

Alcohol⁷

DirectSens®

Alcohol Biosensor Kit

to be used with the
DirectSens® Reader T4

Product No. AK0101

User Manual

Version: 3.0

DirectSens®

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ABOUT OUR PRODUCT

The **DirectSens® Alcohol Biosensor Kit** enables fast and accurate quantification of alcohol in non-alcoholic and 0.0 % beer, shandy and wine.

The core element of the measurement is an optimized enzyme, which is immobilized on a disposable biosensor strip. Using **DirectSens® Reader T4**, the alcohol concentration can be measured directly and accurately.

Specifications

Measuring range:	0.0150 – 0.800 % v/v alcohol
Measuring time:	2 minutes
Sample volume:	min. 100 µL
Repeatability:	≤ 6 % standard deviation
Reproducibility:	≤ 8 % standard deviation
Shelf life:	12 months at 2 – 8 °C (36 – 46 °F)
Validated matrices:	non- alcoholic and 0.0 % beer, shandy and wine.

General Hints

- Perform the measurements at room temperature 20 – 24 °C (68 – 75 °F).
- Close the biosensor strip vial immediately after taking out a biosensor strip.
- Prevent microbial contamination in buffer and control solution.
 - Always use fresh and clean pipette tips.
 - Close bottles and vials directly after taking out the liquid.
- Avoid spilling liquids into the reader. This may cause damage to the instrument.
- Store the biosensor kit at 2 – 8 °C (36 – 46 °F) but the alcohol buffer at room temperature.

01. Materials

DirectSens® Alcohol Biosensor Kit

- 25 Alcohol Biosensor Strips
- 1 Bottle (125 mL) of Alcohol Buffer
- 1 Vial (2.0 mL) of Alcohol Control Solution
- 28 Sample Applicators
- Manual
- Quality Assurance Certificate

Additionally Required Materials

- **DirectSens® Reader T4**
- Vials, pipettes, tips for sample dilution
- Beaker, funnel and fluted filter paper for degassing (if applicable)
- **Optional:** Laptop or PC with the DirectSens® Biosensor Software installed

Handling of sample material

Due to the high volatility of alcohol, special care must be taken during sample handling to avoid alcohol losses and ensure accurate results.

- Do not leave sample containers open longer than necessary.
- Use tightly closed containers with minimal headspace whenever possible.
- Prepare sample dilutions shortly before analysis and measure as soon as possible.

02. Sample preparation

2.1. Preparing decarbonized sample

Carbonated beverages must be decarbonized prior to measurement.

- Use one funnel, one fluted filter paper and one beaker per sample.
- Pour the sample through the fluted filter and collect it in a beaker.
- If necessary, repeat steps using a fresh fluted filter paper and beaker.

2.2. Preparing alcohol measuring solution



Store the alcohol buffer at room temperature. If taken out of the fridge, allow it to come to room temperature for at least 2 hours.

- Mix decarbonized sample 1 + 4, 1 + 19 or 1 + 39 with alcohol buffer, depending on the expected alcohol concentration of the tested sample.

Range alcohol, % ABV	Dilution factor	Example for dilution
0.015 - 0.100	1 + 4	200 µL decarbonized sample + 800 µL buffer
0.06 - 0.40	1 + 19	100 µL decarbonized sample + 1900 µL buffer
0.12 - 0.80	1 + 39	100 µL decarbonized sample + 3900 µL buffer

03. Measurement

3.1. Switching on the reader

- Press the **on/off** button for a few seconds until the display is activated.
- Press the **Measure** button.

3.2. Transferring the calibration constants and inserting sample information

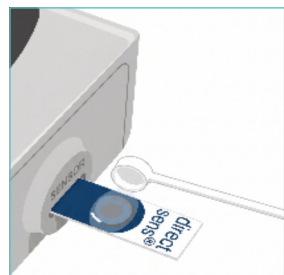
- Select the user and press **Select**.
- Point the red light of the QR scanner directly onto the QR code located on the lid of the biosensor kit (distance 10 – 20 cm / 4 – 8 inch) until the next screen appears. The calibration constants are transferred via the QR code.
- Press **Continue**.
- Scan (QR or Bar Code) or alternatively type in a sample name. Then press **OK**.
- Select the dilution factor (chapter 2.2) and press **Select**.



The calibration constants are specific for each batch of the Biosensor Kit. Always use the QR code of the currently used kit.

3.3. Measuring alcohol

- Take one biosensor strip from the biosensor strip vial and close the vial. **Avoid touching the sensitive area on the biosensor strips!**
- Let the biosensor strip rest on the bench for 30 seconds to allow it to warm to room temperature before use.
- Take the biosensor strip with the blue side upwards and the metal contacts pointing towards the reader and insert it into the reader as far as it can go.
- Confirm by pressing **Continue**.
- Apply the measuring solution using an enclosed sample applicator.
- Immerse the sample applicator in the solution three times. After collecting the sample, ensure that the applicator is completely filled and free of air bubbles.
- Position the sample applicator so that its lower edge is in direct contact with the protruding plastic edge of the biosensor cover.
- In case the sample is not taken up immediately, slowly move the sample applicator upward until sample uptake begins.



- Hold the sample applicator in this position until the microfluidic measuring chamber on the biosensor is completely filled (~ 0.5 seconds).
- The reader will automatically detect the sample and start the measurement. The measurement will take approximately 50 seconds.

Do not touch the biosensor strip during this step!



Avoid air bubbles during sample application!
If an air bubble appears on the working electrode (big black circle) the measurement is not valid and must be stopped!

3.4. Viewing the result

- After the measurement, the result will be displayed.
- Press **Continue** to initiate a new measurement (start from chapter 2.1) or press **Stop** to terminate the measurement sequence.

04. System performance checks

4.1. Performing a control solution test



The control solution imitates a 1 + 4 diluted sample, that already was mixed with buffer. Therefore, it can be readily used, no dilution or mixing with buffer necessary.

- Let COS vial pre-warm at room temperature for a minimum of 30 minutes.
- In the start-up screen of the DirectSens® Reader T4, press on **Control**.
- Follow the measurement procedure (steps 3.2 – 3.4) to perform the control solution measurement.
- The target result for alcohol is between 0.0420 and 0.0580 % v/v (95 % confidence interval).
- It is very important to close the COS vial quickly and properly after every use to ensure that no alcohol evaporates and alters the alcohol concentration of the control solution.



- Perform a control solution test in case there is any doubt about the performance of the biosensor kit, e.g. due to elevated temperatures during transport or storage or due to unexpected results.
- Adapt the frequency of the regular control solution tests to your laboratory's quality guidelines. Best practice is to do a control solution test as first measurement when opening a new biosensor kit.

4.2. Performing a reader test

The DirectSens® Reader T4 Kit contains an electronic testing device. This device can be used for a 3-minute check-up of the electrical measuring characteristics of the reader. In order to perform a reader test, the reader must be connected to the DirectSens® Biosensor Platform Software via USB. For detailed information please read the **DirectSens® Reader T4 Kit and Software User Manual**.



- Perform the reader test in case there is any doubt about the reader performance. This can be due to exposure to a strong mechanical shock, due to a liquid that entered the reader, or due to unexpected results.
- Adapt the frequency of regular reader test to your laboratory's quality guidelines.

05. Disposal

All liquids of the biosensor kit can be disposed of in normal water drains. All solid parts can be disposed of in standard household waste.

06. Further information

On the website of the alcohol biosensor kit you find this manual and a tutorial video.

<https://www.directsens.com/products/alcohol/>

For personal support, please contact

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All specifications and procedures are subject to change without notice.



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