

Alcohol proof

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Alcohol proof is a measure of how much ethanol (alcohol) is contained in an alcoholic beverage. The term was originally used in the United Kingdom and was equal to about 1.75 times the alcohol by volume (ABV). The UK now uses the ABV standard instead of alcohol proof. In the United States, alcoholic proof is defined as twice the percentage of ABV.

The measurement of alcohol content and the statement of this content on the bottle labels of alcoholic beverages is regulated by law in many countries.



A bottle of 151 proof ("over-proof") rum

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History

The term "proof" dates back to 16th century England, when spirits were taxed at different rates depending on their alcohol content. Spirits were tested by soaking a pellet of gunpowder in them. If the gunpowder could still burn, the spirits were rated above proof and taxed at a higher rate.^[1] Gunpowder would not burn in rum that contained less than 57.15% ABV. Therefore, rum that contained this percentage of alcohol was defined to have "100° (one hundred degrees) proof".^[2] The gunpowder test was officially replaced by a specific-gravity test in 1816.^[1]

From the 18th century until 1 January 1980, the UK measured alcohol content in terms of "proof spirit", which was defined as spirit with a gravity of $\frac{12}{13}$ that of water, or 923 kg/m^3 , and equivalent to 57.15% ABV.^[3]

The value 57.15% is very close to the fraction $\frac{4}{7} = 0.5714$. Thus, the definition amounts to declaring that 100° proof spirit has an ABV of $\frac{4}{7}$. From this, it follows that to convert the ABV (expressed as a percentage, as is standard, rather than as a fraction) to degrees proof, it is only necessary to multiply by $\frac{7}{4} = 1.75$. Thus pure, 100% alcohol will have $100 \times (\frac{7}{4}) = 175^\circ$ proof, and a spirit containing 40% ABV will have $40 \times (\frac{7}{4}) = 70^\circ$ proof.

The proof system in the United States was established around 1848 and was based on percent alcohol rather than specific gravity. 50% alcohol was defined as 100 proof.^[1]

The use of "proof" as a measure of alcohol content is now mostly historical. Today, liquor is sold in most locations with labels that state its alcohol content as its percentage of alcohol by volume (ABV).

The term "percent proof" was often erroneously used, but has no meaning: alcoholic strength should be stated as "degrees proof" (UK) or "proof" (US) if the respective "proof" scale is being used, or "percent ABV" if it is expressed as a percentage.

Governmental regulation

European Union

The European Union follows recommendations of the International Organization of Legal Metrology (OIML). OIML's International Recommendation No. 22 (1973)^[4] provides standards for measuring alcohol strength by volume and by mass. A preference for one method over the other is not stated in the document, but if alcohol strength by volume is used, it must be expressed as a percentage (%) of total volume, and the water/alcohol mixture must have a temperature of 20 °C (68 °F) when measurement is done. The document does not address alcohol proof or the labeling of bottles.

United Kingdom

Since 1 January 1980, the United Kingdom has used the ABV standard to measure alcohol content, as prescribed by the European Union.

"In common with other EC countries, on 1st January, 1980, Britain adopted the system of measurement recommended by the International Organisation of Legal Metrology, a body with most major nations among its members. The OIML system measures alcohol strength as a percentage of alcohol by volume at a temperature of 20 °C. It replaced the Sikes system of measuring the proof strength of spirits, which had been used in Britain for over 160 years."^[3]

"Britain, which used to use the Sikes scale to display proof, now uses the European scale set down by the International Organization of Legal Metrology (OIML). This scale, for all intents and purposes the same as the Gay-Lussac scale previously used by much of mainland Europe, was adopted by all the countries in the European Community in 1980. Using the OIML scale or the Gay-Lussac scale is essentially the same as measuring alcohol by volume except that the figures are expressed in degrees, not percentages."^[5]

United States

In the United States, alcohol content is measured in terms of the percentage of alcohol by volume. The Code of Federal Regulations (27 CFR [4-1-03 Edition] §5.37 Alcohol content) requires that liquor labels must state the percentage of ABV. The regulation permits, but does not require, a statement of the proof provided that it is printed close to the ABV number.^[6] For bottled spirits over 100 ml containing no solids, actual alcohol content is allowed to vary within 0.15% of ABV stated on the label.^[3] Alcohol proof in the United States is defined as twice the percentage of alcohol by volume. Consequently, 100-proof whiskey contains 50% alcohol by volume; 86-proof whiskey contains 43% alcohol.^[3] In the United States the term "degrees proof" is normally not used. For example, 50% ABV would be described as "100 proof" rather than "100 degrees proof".

Canada

Officially, Canada follows U.S. usage in labeling by percentage of alcohol by volume.^[7] However, the old UK proof standard is still used casually; "over-proof rum" refers to alcohol greater than 100° UK proof, i.e. greater than 57% ABV. As an example, most common spirits, at 40% ABV, are 70° proof in Canadian usage, and 100° proof spirits are 57% ABV.^[8]

See also

- Alcohol by volume
- Cask strength
- Gravity (alcoholic beverage)
- Volume percent

References

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<http://www.dcs.ed.ac.uk/home/jhb/whisky/swa/chap6.html>
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5. Regan, Gary (2003). *The Joy of Mixology*. New York: Clarkson Potter. pp. 356–357. ISBN 0-609-60884-3.
6. *Title 27 Alcohol, Tobacco and Firearms, Chapter 1, §5.37*. Bureau of Alcohol, Tobacco and Firearms; Department of the Treasury. p. 62.
7. Canadian Food Inspection Agency - Alcoholic Beverages (<http://www.inspection.gc.ca/english/fssa/labeti/alcoe.shtml>)
8. Drug Library: Canadian Government Commission - Alcohol, item 61
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External links

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