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Alcoholometer

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- Reference, overview and EU alcoholometer -
Only for alcohol determination in distillates!

Page 1/2

Technical informations and instructions for use

Operating principle

Like any hydrometer, the **alcoholometer** also works according to Archimedes' principle: the immersion depth of the floating instrument is a measure of the specific gravity and thus the composition of the liquid under investigation.

The scaling in "%vol" (percent by volume) denotes the concentration of alcohol (ethanol) in ml dissolved in 100ml of alcohol-water mixture at a temperature of 20°C.

This explains why only colourless distillates and aqueous dilutions of distillates can be tested for their alcohol content by "spindle testing" with an alcoholometer

Can wine, whiskey or liqueur be spindled?

Of course, the alcoholometer would also float in these drinks. But the sugars, wood extractives, acetic and fruit acids contained in them distort the reading of the alcoholometer to such an extent that the result is far from the actual alcohol content.

Wines, liqueurs, batch spirits, whiskeys, wine spirits, wood barrel-aged and sweetened brandies and spirits cannot be directly spindled, but must first be distilled to separate the interfering components. You will find a description of this distillative alcohol determination in our product information

Sample distillation and **steam distillation**.

Choosing the right alcoholometer

Reference alcoholometers are used for the rough estimation of alcohol contents, e.g. in the receiver of the still. Due to their small size and their long scale, they are not more accurate than $\pm 1\%$ vol, they do not contain a thermometer and are also very inexpensive for this reason.

Overview alcoholometers contain a built-in thermometer with temperature correction scale. Depending on the length of the scale, its accuracy is ± 0.2 , ± 0.5 or $\pm 1\%$ vol.

Only **EU alcoholometers** (with built-in thermometer) allow alcohol measurements with an accuracy of $\pm 0.1\%$ vol, which is necessary for declaring the alcohol strength of brandies and spirits, for trading distillates and for recording alcohol tax. EU alcoholometers cover the entire range from 0 to 100%vol in steps of 5%vol (**class III**) or 10%vol (**class II**).

Use of the alcoholometer

It is strongly advised not to let the alcoholometer float directly in the tank, barrel or bucket. At just under 10€, a **spindle cylinder** is out of all proportion to the loss of an alcoholic distillate that has to be disposed of because of contamination with glass splinters, steel shot and thermometer liquid! The **spindle cylinder** is filled about 2/3 with the test sample. Then carefully remove the alcoholometer from the packaging sleeve at the top of its stem and slowly immerse it in the sample just until it floats freely.

The instrument must not swing up and down, otherwise the film of liquid adhering to the stem would increase the weight of the **alcoholometer** and thus falsify the measurement result.

Air bubbles adhering to the instrument also interfere with the analysis and must be removed by carefully rotating or pulling out and re-immersing the **alcoholometer**.

After 1-2 minutes read the alcohol strength from the %vol scale in the stem.

The accuracy of the result depends largely on the following details:

Requirements regarding the alcoholometer

As a glass, highly sensitive measuring instrument, the alcoholometer must be protected from heat, cold, impact and falling. Only an intact, externally absolutely clean and grease-free **alcoholometer** provides reliable results. After each use, it must be

has adhered, with methylated spirit and dried with a lint-free cloth.

Requirements for the spindle cylinder

The **spindle cylinder** (see separate product information "Spindle cylinder and measuring cylinder") should be at least as long as the **alcoholometer** so that it does not sit on the bottom of the cylinder even with high alcohol contents. Its diameter should be so much larger than the diameter of the **alcoholometer's** float that it floats freely and does not rest against the glass wall.

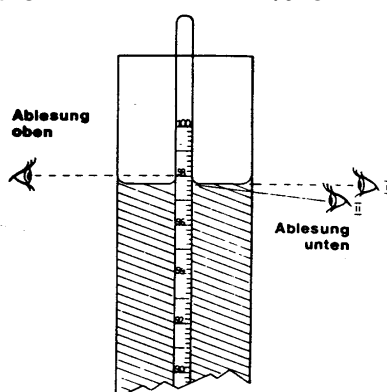
The spindle cylinder must also be kept clean and free of grease by rinsing it thoroughly with water immediately after use, and occasionally cleaning it with a brush and washing-up liquid. Before filling with the distillate sample, the spindle cylinder must either be dust-dry or pre-rinsed with some sample liquid.

Requirements for the distillate sample

The sample to be analysed must be a representative average sample of the total distillate quantity previously homogeneously mixed. The sample should be crystal clear, at most slightly opalescent. Experience has shown that the spindle analysis of distillates diluted directly with water beforehand is inaccurate, as this is associated with heating and the formation of gas bubbles. The temperature of the distillate sample must be between 5 and 25°C.

Correct reading

Alcoholometers are adjusted for "lower reading" (see sketch). In this way they differ from our saccharimeters and must scales, which are read at the top. The reading of the **alcoholometer** is thus the imaginary intersection of the liquid surface with the **%vol** scale.



Temperature correction

The %vol scale of each alcoholometer is adjusted to 20°C and has the highest accuracy at this temperature. Readings taken at temperatures deviating from 20°C can be corrected on **survey alcoholometers** using the correction scale to the right of the built-in thermometer, e.g.:

Temperature correction of the instrument:

Reading: 40.8%vol at 11°C; correction: +3%vol

Correction: $(40.8 + 3)\%vol = 43.8\%vol$ at 20°C

For **EU alcoholometers**, which do not have this correction scale according to the standard, the reading of the %vol and the temperature on the built-in thermometer in °C must be corrected to 20°C with the help of Table 1 of the "Official Alcohol Tables" (400-page table). The same example shows the significantly better accuracy of this type of temperature correction:

Temperature correction with the alcohol table 1:

Reading: 40.8%vol at 11°C

Reading from table 1: 44.4%vol at 20°C

Testability

Since **alcoholometers** are no longer officially calibratable due to the ban on mercury (also as a filling liquid in thermometers), the factory test certificate is considered an adequate document for the correctness of the instrument.

Our alcoholometers with built-in thermometer, i.e. all **overview** and all **EU alcoholometers** are "testable". They bear an individual four-digit numbering with which a test document, the so-called factory test certificate, can be assigned to a specific **alcoholometer**.

"Verified with factory test certificate" means that the alcoholometer has been subjected to an additional test independently of the regular quality control and that this test has been documented. This document enclosed with the instrument with the same instrument number is the guarantee that the deviation at any point of the %vol and temperature scale is not greater than one graduation mark.

Product range

You will find our complete delivery programme of

- reference alcoholometers
- overview alcoholometers
- EU alcoholometers
- Alcoholometers for 100ml distillate

in our price list "Alcoholometers".



Regularly used instruments are kept handy and safe in our **hydrometer rack** (stainless steel wall holder for 6 alcoholometers, must scales or saccharimeters).

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