# USER MANUAL

## For 3in1 flow-through cuvettes with screw connections

Thank you for choosing the new, innovative 3in1, precision cuvette from Hellma Analytics. Hellma precision cuvettes, for use in laboratories, are manufactured and tested with the greatest care and strictly adhere to DIN ISO EN 9001 and 14001, ensuring high quality and a long working life. **Please take some time to carefully read through the following important instructions.**

## PRODUCT DESCRIPTION

The 3in1 precision cuvette is made of 100 % quartz glass; that offers special characteristics and brings many advantages in day-to-day use.

→ Flexibility in applications, as the cuvette has two path lengths.

→ Fluorescence measurement possible for each path length.

→ No liquid leakage, monolithic quartz glass construction prevents this by design.

→ Stress-free and extremely chemically resistant thanks to 100 % quartz glass construction.

→ Fully autoclavable.

→ Secure tube connection is ensured due to the innovative quartz glass internal threads.

→ Tube set provided with the cuvette is made of solvent-resistant material.

### Special features for TDA applications:

→ Second path lengths can be set without time consuming changing of the cuvette respectively no longer screwing and unscrewing of the tubings necessary.

→ Red point mark for the quick detection of the path length position.

## SAFETY INFORMATION

The 3in1 precision cuvette is made out of 100 % quartz glass. Like all glass components, it must be handled with care to prevent damages caused by tipping over, dropping, bumping or scratching.

### To enjoy your 3in1 precision cuvette for as long as possible, please observe the following information:

→ **DO NOT** leave the cuvette on the bench unprotected.

→ Clean the cuvette directly after use.

(!) **DO NOT allow the sample to dry in the cuvette.**

→ Follow the cleaning instructions.

→ After the cuvette has been used in the spectrophotometer and immediately cleaned, put the cuvette back in the storage box for safety reasons.

(!) **When using the cuvette, take care of the delicate measurement windows, avoid contaminating or scratching them through contact with your hands or objects.**

(!) **Contamination or scratches on the measurement windows can affect the accuracy of measurement results.**

## USING THE FLOW-THROUGH CUVETTE

### Connecting the tubes using M6 threaded connectors.

**Make sure you follow the instructions in the correct sequence when connecting the tubes provided:**

1. Use the tube with the short screw connection first of all,

2. followed by the tube with the long screw connection.

### Tighten the tube connections.

(!) **DO NOT use any tools (e. g. pliers).**

→ Simply tighten the screws by hand as much as possible.

→ Such tightened screw connections are used at Hellma Analytics for their final inspection, where a pressure of 3 bar is applied to test for possible leaks.

(!) **Make sure that the inlet tube is screwed to the thread with the arrow.**
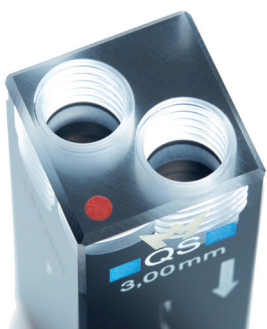
# CLEANING

Improper cleaning of the cuvette can impair its function and cause damage.

(!) **Important: Clean the cuvette as soon after taking the measurement as possible.**

(!) **DO NOT let the sample dry in the cuvette.**

→ Use soft, lint-free cloths or swabs to clean the exterior.

(!) **DO NOT clean the cuvette using an ultrasonic cleaner. It can cause micro-cracks which lead to the destruction of the cuvette.**

## Cleaning the cuvette after measuring

1. After taking the measurement, immediately rinse the cuvette with the same solvent used for the sample.

2. Next, thoroughly rinse the cuvette using clean ethanol or a similarly volatile solvent and leave to dry (e. g. in a drying cabinet). Pure water can also be used to rinse the cuvette, but this will slow down the drying process.

## Routine cleaning

The cuvette should primarily be cleaned in the flow-through operation. This flow-through is achieved by using a pump to connect the inlet of the cuvette to a storage tank filled with cleaning concentrate. Connect the drainage tube to the storage tank as well. We recommend using Hellmanex® III cleaning concentrate for this closed circuit. A 2 % solution of Hellmanex® III solution is a tried and tested way of tackling the most common cleaning problems. Please observe the information on the bottle. Afterwards, thoroughly rinse the cuvette using pure water.

## Removing stubborn contaminants

→ You can remove protein-based contaminants using diluted hydrochloric acid. – Concentrated sulfuric acid can be used to remove many organic substances. – If neither hydrochloric acid nor sulfuric acid work, try removing the impurity using mixtures such as $H_2SO_4/H_2O_2$. This type of cleaning, however, should only be carried out by experienced employees.

(!) **Please make sure you follow the protective measures recommended by the manufacturers in the use of these aggressive mixtures.**

## Removing external contaminants

External contaminants are best wiped away using a damp cloth or lint-free microfiber cloth. Dampen the cloth with a solvent (e. g. alcohol).

# TROUBLESHOOTING

## The screw connection doesn't seal, sample fluid is leaking from the screw connection.

1. **The screws haven't been tightened enough or have loosened.**

→ Check to see if this has happened, particularly after long use, and retighten the screws if necessary.

2. **The flange on the tubes is broken or damaged.**

→ Replace the screw tube connection with a new screw tube.

3. **The bores on the upper surface of the cuvette are damaged and showing cracks, preventing the flange from sealing.**

→ Contact Hellma Analytics customer service.

4. **There are dirt particles between the upper surface of the cuvette and the flange.**

→ Clean the cuvette following the instructions in this manual. **DO NOT** use any hard or sharp tools when cleaning.

5. **Parts of the screw connections provided have been replaced with parts that do not have the correct size, e. g. screws with threads that are too short.**

→ **ONLY** use original Hellma Analytics screw connections.

**If after following these steps you are still experiencing problems with the screw connection seal, please contact Hellma Analytics customer service.**

## Measurement values are fluctuating strongly

→ Loosened screw connections can cause leakage and bubble entrapment.

→ Ensure that all screw connections are screwed tightly (by hand – **DO NOT** use tools).

## Bubbles in the cuvette

→ Loosened screw connections can cause leakage and bubble entrapment.

→ Insufficient cleaning can cause bubbles to be retained in the cuvette.

→ Clean the cuvette following the instructions in this manual for to avoid problems from bubbles.

→ If, despite tight screw connections and optimally cleaned cuvettes, bubbles are still formed in the cuvette, so it can be assumed that they are already in the analyzed sample/solution, in this case it is important to produce a bubble-free sample/solution.

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