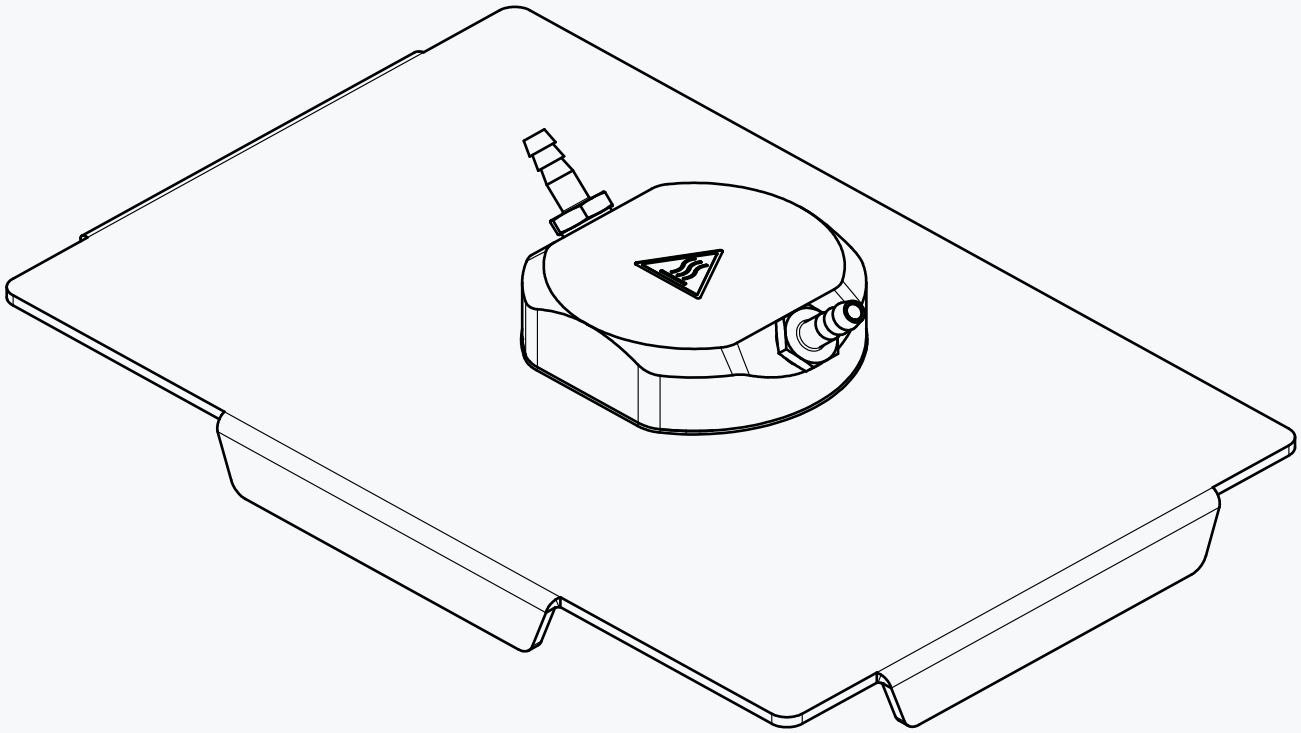


Technical data sheet

FlowCell

The FlowCell is an accessory for ProxiMate™ and ProxiMate™ Essential to measure liquid samples in the Up-View mode under flow conditions.

Scope of delivery

All configurations are supplied ready to use.

Component	Specifications supplied
FlowCell base (selected pathlength)	1
FlowCell window	1
Sealing FlowCell	1
Screws	4
FlowCell positioning plate	1
Mounting clip	2

Item numbers:
11084993: FlowCell 0.3 mm pathlength
11084990: FlowCell 1.0 mm pathlength
11084992: FlowCell 2.0 mm pathlength

Not included: peristaltic pump and tubes.

Additional FlowCell bases with different pathlengths can be ordered separately, see Spare parts.

Technical data

Specification

Dimensions	FlowCell (Ø x H)
FP 0.3 mm*	70 x 35.6 mm
FP 1.0 mm*	70 x 35.6 mm
FP 2.0 mm*	70 x 35.6 mm
Weight	0.88 kg
Tube hose size	1/8”

*FP – FlowCell base pathlength

Materials

Component	Material of construction
FlowCell base (selectable pathlength)	Stainless steel
FlowCell window	Sapphire
Glue window	Epoxy
Screws	Stainless steel
Sealing FlowCell base	EPDM
Hose barb	Stainless steel
Positioning plate	PMMA
Mounting clip	PA
Sealing hose barb	PP

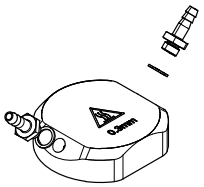
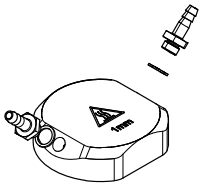
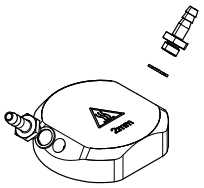
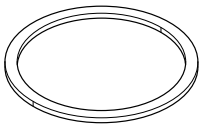
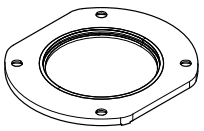
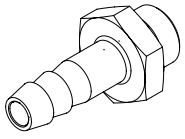
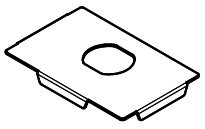
Spare parts and accessories

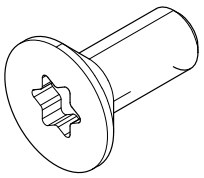
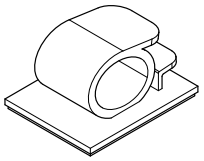
Use only genuine BUCHI consumables and spare parts in order to ensure correct, safe and reliable operation of the system.

NOTE

Any modifications of spare parts or assemblies are only allowed with the prior written permission of BUCHI.

Spare parts

	Order no.	Image
FlowCell base pathlength 0.3 mm	11084985	
FlowCell base pathlength 1.0 mm	11084984	
FlowCell base pathlength 2.0 mm	11084986	
Sealing FlowCell	11084977	
FlowCell window	11084975	
Hose barb 1/8"	015642	
FlowCell positioning plate	11085009	

	Order no.	Image
Countersunk screw (M4 × 10)	020909	
Mounting clip	11055583	

Description

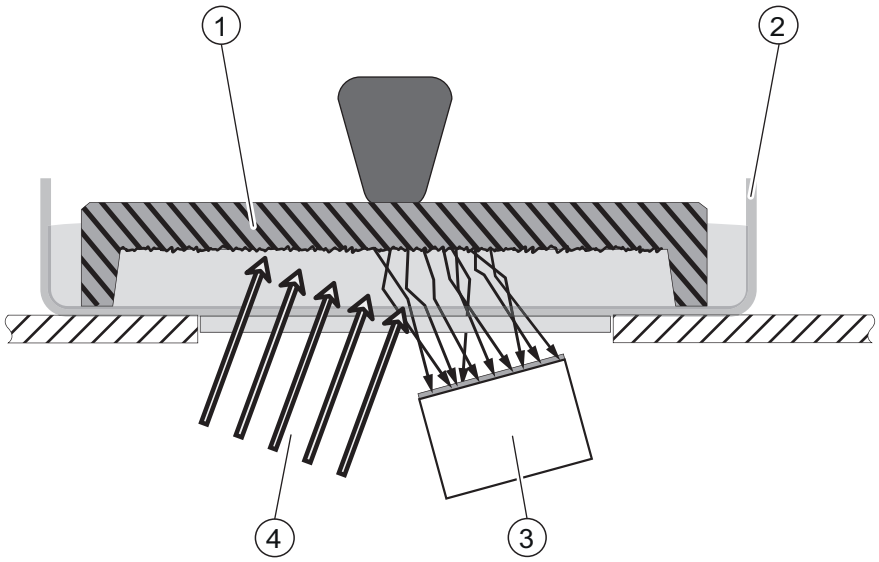
The FlowCell is an accessory for ProxiMate™ Up-View, Dual-View, or Essential configurations that can be applied to measure liquid samples in transflectance mode. Measuring samples in steady flow conditions ensures accurate mean values over a larger sample volume.

Transflectance mode

Transflectance mode is designed for the analysis of translucent and opaque liquid samples. In this configuration, near-infrared light is directed into the sample, where it penetrates the medium and interacts with its constituents. The light is then diffusely reflected by an integrated reflective surface positioned opposite the light source.

After reflection, the light travels back through the sample a second time before being collected by the detector. This dual-pass transmission enhances the interaction between light and sample, enabling the acquisition of robust spectral information even in samples with limited transparency.

The resulting transflected signal contains detailed absorption and scattering characteristics, making transflectance mode ideal for applications requiring high sensitivity in optically dense liquids.



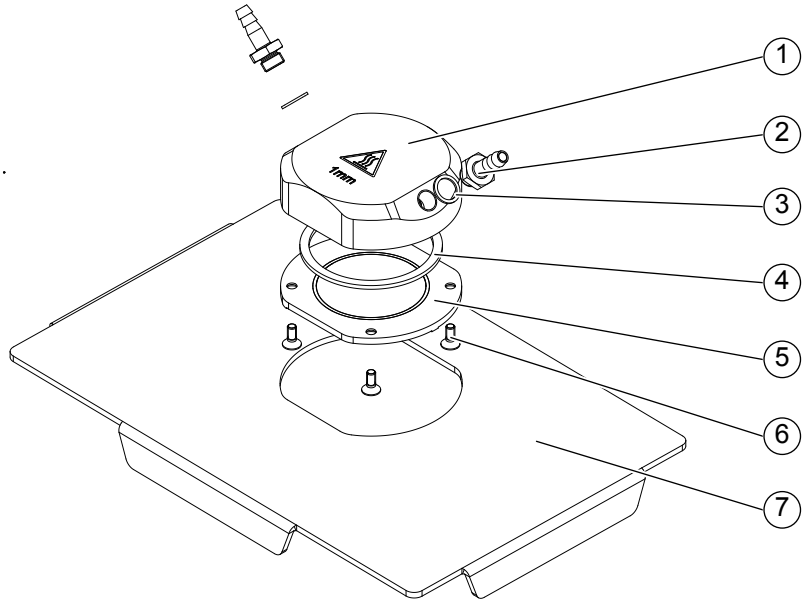
① Transflectance cover

② Sample cup

③ Sensor

④ Light

Configuration



1	FlowCell base	2	Hose barb 1/8”
3	Sealing for hose barb	4	Sealing FlowCell
5	FlowCell window	6	Screws
7	Positioning plate		

Three different pathlengths of the FlowCell (1) can be chosen, depending on the sample type: 0.3 mm, 1.0 mm, or 2.0 mm.

The window (5) is mounted to the FlowCell base (1) with four screws (6). A sealing ring (4) ensures tightness during operation. The window can be dismounted for cleaning purposes or to change the FlowCell pathlength for a different sample type. The complete FlowCell is placed on the positioning plate (7).

The hose barbs of the FlowCell base (2) need to be connected to a peristaltic pump with tubes for generating the sample flow.

Operation

Peristaltic pumps are highly suitable for sample transport in food and feed applications due to their hygienic design and operational simplicity. As the sample is only in contact with the tubing, cross-contamination is minimized. These pumps offer adjustable flow rates and require minimal maintenance, making them ideal for both calibration development and routine operation.

To ensure consistent and accurate measurements, it is essential that the sample flow remains stable and free of air bubbles within both, the tubing and FlowCell. Inconsistent flow or the presence of air bubbles may negatively affect spectral quality and prediction accuracy. For optimal performance it is recommended to use a consistent flow rate and sample handling procedure for each sample type during both, calibration development and routine analysis.

Cleaning

After each measurement cycle, the FlowCell system can be cleaned in place (CIP) by circulating suitable cleaning agents through the tubing and the FlowCell (e.g. distilled water, ethanol). Make sure that the cleaning agent is completely removed from the setup before starting the next measurement.
NOTICE! Ensure that the selected cleaning solution is compatible with all wetted components, including the FlowCell materials (see Materials), tubing, and pump.

For thorough cleaning:

- ▶ Remove the screws (6) securing the window (5).
- ▶ Detach the window (5) and sealing ring (4) carefully from the FlowCell base (1).
- ▶ Clean all internal surfaces of the FlowCell gently with a mild cleaning agent and a soft, lint-free cloth. Take care not to scratch the optical window or other surfaces.
- ▶ Allow all components to dry completely.
- ▶ Reassemble the unit by placing the sealing ring (4) and window cover (5) back onto the FlowCell base (1), and secure them using the screws (6).

Regular and proper cleaning ensures optimal optical performance and prolongs the life of the FlowCell.

Recommendations

To ensure the highest level of accuracy and repeatability in both, calibration development and routine measurements, consistent sample presentation is essential. The quality of this measurement depends heavily on how the sample is introduced and kept during spectra acquisition. There are several conditions that may have an influence on the spectral behavior of the samples. The most important are:

Sample Temperature
Maintain a stable temperature throughout the measurement process. For elevated sample temperatures, an external heating plate with temperature control and sensor can be applied to maintain the required sample temperature in the sample container. Samples should reach full thermal equilibration, particularly at temperatures ≥ 60 °C. Choose appropriate tubing material and length to minimize temperature loss, and ensure consistent flow dynamics.

Notes

- When applying higher temperatures to the sample, the FlowCell will heat up accordingly.
- Make sure that the samples are not altered when elevated temperatures are applied.
- Operate the heated system carefully to avoid any injuries.

Sample Flow
Ensure a constant and stable flow. Use a peristaltic pump with adjustable speed for fine control. Avoid pump speeds above 84 mL/min to prevent repeatability issues. Let the entire flow system stabilize before initiating measurements.

Avoiding Air Bubbles
Air bubbles can reduce prediction accuracy. If air is present, wait for bubbles to evacuate naturally, or temporarily increase the flow rate to push them through, then reduce it back to the desired rate before measurement begins. If still observing some bubbles, physically move the FlowCell and visually check if there are any air bubbles in the cell. Place the FlowCell afterwards to the initial position.

Pathlength Selection
Evaluate and validate the optimal pathlength for each sample type based on flow behaviour and spectral quality. For viscous samples, a 0.3 mm pathlength may result in poor flow and trapped air. A 2.0 mm pathlength, while better for flow, may reduce signal quality due to higher absorption (see table below for examples).

Operational Stability
The FlowCell must remain in a fixed, stable position throughout the entire measurement process. Do not rotate, tilt, or reposition the FlowCell during sample flow or spectral acquisition. Always use the positioning plate for all measurements, including the BCV calibration. Ensure that all tubing and connections are securely fixed and free of tension that could prevent movement of the cell.

Sample type*	Pathlength (mm)	Pump speed (mL/min)	Temperature (°C)
Crude palm oil	2.0	48	60
Sunflower seed oil	2.0	96	RT (23-25)
Milk	0.3	96	RT (23-25)
Fish sauce	0.3	96	25

*Examples for typical sample types

For other sample types, use the closest matching category as a reference and perform validation tests to confirm suitability of the conditions.

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