Alcoholic Drinks, Measures & Units

in the

United Kingdom

Frank Tapson

An account of the different sorts and sizes of measures used in connection with alcoholic drinks and the relationships between them

Version 1.0 (2004)

The main terms and words covered in these pages are

units of alcohol	pints
alcohol by volume (%AbV)	litres L
proof	centilitres cL
calories	millilitres mL

The definitions used for all calculations are

1 pint = 568.26125 mL (millilitres)

1 unit of alcohol = 10 mL of ethanol

100% proof = 57.06% alcohol by volume

and so this document is
valid only in the UK.

Compared with USA where definitions needed would be
1 pint = 473.176473 mL (millilitres)
1 unit of alcohol = 17.7 mL of ethanol
100% proof = 50% alcohol by volume

The accuracy to which any particular figure, or set of figures, is given is that which is considered to best fit the context.

A much fuller account of all this, together with details of the measures used in other countries, and a set of on-screen calculators to handle all the calculations can be found on the Web at

www.ex.ac.uk/trol/scol/alcohol

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Introduction and Basic Facts

There is now a considerable body of opinion supporting the view that alcohol, in 'reasonable' amounts, can be of benefit to the health and general well-being of the human body. But the big question is, what is 'reasonable'? Which, in turn, makes one ponder on how it can best be measured? It was easy for scientific people to devise their own ways, but their methods were not exactly simple. And it needed to be user-friendly to convey messages about alcohol consumption, and its effects on health, to the general public. It was thoughts like these in the late 1970's and early 80's which led to the idea of creating a 'unit of alcohol'. From hereon we refer to this simply as a 'Unit'. The advice then offered is

For 'sensible drinking' consumption of alcohol in one week should not exceed
28 Units for men 21 Units for women,
and in any single drinking 'session' the consumption should not exceed
4 Units for men 3 Units for women.
In addition, it is also recommended that at least one day of the week should be alcohol-free.

Obviously, for this to be of any use at all, we need to know what a Unit is.

First of all, we should be clear that it is not just a matter of how big the drink is, but only how much alcohol it contains. For instance, most people would probably accept without question the fact that one-eighth of a pint of whiskey can contain as much alcohol as a whole pint of beer.

So we need to know the 'strength' of the drink. Fortunately, all alcoholic drinks now carry on their container a statement showing how much alcohol they contain, given as a percentage of the volume of the liquid. This is usually written in the form 15 %AbV (short for 15 percent Alcohol by Volume), which would mean (in this case) that 15% (about one-sixth) of the volume was pure alcohol.

Then we need only to know that 10 millilitres of alcohol = 1 Unit, to be able to work out just how many Units there are in any volume of an alcoholic drink. Some idea of the variety and complexity of all this may be gained by looking at this set of results aimed at establishing a 2-Unit drink.

Small glass	(50 mL)	of liquer	(40 %AbV)	contains 2 Units
Glass	(175 mL)	of white wine	(11.5 %AbV)	contains 2 Units
Glass	(100 mL)	of sherry	(20 %AbV)	contains 2 Units
Half-pint	(284 mL)	of cider	(7 %AbV)	contains 2 Units
Pint	(568 mL)	of beer	(3.5 %AbV)	contains 2 Units

The following pages of tables, graphs and scales, are intended to remove the need to do the actual arithmetic needed, and allow those interested merely to look up the number of Units to be found in any given quantity of alcoholic drink at any particular %AbV (within the range of normal usage).

Some facts which will allow quick assessments to be made in certain situations are:

1 pint beer (3.5%) = 2 Units 1 pint beer (5%) = 3 Units
1 bottle (750 mL) white wine (12%) = 9 Units (this covers Champagne)
1 bottle (750 mL) red wine (15%) = 11 Units
A 750 mL bottle 'fills' between 4 & 6 glasses depending on their size.
1 bottle (700 mL) spirits (40%) = 28 Units

For guidance on doing a Personal Consumption Audit, go to the Web-site listed at the front and look at the Background Notes.

Formulas If

Volume = Volume of liquid measured in milliltres (mL)
%AbV = Percentage of Alcohol by Volume in that liquid
Units = Number of Units of Alcohol in that amount of that liquid.
(where 1 Unit contains 10 mL of ethanol)

Then the following relationships are true:

Units = Volume × %AbV ÷ 1000 **Volume** = Units × 1000 ÷ %AbV

%AbV = Units × 1000 ÷ Volume

Units of Alcohol

Table shows number of units of alcohol for a given volume and %AbV

%Alcohol by Volume ~ %AbV	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
40	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**
39													*25*	*27*	*29*	*31*	*33*	*35*	*37*	**39**
38									*17*	**19**	*21*	*23*					*32*	*34*	*36*	**38**
37						*11*	*13*	*15*				*22*	*24*	*26*	*28*	*30*		*33*	*35*	**37**
36					**9**				*16*	**18**	*20*			*25*	**27**	*29*	*31*	*32*	*34*	**36**
35				**7**				**14**				**21**	*23*		*26*	**28**	*30*		*33*	**35**
34							*12*			**17**			*22*	*24*		*27*	*29*	*31*	*32*	**34**
33			*5*			*10*			*15*		*18*	*20*		*23*	*25*		*28*	*30*	*31*	**33**
32					**8**			*13*		**16**		*19*	*21*		**24**	*26*	*27*	*29*	*30*	**32**
31							*11*		*14*		*17*		*20*	*22*	*23*	*25*	*26*	*28*	*29*	**31**
30		**3**		**6**		**9**		**12**		**15**		**18**		**21**		**24**		**27**		**30**
29							*10*		*13*		*16*		*19*	*20*	*22*	*23*	*25*	*26*	*28*	**29**
28					**7**					**14**		*17*	*18*		**21**		*24*	*25*	*27*	**28**
27			*4*			*8*		*11*	*12*		*15*	*16*		*19*	*20*	*22*	*23*	*24*	*26*	**27**
26							*9*			**13**			*17*	*18*		*21*	*22*	*23*	*25*	**26**
25				**5**				**10**			*14*	**15**	*16*		*19*	**20**	*21*		*24*	**25**
24					**6**				*11*	**12**	*13*			*17*	**18**	*19*	*20*	*22*	*23*	**24**
23						*7*	*8*					*14*	*15*	*16*	*17*			*21*	*22*	**23**
22								*9*	*10*	**11**	*12*	*13*	*14*			*18*	*19*	*20*	*22*	**22**
21														*15*	*16*	*17*	*18*	*19*	*21*	**21**
20	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
19														*13*	*14*	*15*	*16*	*17*	*18*	**19**
18									*8*	**9**	*10*	*11*	*12*				*15*	*16*	*17*	**18**
17						*5*	*6*	*7*				*10*	*11*	*12*	*13*	*14*		*15*	*16*	**17**
16					**4**				*7*	**8**				*11*	**12**	*13*	*14*	*14*	*15*	**16**
15				**3**				**6**			*8*	**9**	*10*		*11*	**12**	*13*		*14*	**15**
14							*5*			**7**			*9*	*10*		*11*	*12*	*13*	*13*	**14**
13			*2*			*4*			*6*		*7*	*8*		*9*	*10*		*11*	*12*	*12*	**13**
12					**3**			*5*		**6**		*7*	*8*		**9**	*10*	*10*	*11*	*11*	**12**
11							*4*		*5*		*6*		*7*	*8*	*8*	*9*	*9*	*10*		**11**
10		**1**		**2**		**3**		**4**		**5**		**6**		**7**		**8**		**9**	*10*	**10**
9							*3*		*4*		*5*		*6*	*6*	*7*	*7*	*8*	*8*	*9*	**9**
8					**2**					**4**		*5*	*5*		**6**		*7*	*7*	*8*	**8**
7			*1*			*2*		*3*	*3*		*4*	*4*		*5*	*5*	*6*	*6*	*6*	*7*	**7**
6							*2*			**3**			*4*	*4*		*5*	*5*	*5*	*6*	**6**
5				**1**				**2**			*3*	**3**	*3*		*4*	**4**	*4*		*5*	**5**
4					**1**				*2*	**2**	*2*			*3*	**3**	*3*		*4*	*4*	**4**
3						*1*	*1*					*2*	*2*	*2*	*2*		*3*	*3*	*3*	**3**
2								*1*	*1*	**1**	*1*	*1*	*1*			*2*	*2*	*2*	*2*	**2**
1														*1*	*1*	*1*	*1*	*1*	*1*	**1**

Volume in millilitres ~ mL

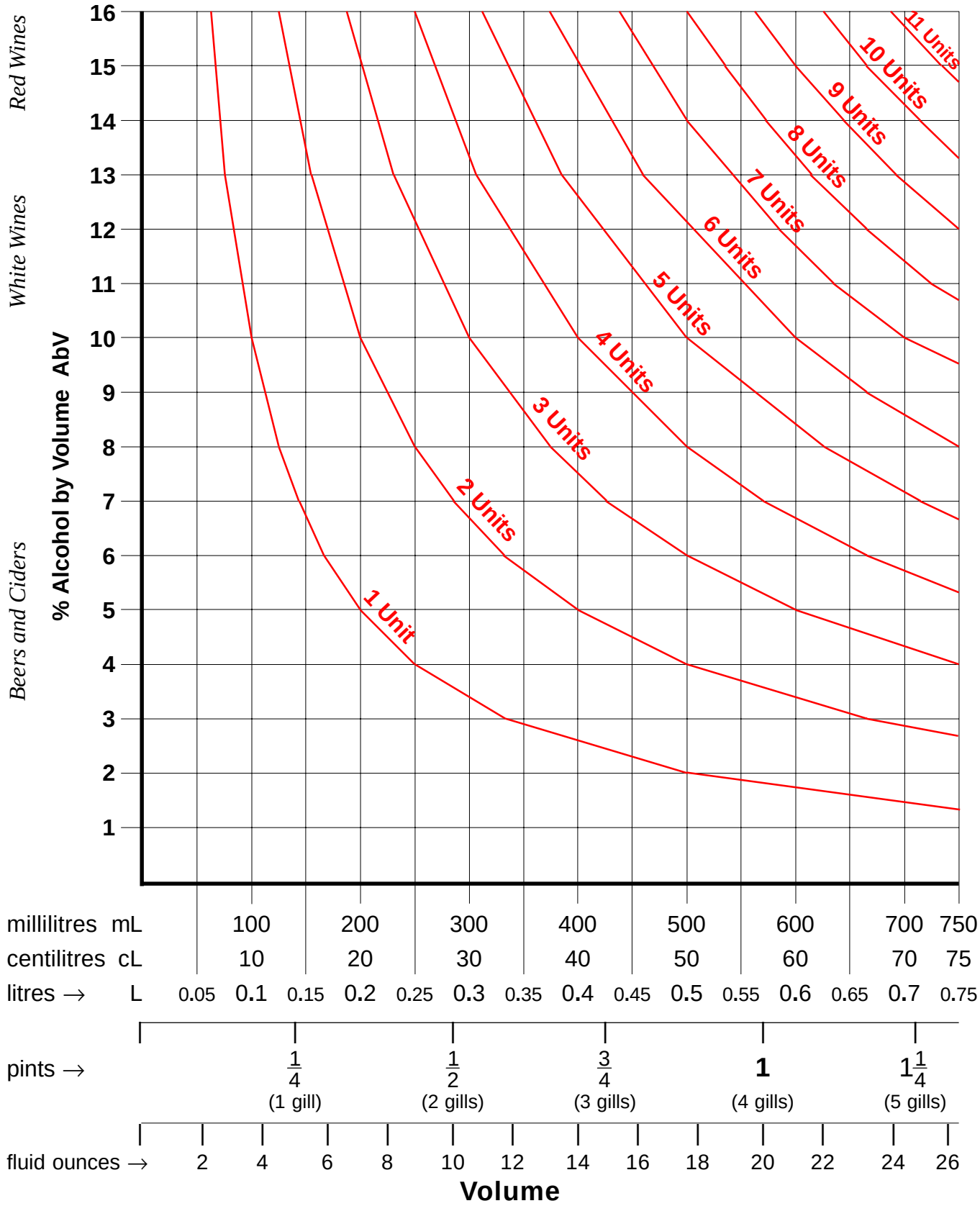
To use: find volume (in mL) at bottom of table and, from there, go straight up to level of %AbV shown on left of table and read off number of units at that point. Where no value is given, it may be estimated from those around. Figures printed in **bold** are exact. All others have been rounded to the nearest whole number.

1 pint = 568 mL

UK

Units for Volumes **0 – 750 mL** & AbV **0 – 16%**

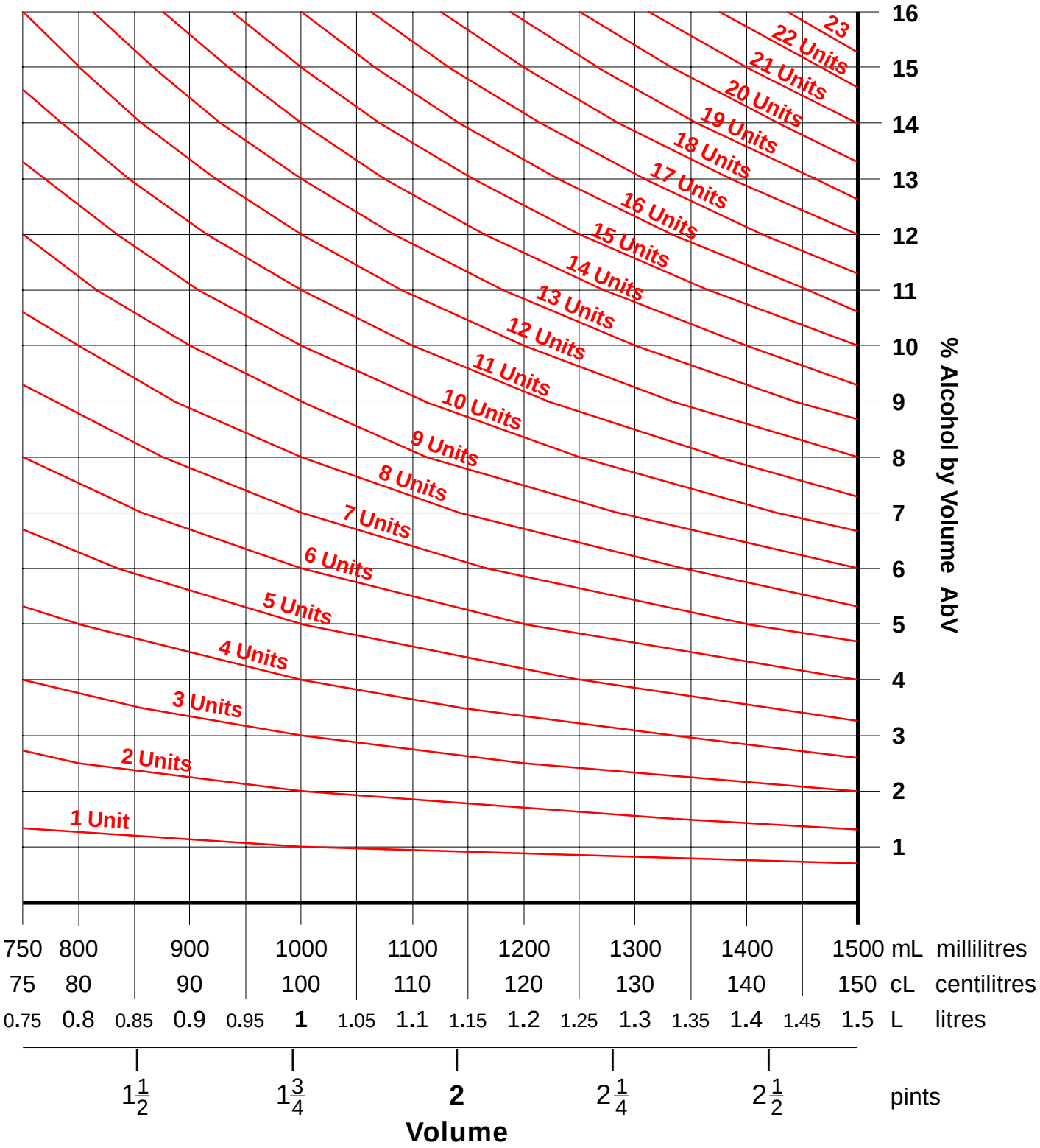
For finding the number of units of alcohol in
a volume of liquid whose %AbV is known.



To use: First find two places**:** the required volume on one of the bottom scales and the %AbV on the side scale.
Next go straight up and across respectively from these two places to meet at a point on the grid. From this point, go to the nearest red ‘curve’and read off the number of units. (*Spoilt for choice? Take the higher number*.)

Units for Volumes **750 – 1500 mL** & AbV **0 – 16%**

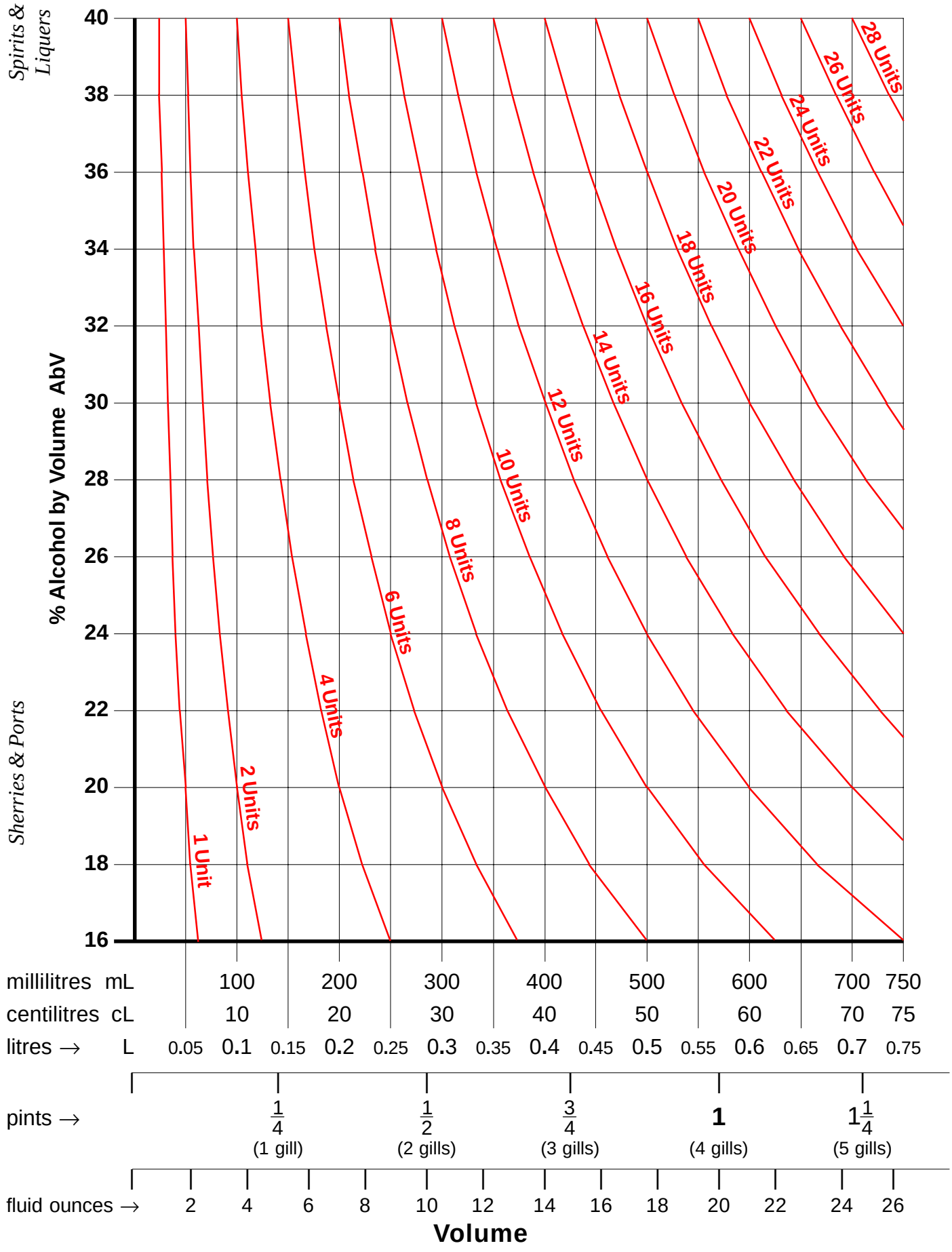
UK



UK

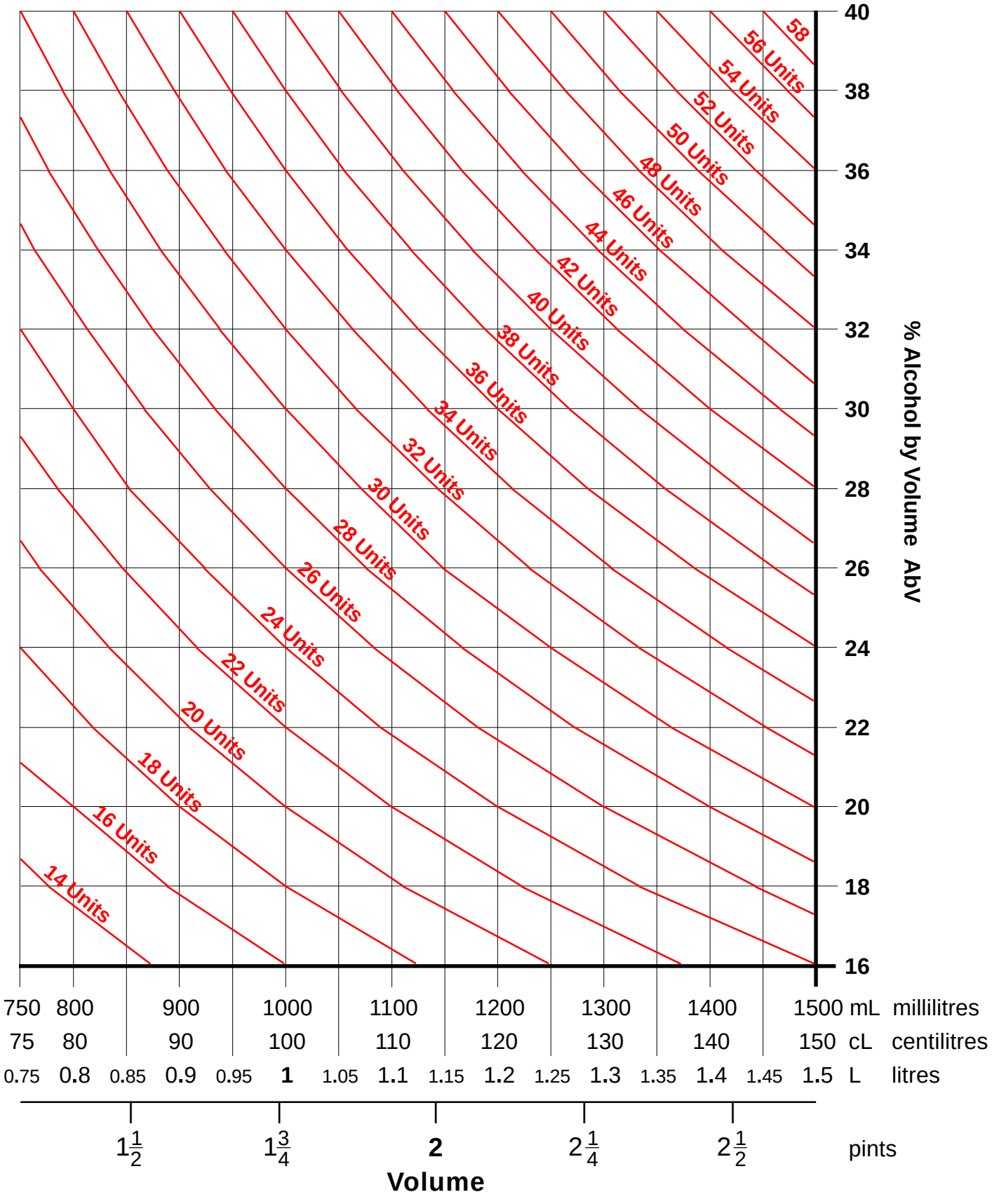
Units for Volumes **0 – 750 mL** & AbV **16 – 40%**

For finding the number of units of alcohol in
a volume of liquid whose %AbV is known.



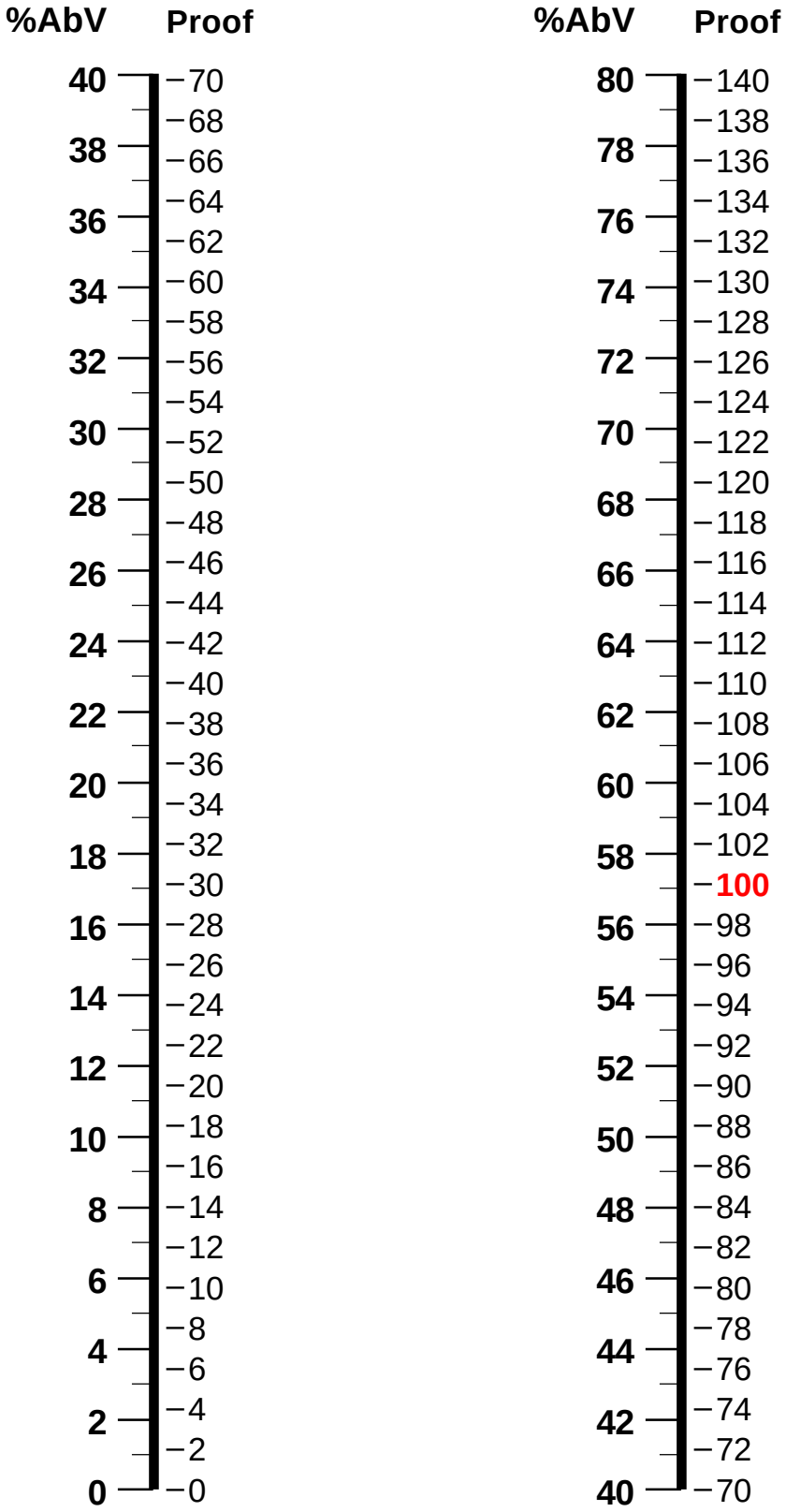
Units for Volumes **750 – 1500 mL** & AbV **16 – 40%**

UK



Proof and %AbV

Scales for converting between proof and %AbV



The connection between %AbV and proof was defined by an Act of Parliament in 1816 which in effect, but not in words, was equivalent to saying

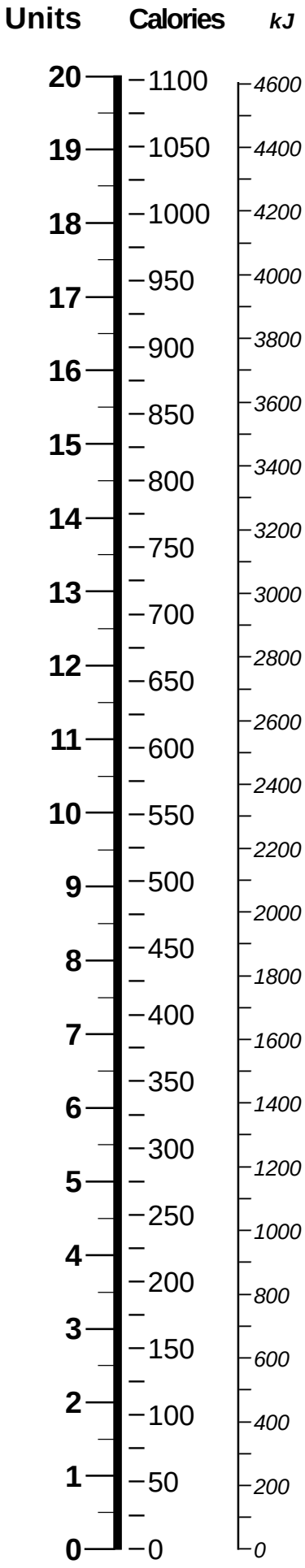
100% proof = 57.06 %AbV

from which it follows that

proof = %AbV ÷ 0.5706 %AbV = proof × 0.5706

Units and Calories

Scales for converting between them



Alcohol is a fuel, just like petrol or coal but, unlike most fuels, alcohol is also digestible by the human body. This means that the energy in alcohol (in the form of carbon and hydrogen) is metabolized and taken into our system.

It is easy to measure the amount of energy in the alcohol. It is a little over

55 Calories (or 230 kJ) in a Unit

(or in every 10 mL of alcohol)

The scales on the right make it easy to see the number of Calories (or kilojoules) there are in any quantity of Units up to 20. Bigger numbers than that can easily be dealt with by addition or multiplication.

However, it should be noted that we do not know if these calories count in the usual way towards our diet. Some research has reported that drinking in moderation (that is within the accepted guidelines) has no appreciable effect on body-mass. But that only applies to wine and spirits which have almost no calories other than what is in the alcohol.

BEER, and similar drinks, are a different matter. In that case the beverage itself has a definite calorie content apart from that of the alcohol. Unfortunately, it is not a regular amount and so cannot be forecast, since it depends heavily on how the beer was made. Finding exactly what the calorie content is requires a full analysis of the actual beer. To give some idea of how much it can vary, one survey of over one hundred beers found between 20 and 90 Calories per 100 mL sample from each beer. That did include the calories from the alcohol which (by estimation) ranged from about 5 to 20 Calories. But there was no relationship between the alcohol content and the total calorie content of the beer.

Table shows number of **units of alcohol** for a given volume and %AbV

%Alcohol by Volume ~ %AbV (1 - 20)	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
20	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
19														*13*	*14*	*15*	*16*	*17*	*18*	**19**
18									*8*	**9**	*10*	*11*	*12*				*15*	*16*	*17*	**18**
17						*5*	*6*	*7*				*10*	*11*	*12*	*13*	*14*		*15*	*16*	**17**
16					**4**				*7*	**8**				*11*	**12**	*13*	*14*	*14*	*15*	**16**
15				**3**				**6**			*8*	**9**	*10*		*11*	**12**	*13*		*14*	**15**
14							*5*			**7**			*9*	*10*		*11*	*12*	*13*	*13*	**14**
13			*2*			*4*			*6*		*7*	*8*		*9*	*10*		*11*	*12*	*12*	**13**
12					**3**			*5*		**6**		*7*	*8*		**9**	*10*	*10*	*11*	*11*	**12**
11							*4*		*5*		*6*		*7*	*8*	*8*	*9*	*9*	*10*		**11**
10		**1**		**2**		**3**		**4**		**5**		**6**		**7**		**8**		**9**	*10*	**10**
9							*3*		*4*		*5*		*6*	*6*	*7*	*7*	*8*	*8*	*9*	**9**
8					**2**					**4**		*5*	*5*		**6**		*7*	*7*	*8*	**8**
7			*1*			*2*		*3*	*3*		*4*	*4*		*5*	*5*	*6*	*6*	*6*	*7*	**7**
6							*2*			**3**			*4*	*4*		*5*	*5*	*5*	*6*	**6**
5				**1**				**2**			*3*	**3**	*3*		*4*	**4**	*4*		*5*	**5**
4					**1**				*2*	**2**	*2*			*3*	**3**	*3*		*4*	*4*	**4**
3						*1*	*1*					*2*	*2*	*2*	*2*		*3*	*3*	*3*	**3**
2								*1*	*1*	**1**	*1*	*1*	*1*			*2*	*2*	*2*	*2*	**2**
1														*1*	*1*	*1*	*1*	*1*	*1*	**1**

Volume in millilitres ~ mL

To use: find volume (in mL) at bottom of table and, from there, go straight up to level of %AbV shown on left of table and read off number of units at that point. Where no value is given, it may be estimated from those around. Figures printed in **bold** are exact. All others have been rounded to the nearest whole number.

1 pint = 568 mL

The Pocket Guide to Units of Alcohol

A handy table for estimating alcohol content (U K only)

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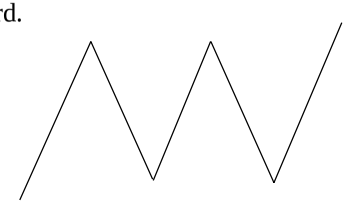
To make: print (or copy) this and the following page back to back on a single sheet of paper or light card.
As a check on alignment the positions of the two **A**'s should match (to within 2 mm. will do).
Cut around the marked outer rectangle.
Score along the three lines running across the rectangle. Crease and fold along these lines.
The dashed lines should be 'hill folds', that is the line is on the outside of the fold.
The plain lines should be 'valley folds', that is the line is on the inside of the fold.
The whole thing, stood upright, and looked down on, should like the diagram on the right.



A

Table shows number of **units of alcohol** for a given volume and %AbV

%Alcohol by Volume ~ %AbV (20 - 40)	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
40	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
39													25	27	29	31	33	35	37	39
38									17	19	21	23					32	34	36	38
37						11	13	15				22	24	26	28	30		33	35	37
36					9				16	18	20			25	27	29	31	32	34	36
35				7				14				21	23		26	28	30		33	35
34							12			17			22	24		27	29	31	32	34
33			5			10			15		18	20		23	25		28	30	31	33
32					8			13		16		19	21		24	26	27	29	30	32
31							11		14		17		20	22	23	25	26	28	29	31
30		3		6		9		12		15		18		21		24		27		30
29							10		13		16		19	20	22	23	25	26	28	29
28					7					14		17	18		21		24	25	27	28
27			4			8		11	12		15	16		19	20	22	23	24	26	27
26							9			13			17	18		21	22	23	25	26
25				5				10			14	15	16		19	20	21		24	25
24					6				11	12	13			17	18	19	20	22	23	24
23						7	8					14	15	16	17			21	22	23
22								9	10	11	12	13	14			18	19	20	22	22
21														15	16	17	18	19	21	21
20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Volume in millilitres ~ mL

For details about use and accuracy, see other side.

The Pocket Guide to Units of Alcohol

A handy table for estimating alcohol content (U K only)

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