

Alcohol Doses

The dose of alcohol is calculated by multiplying the volume of an alcoholic beverage by the percentage of alcohol by volume. For example, twelve ounces of beer that is 4% alcohol by volume would have a dose of 0.48 ounces of alcohol. Pure alcohol (100% alcohol) is called "absolute alcohol." Absolute alcohol is alcohol without any water molecules in it. Alcohol produced by distillation contains water molecules that are very hard to remove. The strongest readily available alcoholic beverage, often called "neutral grain spirits" is about 95% absolute alcohol (190 proof). It is possible to manufacture absolute alcohol, also called "scientific alcohol," by synthesis.

The dose of alcohol in a typical 12 ounce can of beer, is approximately equal to the dose of alcohol in a 4 to 5 ounce serving of wine, or in a "shot" of whiskey. This average-sized dose of alcohol is equal to one-half ounce of absolute alcohol, and is sometimes called a "drink equivalent."

Examples of Drink Equivalence	
12 ounces of 4% beer	0.48 ounces of absolute alcohol
5 ounces of 10% wine	0.50 ounces of absolute alcohol
1.25 ounces of 40% vodka (80 proof)	0.50 ounces of absolute alcohol
1.25 ounces of 43% whiskey (86 proof)	0.52 ounces of absolute alcohol
all of the above servings have approximately 0.50 ounces of absolute alcohol	

Some typical servings of other alcoholic beverages do **NOT** contain a single drink equivalent. They may contain more or less alcohol than is found in an "average-sized" dose of alcohol. Examples include:

Examples of Drink Non-Equivalence		
Dose of Alcoholic Beverage	Amount of absolute alcohol	Number of drink equivalents
40 ounce bottle of 8% malt liquor	3.2 oz.	6.4 drink equivalents
12 ounce bottle of 2.5% low alcohol beer	0.3 oz.	0.6 drink equivalents
1.25 ounce shot of 151 proof rum	0.94 oz.	1.9 drink equivalents
12.5 ounce bottle of 20% fortified wine cooler	2.5 oz.	5.0 drink equivalents

ALCOHOL MEASUREMENTS

Measurements and Equivalents

One fluid ounce (U.S.) of alcohol equals:

- 1.805 cubic inches
- 29.573 milliliters
- 1.041 British fluid ounces
- and weighs 0.79 ounces avoirdupois

Common measurements of alcoholic beverages(U.S.):

Common Measurements for Alcoholic Beverages	
"pony shot"	0.5 jigger; 0.75 fluid ounces
"shot"	0.666 jigger; 1 fluid ounce
"large shot"	1.25 ounces
"jigger"	1.5 shots; 1.5 fluid ounces
pint	16 shots; 0.625 fifths
fifth	25.6 shots; 25.6 ounces; 1.6 pints; 0.8 quarts; 0.75706 liters
quart	32 shots; 32 ounces; 1.25 fifths
magnum	2 quarts; 2.49797 wine bottles
bottle wine	0.800633 quarts; 0.7577 liters

Calorie Content of Alcoholic Beverages

One gram of ethyl alcohol yields 7 calories of energy when metabolized by the body. That converts of approximately 200 calories per ounce of absolute alcohol, or about 100 calories per drink equivalent (one-half ounce of absolute alcohol). The total calorie content of an alcoholic beverage includes the calories from the alcohol itself, and calories from other components of the beverage (residual sugars or grains in beers and wines, for example). A typical serving of regular beer yields about 150 calories (about 100 calories from the alcohol and about 50 calories from the residual carbohydrates). A typical serving of light beer has a lower alcohol content and less residual carbohydrates, so the total calorie content could be about 100 calories (about 80 calories from the alcohol and about 20 calories from the residual carbohydrates).

The most common system for measuring and reporting Blood Alcohol Levels (BAL) is calculated using the weight of alcohol (milligrams) and the volume of blood (deciliter). This yields a Blood Alcohol Concentration that can be expressed as a percentage (ie. 0.10% alcohol by volume), or as a proportion (ie. 100 mg. per deciliter). This system is the one prescribed by almost every state, and is sometimes referred to as the "weight by volume" or "w/v" method.

A few states prescribe a "weight by weight" or "w/w" method (milligrams of alcohol in milligrams of blood). For forensic evidence purposes, the w/w can be calculated by dividing the w/v by a factor of 1.055 (the average specific gravity of blood).

Although most evidentiary rules specify that the proportion of alcohol in the whole blood by used to measure the level of intoxication, most hospitals routinely calculate the proportion of a drug in the plasma portion of the blood. While this measurement is the most useful one for medical purposes, it is not the appropriate one for most legal purposes. Since the addition of red and white blood cells would add to the blood volume that dilutes the alcohol, using only the plasma fraction would result in a percentage of alcohol that is higher than would be found in whole blood. Although there is some variation from person to person, depending upon the density of their bloods, the average adjustment factor is 1.16. In other words, to estimate the alcohol level in whole blood using the alcohol level in blood plasma, divide by 1.16. For example, a plasma alcohol level of 0.15% would convert to a blood alcohol level of 0.13%.

Comparison of Blood Alcohol Level Reporting Systems	
Six different methods of reporting the same blood alcohol measurement.	
Method of Stating the Measurement	Result
Blood Alcohol Concentration (percent weight to volume)	0.10%
Milligrams per milliliter	1.0
Milligram percent (milligrams per 100 ml.)	100
parts per million	1000
Percent by weight (weight by weight)	0.09%

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Indiana Prevention Resource Center

Factline on Alcohol Doses, Measurements, and Blood Alcohol Levels

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