LCK240
Photometrical Iodine Sample Method (PIS)

Iodine value > 0.2 / Accuracy: ±0.05 (standard deviation of multiple determinations) **LCK240**

Scope and application: For beer and beer wort.

Test preparation

Temperature

The temperature of the sample and reagents must be between 15–25 °C (59–77 °F).

Items to collect

Description	Quantity
Plastic tube	1
Rubber stopper (LZC925)	1
Filter plunger	1
Membrane filter 1.2 µm (LCW904)	1

Before starting

A number of samples can be processed in parallel. The sample cuvettes must be measured in the same sequence for **both** the blank value and the main value measurements.
Starch in fresh beers may form a **very fine precipitate**, which can clog the filter plunger. In such cases leave the precipitate to settle for about **1 minute.**
Make sure that no precipitate remains on the bottom of the plunger.
Put a rubber stopper (LZC925) on the filter plunger to prevent leaks when the sample is mixed.
Put a rubber stopper (LZC925) on the filter plunger to make it easier to draw out the plunger.
For reliable and quality results, only use accessories from the manufacturer.
Review safety information and expiration date on the package.
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.
Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Before starting—Sample preparation

Samples that contain carbon dioxide must be degassed before the analysis is completed. Turbid samples (wort, cloudy beers) must be clarified. This can be done by centrifuging, as in the MEBAK method, or by filtering with a membrane filter (1.2 µm, LCW904).

Turbid samples must be clarified **before** the analysis is completed.

Prepare the iodine solution

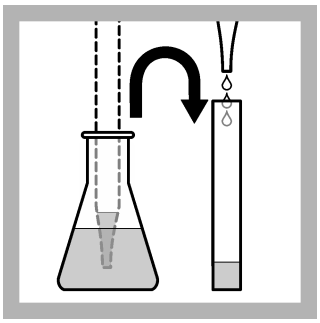
Depending on the **number of samples** for analysis, a volume of iodine solution is prepared in the accompanying empty cuvette (with rubber stopper). This is done by pipetting the same amount of **Solution A*** and **Solution B**** into the cuvette and then inverting it a few times to mix them.

Note: The iodine solution is stable for **only a few hours** and should be freshly prepared for each series of analyses.

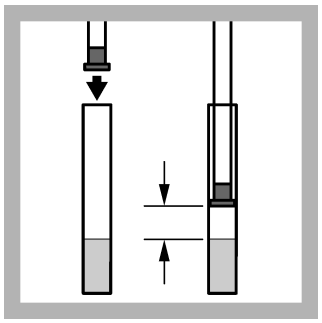
Number of samples	Solution A* (in mL)	Solution B** (in mL)
1	0.2	0.2
2	0.3	0.3
3	0.5	0.5
4	0.6	0.6

Procedure—Precipitation (Filtration)

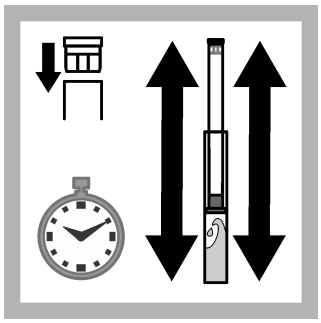
1. Sample preparation: Turbid samples must be clarified before the analysis is carried out (for example: filtration with membrane filter 1.2 µm).



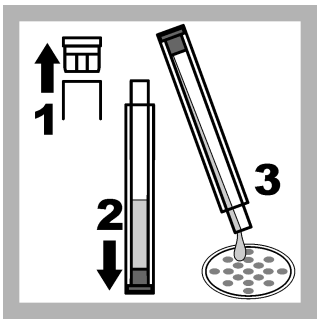
2. Pipet into a plastic tube: **1 mL** of sample and **4 mL** of solution **C**.



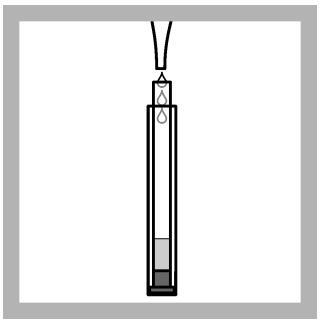
3. Place the filter plunger on the tube and push the plunger down until it is approximately **2 cm** above the surface of the liquid.



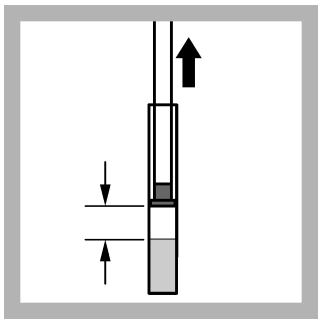
4. Place the rubber stopper (LZC925) on the filter plunger and shake for **2 minutes**.



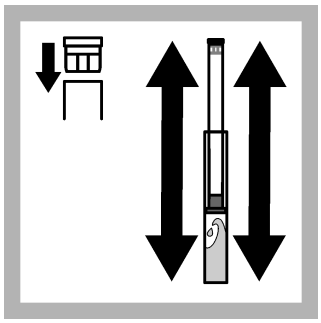
5. Remove the stopper from the filter plunger. Push the filter plunger down until it reaches the bottom of the plastic tube. Dispose of reacted solutions according to local, state and federal regulations.



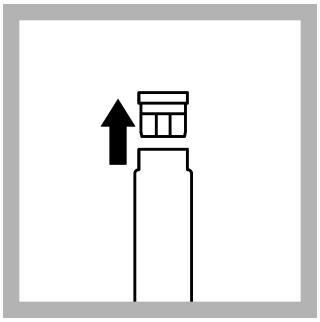
6. Pipet into the filter plunger:
2 mL of solution **D**.



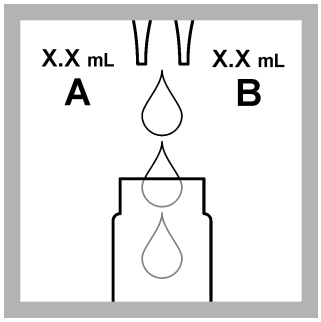
7. Draw filter plunger upward until it is approximately **2 cm** above the surface of the liquid.



8. Place the rubber stopper on the filter plunger and shake until the precipitate is completely dissolved. This may take from just a few seconds to 5 minutes, depending on the sample.

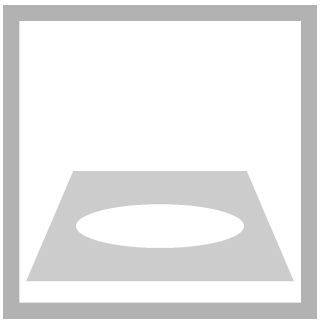


9. Preparing the iodine solution: Open the cuvette.

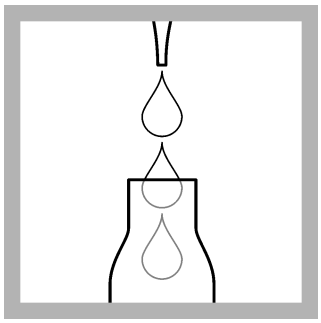


10. Pipet equal volumes of **solutions A** and **B**. Refer to: Before starting—Sample preparation on page 2.

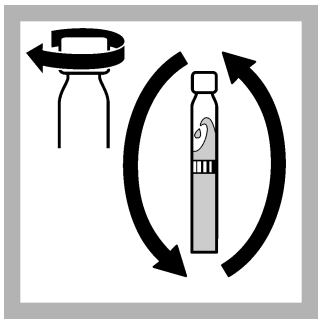
Procedure—Evaluation



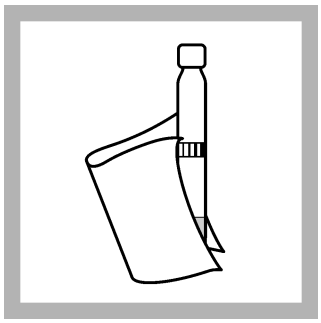
1. Only DR1900 / DR2800 / DR3800 / DR5000: Go to Stored Programs. Select the test, close the cuvette compartment and push **ZERO** with empty cell holder.



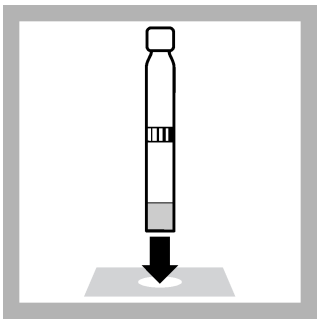
2. Blank value: Pipet into the cuvette test:
1 mL of prepared sample(s).



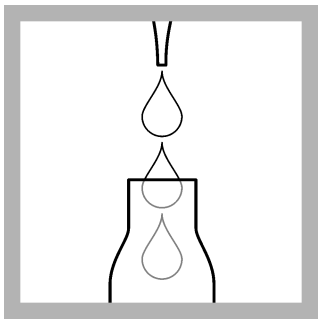
3. Close the cuvette(s) and invert a few times.



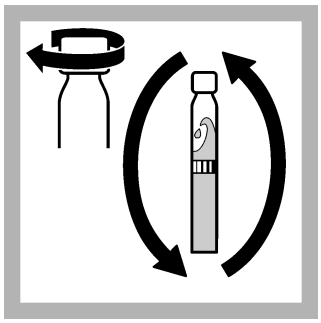
4. Thoroughly clean the outside of the cuvette(s).



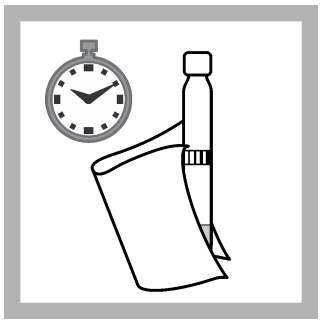
5. Every DR: Insert the **first** sample cuvette (blank value). Only DR1900 / DR2800 / DR3800 / DR5000: push **READ**. Every DR: Enter the **number of samples** and push **OK**. Insert the **specified number** of sample cuvettes. Only DR1900 / DR2800 / DR3800 / DR5000: push **READ**.



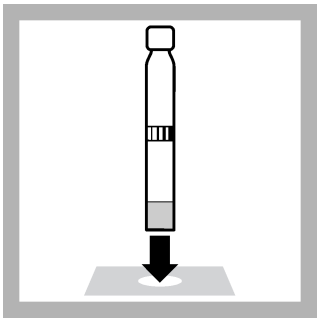
6. Main value: Pipet into the same cuvette(s):
0.25 mL of prepared iodine solution.



7. Close the cuvette(s) and invert a few times.



8. After **1 minute** thoroughly clean the outside of the cuvette(s).



9. Every DR: Insert the sample cuvette(s) (main value). Only DR1900 / DR2800 / DR3800 / DR5000: push **READ**. After the **final** sample cuvette has been measured, an audible signal is emitted.

Summary of method

High-molecular dextrins and starch in worts and beer are precipitated by adding ethanol. The precipitate is separated out and then dissolved in a phosphate buffer, to which iodine solution is subsequently added.

Depending on the molecular weight and degree of branching of the erythrodextrins and starch, the solution forms a red to blue color. The intensity of the color is measured photometrically.

Refer to: *MEBAK Würze, Bier, Biermischgetränke;* 2012, p. 52 ff.

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