carat has different weight at
	= 0.200 or 1/5 gram	different places.
	= 200 milligrams	

1. Some of the measures are wholly or partly obsolete, although not mentioned as such, but have been given for clarification to avoid confusion.
2. Figures for some of the conversion Factors may differ slightly in value (due to rounding off), but that will make no difference for practical purposes.

“Avoirdupois” literally means ‘things or goods that sell by weight’ “troy is derived from Troyes, a town in France where this weight was first used, “Apothecary’ means a Druggist’.

The term carat is also used to express the fineness of gold, each carat meaning a twenty-fourth part, Pure gold or fine gold is described as “24-carat fine”. Standard gold is “22-carat fine” since it contains 22 parts there are 14 parts (by weight) of pure gold.

CONVERSION FACTORS

1 grain	= 64.8 milligrams	1 milligram	= 0.0154 grains
	= 0.0648 grams	1 gram	= 15.43 ”
1 oz. avp	= 28.35 ”		= 0.035 oz avp
1 oz. tr or ap	= 31.103 ”		= 0.032 ” tr
1 lb. avp	= 453.592 ”	1 Kilogram	= 35.27 ” avp
	= 0.454 kilograms		= 32.15 ” tr
1 stone	= 6.35 ”		= 2.2 lbs. avp
1 cwt.Br.	= 50.802 ”	1 quintal	= 220.46 ” ”
	= 0.508 quintals		= 1.968 cwt.Br.
1cwt.Us	= 45.352 kilograms		= 2.2 quintalsUs
1 ton Br.	= 1016.06 ”	1 tonne	= 2204.6lbs.avp
	= 1.016 tonnes		= 0.9842 tonsBr.
1 ton Us.	= 907.2 kilograms		= 1.1023 ” Us
	= 0.907 tonnes		= 19.68 cwts. Br

MEASURES OF LENGTH

British Units

12 inches	= 1 foot
3 feet	= 1 yard
52 yards	= 1 rod, pole or perch
220 yards	= 1 furlong
8 furlongs	= 1 mile = 1760 yards
5000 feet	= 1 canal mile

Gunter's Surveying Chain

7.92 inches	= 1 link
25 links	= 1 rod or pole
100 links	= 1 chain*=66ft.
10 chains	= 1 furlong
80 chains	= 1 mile
10 sq. chains	= 1 acre

* Engineer's chain is 2 ft.

1 mil or milli-inch = one- thousandth of an inch

1 micro- inch = one- millionth of an inch

NAUTICAL MEASURES

A nautical or sea mile is the distance on the earth's surface at the sea level of one minute of arc (1/60 of a degree) of longitude of earth at the equator. A nautical mile is taken equal to 6080.26 ft. or 1.1515 statute (or land) mile- (5280*1.1515) by the British Admiralty, and 6086.07 ft. or 1.152664 statute miles by the US Coast Survey Dept. (The statute or land miles being 5280 ft.) The International nautical miles is 6076.12 ft. or 1852 metres, i.e., 1.15078 miles or 1.852 kilometres per hour.

'Knot' is a rate and not a distance and is used for expressing ship's rate of travel: 1 Knot is one nautical mile or 6080 ft. per hour =1.1515 land miles (British Admiralty) per hour (or 1.853 kilometres per hour.)