

OPERATING MANUAL

SKC BioSampler

Flow calibration, sterilising, collection liquids and coatings, sampling and sample handling with the SKC BioSampler swirling-liquid impinger for bioaerosols, 12.5 L/min. Includes care, troubleshooting and ordering information.

AMTC-MN-0018

About this manual

The SKC BioSampler® is a glass impinger that collects airborne microorganisms and other bioaerosols into a swirling liquid, or onto a sticky coating, at about 12.5 L/min. This manual follows a sample from start to finish: setting and calibrating the pump flow, sterilising the sampler, choosing and filling the collection medium, sampling, and handing the sample over to the laboratory. Later chapters cover care of the glassware, troubleshooting, the performance data and the order numbers of accessories and spare parts.

Read Safety (p. 6) before your first sample: the commonest errors spoil the sample or let collection liquid reach the pump. For a first sample, calibrate the flow as in Calibration and verification (p. 16), then work through Operation (p. 11) in order, from preparing the sampler to Sampling (p. 12).

The manual applies to the BioSampler with 20 mL collection vessel, Cat. No. 225-9595 (also as a set of four, 225-9595K4), and with 5 mL collection vessel, Cat. No. 225-9593, and to the kits built around them. Analyt-MTC supplies and supports the BioSampler; for questions, spare parts and repairs see Service, warranty and contacts (p. 22).

Keep this manual for the lifetime of the product. The current revision is on the product page at analyt-mtc.com.

Abbreviations

Abbreviation	Meaning
ID	Inside diameter (of tubing)
PBS	Phosphate-buffered saline (collection liquid)
PCR	Polymerase chain reaction (analysis method)

How this manual marks information

NOTICE

Practices not related to personal injury — damage to the product, the process or the sample.

Note
Information that helps understanding; never a hazard.

Numbers in bold in a figure caption refer to the numbered callouts in the figure. Flow is given in L/min; vacuum in inches of mercury (inHg), as marked on the BioLite+ pump's gauge.

Document information

Title	SKC BioSampler — Operating manual
Document number	AMTC-MN-0018
Revision	Rev. 2 — October 2026
Applies to	BioSampler, Cat. No. 225-9595, 225-9595K4 and 225-9593, and the BioSampler kits
Language	English
Manufacturer	SKC Inc.

Revision history

Rev.	Date	Change
2	October 2026	Quality programme: new document type, number and identity pages.
1	October 2026	First issue.

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CHAPTER 1

Safety

Read this chapter before your first sample. A bioaerosol sample is only as good as its handling. The rules in this chapter keep the sample sterile and viable, keep the glassware intact and keep collection liquid out of the pump.

Intended use

The BioSampler is a glass impinger that collects airborne microorganisms and other bioaerosols into a swirling liquid, or onto a sticky coating, at about 12.5 L/min. Use it as this manual describes, with a pump that holds sonic flow through the sampler, and with a liquid trap between the sampler and the pump whenever you sample into a liquid.

Heating the sampler assembled, heating ViaTrap mineral oil and sampling into a liquid without a liquid trap are misuse: they can damage the sampler, the collection oil or the pump, as the sections below explain.

Sterilising and assembling

NOTICE

Heat can damage the sampler and its collection oil. If you heat the sampler assembled, the ground-glass joints can stick together, and heat turns ViaTrap mineral oil cloudy. Take the sampler apart into its three pieces before you autoclave it or heat it in an oven. Never autoclave or heat ViaTrap mineral oil. Sterilise it by filtration (see Filling the vessel with liquid (p. 11)). The nozzle section and the collection vessel are a matched pair. When you reassemble the sampler, match the identifiers etched on both pieces.

Collection liquids and coatings

NOTICE

The wrong collection liquid or the wrong conditions spoil the sample. Glycerol can kill viable microorganisms by its osmotic pressure. ViaTrap mineral oil may not be suitable for analysis by polymerase chain reaction (PCR). Too much viscous liquid can overflow out of the sampler. Do not sample longer than 30 minutes with water or a water-based liquid, or with a petroleum jelly/hexane coating. Do not use water-based liquids for hydrophobic particles such as fungal spores. Do not sample below 41 °F (5 °C) with a water-based liquid: it can crystallise. Do not use glycerol to collect viable microorganisms. Ask the laboratory which collection liquid it needs. With a viscous liquid such as ViaTrap or glycerol, fill less than 20 mL into a 20 mL vessel, or less than 4 mL into a 5 mL vessel.

Protecting the pump

NOTICE

Collection liquid can be drawn out of the BioSampler into the pump, above all a viscous liquid such as ViaTrap or glycerol. Liquid in the pump can damage it. Whenever you sample into a liquid, put a liquid trap (Cat. No. 225-22) between the BioSampler and the pump.

During sampling

NOTICE

While you sample into a liquid, the vessel can come to hold too little or too much liquid. Too little leaves the vessel wall dry, and too much makes it bubble: either way the sampler does not operate properly. Check the sampler often while it runs, and more often with a viscous liquid. Correct either fault as described in Watching the sampler (p. 14).

CHAPTER 2

Product description

Parts of the sampler

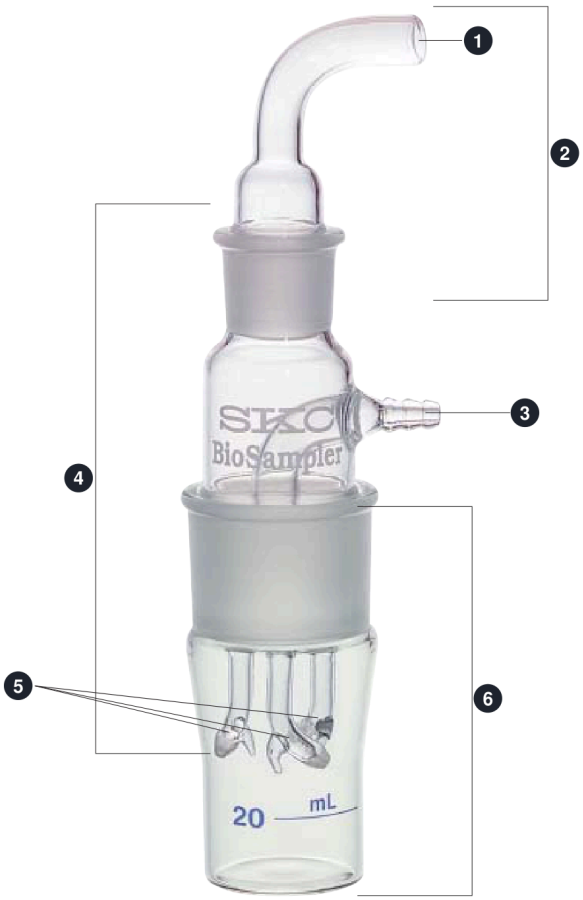


Figure 1. BioSampler with 20 mL collection vessel.
1 Inlet · **2** Inlet section · **3** Outlet to the pump · **4** Nozzle section · **5** Three nozzles (sonic orifices) · **6** Collection vessel

The BioSampler is made entirely of glass, in three pieces joined by ground-glass joints:

- **Inlet section** (2) — the bent inlet tube through which the sampled air enters.
- **Nozzle section** (4) — carries the outlet to the pump (3) and, inside, three nozzles (5) that point tangentially at the vessel wall.
- **Collection vessel** (6) — holds the collection liquid or carries the coating; 20 mL or 5 mL.

A ground-joint cap closes the collection vessel for transport. It does not come with the sampler; it is supplied with the spare collection vessels (see Ordering information (p. 21)).

Note
Nozzle section and collection vessel are supplied as a matched set and carry the same etched identifier. Always put matching pieces together: they fit and perform best as a pair.

How it works

The three nozzles are tangential, 0.630 mm in diameter, and act as sonic (critical) orifices. Once the pump draws a pressure drop of at least 0.5 atm (15 inHg) across the sampler at normal atmospheric pressure, the air in the nozzles reaches the speed of sound and the flow no longer rises with the vacuum: it stays constant at about 12.5 L/min. This is called sonic flow. Each BioSampler has its own flow rate close to 12.5 L/min, which you measure once as its baseline (see Calibration and verification (p. 16)).

The jets leave the nozzles into the collection liquid and set it swirling up the wall of the vessel. Particles in the air are driven into the swirling liquid and held there for analysis. With a coating instead of a liquid, the jets strike a sticky layer on the vessel wall.

With water-based liquids or a coating, the BioSampler collects for up to 30 minutes; with ViaTrap mineral oil, for up to 8 hours at practically constant collection efficiency.

What you need

Item	Comment
BioSampler	20 mL (225-9595) or 5 mL (225-9593)
Sample pump	A pump that maintains sonic flow and has a vacuum gauge or manometer, such as the SKC BioLite+ pump (228-9620, 230 V; 228-9615, 120 V). It is also part of the BioLite+ BioSampler kits.
Flowmeter	For calibration, e.g. rotameter 320-4A20L, 2–20 L/min
Collection liquid or coating	See Choosing the collection medium (p. 11)
Tubing	Silicone tubing, 3/8 in. ID; silicone tubing, 1/4 in. ID; Tygon tubing, 1/4 in. ID
Reducer/adapters	3/8 in. to 1/4 in., two pieces
Liquid trap	Glass trap 225-22, when sampling into a liquid
Pipette	Sterile, for filling and coating
Aluminium foil or Parafilm	To seal inlet and outlet of the prepared sampler

CHAPTER 3

Installation

Holding the sampler

Two accessories hold the sampler in place while it samples:

- **BioSampler case with mounting rod** (225-9606) — the case serves as a base and the rod holds the sampler. It is part of the BioSampler Mini Kit and of the BioLite+ BioSampler Deluxe Kits (see Ordering information (p. 21)).
- **Mounting bracket** (228-9611) — holds the sampler on the side of a BioLite+ pump, on either side.

When the sampler is not in use, store it taken apart in its three pieces (see Storing the sampler (p. 18)).

Fitting the mounting bracket

1. Find the two mounting screws on the side of the BioLite+ pump where the sampler is to go.
2. Put the two holes on the back of the bracket over the screws and slide the bracket down.
3. Tighten the screws to hold the bracket.

Connections

How the sampler connects to the liquid trap or the pump, with which tubing, is shown in Figure 2 (p. 13) and Figure 3 (p. 13) (see Taking the sample (p. 12)), and for flow verification in Figure 5 (p. 16). The tubing sizes are in Specifications (p. 20).

CHAPTER 4

Operation

Operation runs from the prepared sampler to the sample in the laboratory: before every sample, sterilise the sampler and fill or coat its collection vessel; take the sample; then transfer it under sterile conditions and get it to the laboratory quickly.

Before every sample, sterilise the sampler, choose the collection medium for the planned sampling time, and fill or coat the collection vessel under sterile conditions. Where you sample biologically inert particles only, aseptic handling is not needed.

Sterilising the sampler

NOTICE

Heat affects the ground-glass joints of the sampler. If you heat the sampler assembled, the joints can stick together. Never heat the sampler assembled: take it apart into its three pieces first.

1. Take the sampler apart into its three pieces: inlet section, nozzle section and collection vessel.
2. Sterilise the three pieces, and the ground-joint cap if you will use one, in an autoclave or oven at 320 to 356 °F (160 to 180 °C) for 180 to 240 minutes. This kills bacteria and fungi and destroys DNA.
3. When you reassemble the sampler, put together the nozzle section and collection vessel that carry the same etched identifier.

Choosing the collection medium

The planned sampling time decides between a water-based liquid, a coating and a non-evaporating liquid. Ask the analysing laboratory for its specific requirements, including sterilisation.

Sampling time	Recommended medium	Notes
Up to 30 minutes, with a liquid	Sterile distilled water, physiological saline, phosphate-buffered saline (PBS), nutrient broth or peptone water	Not for longer than 30 minutes, and not for hydrophobic particles such as fungal spores. Ask the laboratory for its requirements.
Up to 30 minutes, with a coating	Petroleum jelly/hexane solution	Not for longer than 30 minutes.
Longer than 30 minutes	A non-evaporating liquid, such as ViaTrap mineral oil or glycerol	Collection efficiency stays practically constant over an 8-hour sampling period. ViaTrap must be sterilised before use (see Filling the vessel with liquid (p. 11)) and may not be suitable for PCR analysis. Glycerol is not recommended for viable microorganisms: its osmotic pressure can kill them.

Filling the vessel with liquid

You need: the sterilised collection vessel(s) and sampler pieces, a pipette, sterile collection liquid (for example sterile distilled water, physiological saline, PBS, nutrient broth or peptone water), and aluminium foil or Parafilm.

NOTICE

Heat damages ViaTrap mineral oil. Autoclaving turns the oil cloudy. Do not autoclave it. Sterilise ViaTrap mineral oil before use: filter it through a sterile polycarbonate membrane filter with 0.4 µm pores.

NOTICE

Too much viscous liquid, such as ViaTrap or glycerol, overfills the vessel. The liquid can then overflow out of the sampler. Fill less than 20 mL into a 20 mL vessel, or less than 4 mL into a 5 mL vessel.

1. In a sterile environment, pipette the required amount of sterilised collection liquid aseptically into the sterilised collection vessel.
2. In the same sterile environment, assemble the clean, sterilised inlet section and nozzle section on the filled collection vessel.
3. Seal the sampler inlet and outlet with aluminium foil or Parafilm to keep the sampler sterile until you use it.

Coating the vessel

You need: the sterilised collection vessel(s) and sampler pieces, a pipette, a sterile coating solution, and aluminium foil or Parafilm. The manufacturer recommends a petroleum jelly/hexane solution; other coatings can be used.

1. In a sterile environment, prepare the coating solution. For petroleum jelly/hexane, dissolve about 0.1 g petroleum jelly per millilitre of hexane.
2. Pipette a few drops of the solution aseptically into the collection vessel and turn the vessel until its whole inner surface is wet. The coating must cover the band where the air jets strike the wall.
3. Wait for the hexane to evaporate, which takes up to 5 minutes. It leaves an even, sticky layer on the inner surface.
4. In the same sterile environment, assemble the clean, sterilised inlet section and nozzle section on the coated collection vessel.
5. Seal the sampler inlet and outlet with aluminium foil or Parafilm to keep the sampler sterile until you use it.

Sampling

Before you start

- Calibrate the flow with this sampler and record Q_s (see Calibration and verification (p. 16)).
- When you sample into a liquid, plan for a liquid trap (225-22) between sampler and pump — essential with a viscous liquid such as ViaTrap or glycerol.
- When you sample into a liquid, stay close enough to check the sampler while it runs (see Watching the sampler (p. 14)).
- With a water-based liquid, do not sample at temperatures below 41 °F (5 °C): the liquid can crystallise.

Taking the sample

1. Warm up the pump before you connect it to the sampling train. For the BioLite+, the 5 minutes it runs to stabilise the flow during calibration are enough; for other pumps, follow their instructions.

2. When you are ready to sample, remove the foil or Parafilm from the BioSampler inlet and outlet.
3. Set up the sampling train:
   - **With a collection liquid:** connect the BioSampler outlet on the nozzle section to the inlet of the liquid trap, and the trap outlet to the pump inlet (Figure 2). Do not leave out the trap.
   - **With a coated vessel:** connect the BioSampler outlet on the nozzle section directly to the pump inlet (Figure 3).
4. Start the pump and sample for no longer than the collection medium allows (see Choosing the collection medium (p. 11)). With a liquid, check the sampler regularly as described below.
5. At the end of sampling, stop the pump and write down the sampling time.
6. Calculate the volume of air sampled:

   $$\mathbf{V}\ [\mathrm{L}] = \mathbf{Q_s}\ [\mathrm{L/min}] \times \mathbf{t}\ [\mathrm{min}]$$

   Q_S is the calibrated flow rate, t the sampling time.

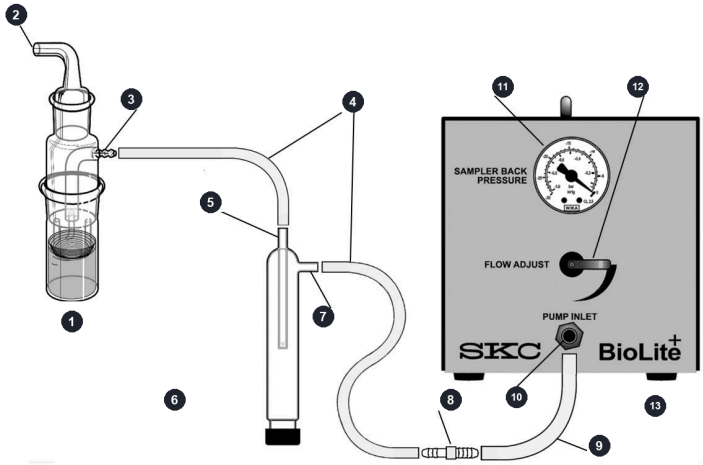


Figure 2. Sampling train with a collection liquid and liquid trap 225-22.
1 BioSampler, filled with liquid · **2** BioSampler inlet · **3** BioSampler outlet · **4** Silicone tubing, 1/4 in. ID · **5** Trap inlet · **6** Liquid trap · **7** Trap outlet · **8** Reducer/adapter · **9** Silicone tubing, 3/8 in. ID · **10** Pump inlet · **11** Vacuum gauge · **12** Flow adjuster · **13** Sample pump

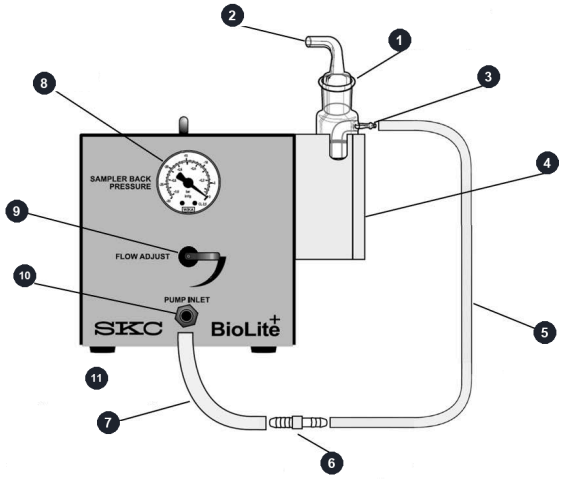


Figure 3. Sampling train with a coated collection vessel, sampler on the optional mounting bracket.
1 BioSampler, coated · **2** BioSampler inlet · **3** BioSampler outlet · **4** Mounting bracket 228-9611 (optional; see Fitting the mounting bracket (p. 10)) · **5** Silicone tubing, 1/4 in. ID · **6** Reducer/adapter · **7** Silicone tubing, 3/8 in. ID · **8** Vacuum gauge · **9** Flow adjuster · **10** Pump inlet · **11** Sample pump

Watching the sampler

NOTICE

While you sample into a liquid, the vessel can come to hold too little or too much liquid. The sampler then does not operate properly. Check the sampler often while it runs, and more often with a viscous liquid.

In correct operation, the liquid swirls up the inside of the collection vessel and keeps the wall wet where the nozzles blow against it (Figure 4, left). Check two things:

- **Enough liquid.** If the wall is not wetted where the nozzles blow, the vessel is underfilled. Pause sampling, add sterilised collection liquid, then carry on.
- **No heavy bubbling.** Strong bubbling means there is too much liquid in the vessel. Pause sampling, pipette some liquid out of the vessel aseptically, then carry on.



Figure 4. Fill level during sampling. Left: correct — the liquid swirls up the wall. Centre: underfilled — the wall stays dry. Right: overfilled — the liquid bubbles heavily.

After sampling

Many analyses of microorganisms allow only a short time between sampling and analysis. Transfer the sample under sterile conditions and get it to the laboratory quickly.

Transferring the sample

1. In a sterile environment, take the BioSampler apart.
2. Transfer the sample:
   - **Collection liquid:** measure the final volume of the liquid accurately, then transfer it aseptically into a sterilised container.
   - **Coated vessel:** wipe the inner surface of the vessel with a small piece of cloth or paper, and put the cloth or paper aseptically into a sterilised container.

   Note
   You can also close the collection vessel itself with a ground-joint cap for transport. Grease the ground-glass surface of the cap lightly with silicone grease first, so that the cap does not stick.
3. Seal each sample container, so that the sample cannot be contaminated on the way.
4. Label each container with the sample identification.
5. Send or take the samples to the laboratory as soon as possible after sampling — preferably within 24 hours.

Analysis methods

BioSampler samples suit the following methods of analysis. Choose the method, and with it the collection medium, together with the laboratory.

Method	Used for
Growth culture	Counting and characterising airborne bacteria and fungi, down to species level
Microscopy	Counting total airborne bacteria and fungi, with limited identification
Biochemical assay	Measuring biological compounds such as endotoxins
Immunoassay	Quantifying airborne allergens; variants include fluorescence, enzyme and radioimmunoassay
Polymerase chain reaction (PCR)	Screening for a specific genus or species by in-vitro replication of selected nucleic acid sequences. ViaTrap mineral oil may not be a suitable collection liquid; ask the laboratory which liquid to use.

CHAPTER 5

Calibration and verification

The sample volume is flow rate times sampling time. The BioSampler's nozzles fix the flow once the pump reaches sonic flow, so calibration means two things: setting the pump so that the vacuum is in the sonic range, and measuring the flow this particular sampler then delivers.

Preparing the pump

The steps are written for the BioLite+ pump. For another pump, use its own instructions to the same effect.

1. Plug the pump into a suitable mains outlet.
2. Turn the flow adjuster fully counterclockwise, so that it is completely open.
3. Switch the pump on with the on/off switch on the back.
4. Let it run for 5 to 10 minutes to stabilise, then switch it off.

Setting up the verification train

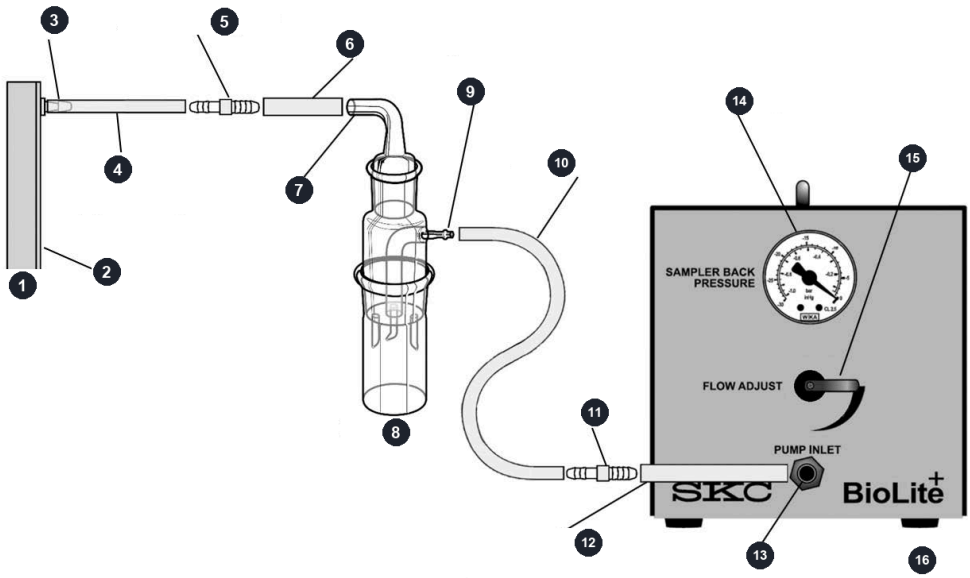


Figure 5. Verification train, shown with rotameter 320-4A20L and the BioLite+ pump.
1 Rotameter · **2** Rotameter inlet · **3** Rotameter outlet · **4** Tygon tubing, 1/4 in. ID · **5** Reducer/adapter · **6** Silicone tubing, 3/8 in. ID · **7** BioSampler inlet · **8** BioSampler · **9** BioSampler outlet · **10** Silicone tubing, 1/4 in. ID · **11** Reducer/adapter · **12** Silicone tubing, 3/8 in. ID · **13** Pump inlet · **14** Vacuum gauge · **15** Flow adjuster · **16** Sample pump

Connect the flowmeter outlet to the BioSampler inlet, and the BioSampler outlet to the pump inlet, as in Figure 5. The rotameter, tubing and reducer/adapters shown come with the BioLite+ BioSampler Kits and Deluxe Kits.

Measuring the flow

1. Switch the pump on. Turn the flow adjuster until the vacuum gauge or manometer reads between 15 and 30 inHg of vacuum: the sampler is now in sonic flow.

   > **Note**
   > Clockwise reduces the flow, counterclockwise increases it.

2. Let the pump run for 5 minutes, so that the flow settles before you take a reading.
3. Read the flow rate on the flowmeter and write it down as Q_s in L/min. You need it to calculate the sample volume.

Checking the baseline

The first calibration of a new sampler is its baseline. Compare every later calibration with it.

> **Note**
> If the flow has changed by 5 % or more from the baseline, a nozzle may be broken or clogged. Replace the nozzle section and calibrate again. The flow with the new nozzle section will usually differ slightly from the old one, because every sampler has its own flow of about 12.5 L/min: record it as the new baseline for this sampler.

CHAPTER 6

Maintenance

Storing the sampler

Store the BioSampler taken apart, in its three pieces, so that the ground-glass joints cannot seize. Keep the pieces clean and dry, in a place without extremes of temperature. Keep each nozzle section with the collection vessel that carries its identifier. Clean and sterilise the sampler before each use, as described in Sterilising the sampler (p. 11).

Replacement parts

Spare collection vessels with caps, and complete samplers with a matched nozzle section and collection vessel, are listed with their order codes under Accessories and spare parts (p. 21).

CHAPTER 7

Troubleshooting

Problem	Cause and remedy
The calibrated flow differs by 5 % or more from the sampler's baseline.	A nozzle may be broken or clogged. Replace the nozzle section, calibrate again and record the new baseline (see Checking the baseline (p. 17)).
The vacuum gauge reads less than 15 inHg.	The sampler is not in sonic flow, so the flow is not stable. Turn the flow adjuster until the gauge reads 15–30 inHg (see Measuring the flow (p. 17)).
The liquid does not wet the vessel wall where the nozzles blow.	Too little liquid. Pause sampling and add sterilised collection liquid (see Watching the sampler (p. 14)).
The liquid bubbles heavily.	Too much liquid. Pause sampling and pipette some liquid out aseptically.
Viscous liquid runs out of the sampler.	The vessel was overfilled. Fill less than 20 mL into a 20 mL vessel, less than 4 mL into a 5 mL vessel.
Collection liquid has reached the pump.	Sampling into a liquid without a liquid trap. Always use trap 225-22 between sampler and pump with a liquid. Have the pump checked by Analyt-MTC.
The ViaTrap oil is cloudy.	It has been heated, for example in an autoclave. Use fresh oil and sterilise it by filtration (see Filling the vessel with liquid (p. 11)).
Water-based liquid crystallises.	The air is colder than 41 °F (5 °C). Do not sample below 41 °F (5 °C) with a water-based liquid.
The glass pieces stick together.	They were heated or stored assembled. Always sterilise and store the sampler in three pieces.

For spare parts, such as a replacement nozzle section, and for anything these remedies do not solve, contact Analyt-MTC (see Service, warranty and contacts (p. 22)).

CHAPTER 8

Specifications

Performance

Flow rate	About 12.5 L/min in sonic flow; each sampler has its own calibrated value
Operating principle	Air passes through three tangential sonic nozzles, 0.630 mm, into a swirling flow of collection liquid, which takes up the bioaerosols for analysis
Sonic-flow condition	Pressure drop across the sampler of 0.5 atm (15 inHg) or more at normal atmospheric pressure; vacuum gauge reading 15–30 inHg
Collection efficiency	Nearly 100 % over a wide range of particle sizes, falling to about 90 % at 0.5 µm
Collection medium	Water or more viscous liquids such as ViaTrap mineral oil*, or a coating; agree the medium with the laboratory
Sampling time	Up to 30 minutes with water-based liquids (not below 41 °F, 5 °C) or a petroleum jelly/hexane coating; up to 8 hours with a non-evaporating liquid such as ViaTrap
Pump	High-volume vacuum pump that reaches sonic flow; the manufacturer recommends the SKC BioLite+ pump

* ViaTrap may not be suitable for PCR analysis. Ask the laboratory which collection liquid to use.

Construction and handling

Material	Glass, three pieces: inlet section, nozzle section, collection vessel; nozzle section and vessel matched by an etched identifier
Collection vessel	20 mL (225-9595) or 5 mL (225-9593)
Connections	Inlet: 3/8 in. ID silicone tubing; outlet: 1/4 in. ID silicone tubing
Sterilisation	Autoclave or oven, 320–356 °F (160–180 °C), 180–240 minutes, disassembled

CHAPTER 9

Ordering information

Order from Analyt-MTC with the order codes.

Samplers and kits

Description	Order code
BioSampler, 20 mL, three-piece glass: inlet section, nozzle section and collection vessel (nozzle section and vessel matched); without ground-joint cap	225-9595
BioSampler, 20 mL, set of 4	225-9595K4
BioSampler, 5 mL, three-piece glass, as above	225-9593
BioSampler Mini Kit: BioSampler, two 20 mL collection vessels with caps, BioSampler case with mounting rod, ViaTrap 120 mL*	225-9597
BioLite+ BioSampler Kit, 230 V: BioLite+ pump, BioSampler with vessel and cap, one additional 20 mL collection vessel with cap, mounting bracket, tubing and adapters, rotameter	228-9620KB
BioLite+ BioSampler Kit, 120 V: as above, with 120 V pump	228-9615KB
BioLite+ BioSampler Deluxe Kit, 230 V: BioLite+ pump, BioSampler, two 20 mL collection vessels with caps, case with mounting rod, ViaTrap 120 mL*, tubing and adapters, rotameter	228-9620KBD
BioLite+ BioSampler Deluxe Kit, 120 V: as above, with 120 V pump	228-9615KBD

Accessories and spare parts

Description	Order code
COLLECTION VESSELS AND MEDIA	
Collection vessel (bottom) with ground-joint cap, for transporting samples, 20 mL	225-9596
Collection vessel (bottom) with ground-joint cap, for transporting samples, 5 mL	225-9596A
ViaTrap collection medium, mineral oil for bioaerosol sampling*, 120 mL	225-9598A
ViaTrap collection medium, 500 mL*	225-9598
ViaTrap collection medium, 950 mL*	225-9599
PUMP AND FLOW	
SKC BioLite+ sonic flow pump, 230 V: housing with vacuum gauge and valve, mains operation only; supplied without orifices or rotameter	228-9620
SKC BioLite+ sonic flow pump, 120 V: as above	228-9615
Rotameter, 2–20 L/min, with 1/4 in. ID Tygon tubing on the outlet	320-4A20L
Glass trap (liquid trap): keeps collection liquid out of the pump; with or without sorbent	225-22
Trap sorbent, 200 g: silica gel/activated charcoal mix to remove vapours	225-22-02
MOUNTING	
BioSampler case with mounting rod and foam insert; the case serves as a base, the rod holds the sampler	225-9606
Mounting bracket, holds the BioSampler on a BioLite+ pump	228-9611

* ViaTrap mineral oil may not be suitable for PCR analysis.

CHAPTER 10

Service, warranty and contacts

Analyt-MTC is your contact for everything concerning the BioSampler and the BioLite+ pump: questions on the method and the choice of collection medium, spare glassware such as nozzle sections and collection vessels, accessories, pump service and warranty claims.

Contact

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Before you contact Analyt-MTC

Have the following at hand so that Analyt-MTC can help you quickly:

- the catalogue number of the sampler or kit (225-9595, 225-9593, …);
- the sampler's baseline flow and the latest calibrated flow (see Checking the baseline (p. 17));
- the collection medium and sampling time you used, and what happened.

Warranty

The BioSampler and its accessories are covered by Analyt-MTC's terms of warranty. Make warranty claims to Analyt-MTC.

Disposal

Dispose of the BioSampler under local regulations; separate metal, glass and plastic parts for recycling where possible.

APPENDIX A

Background literature

- Macher, J.M., et al.: "Sampling Airborne Microorganisms and Aeroallergens". In: *Air Sampling Instruments for Evaluation of Atmospheric Contaminants*, 8th ed., ACGIH, 1995, pp. 589–617.
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- Lin, X., et al.: "Effect of Sampling Time on the Collection Efficiency of All-Glass Impingers". *Am. Ind. Hyg. Assoc. Journal* 58, 1997, pp. 480–488.
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AMTC-MN-0018 · Rev. 2 · 2026-10

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