

# BioSampler

## 8-hour Sampling of Bioaerosols into Liquid

- Design overcomes problems associated with impinger sampling of bioaerosols
- Allows use of non-evaporating collection liquids for longer sampling times
- Maintains constant sampling efficiency up to 8 hours
- Swirling liquid collection method
  - Significantly reduces particle bounce and re-aerosolization
  - Preserves microorganism integrity and viability
- Collection liquid easily transferred to agar plate for culturing
- Samples can be analyzed by a variety of methods
- Reusable — can be autoclaved

The SKC BioSampler® is a glass collection device that externally resembles an All-glass Impinger (AGI-30<sup>‡</sup>). Internally, BioSampler contains design features that overcome some of the sampling problems associated with using impingers for bioaerosol collection.

- Inlet limits collection of airborne particles to those that would pass through the human nose.
- Three tangential nozzles reduce particle bounce off inner wall.
- Airflow through the nozzles causes the collection liquid to swirl upward on the inner wall and gently remove collected particles. The swirling motion generates few bubbles and minimizes re-aerosolization of particles.

<sup>‡</sup> All-glass Impinger (AGI-30)-30 refers to the distance in millimeters between the inlet stem or jet and the base of the impinger.

### The BioSampler Advantage

- **Constant sampling efficiency over longer sampling times**  
**BioSampler:** Thicker, non-evaporating liquids such as ViaTrap® mineral oil can be used to maintain constant sampling efficiency over an 8-hour workshift. Longer sampling times increase sample volumes for detecting organisms at lower concentration levels.  
**Standard Impingers:** Typical sampling times with standard impinger liquids are only 1 to 1.5 hours.
- **Less particle bounce**  
**BioSampler:** Nozzles eject particles at an angle to the sampler's inner wall to reduce particle bounce and preserve aggregates of organisms.  
**Standard Impingers:** Microorganisms are typically damaged by collision with the impinger base plate.
- **Decreased particle re-aerosolization**  
**BioSampler:** Airflow through three tangential nozzles causes the collection liquid to gently swirl and move particles into the collection liquid without re-aerosolization.  
**Standard Impingers:** The collection liquid tends to bubble violently, causing collected particles to re-enter ambient air.



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### BioSampler Operation

BioSampler is operated with a sonic flow pump such as the BioLite. The BioSampler's three nozzles act as critical (sonic) orifices, each permitting 4.2 L/min of ambient air to pass through, resulting in a total flow rate of approximately 12.5 L/min. Collection liquid with a viscosity much higher than water, such as ViaTrap (special mineral oil), can be used with the BioSampler to provide constant collection efficiency over an eight-hour sampling period.

### BioSampler Sample Analysis

BioSampler samples provide many analysis options. Contact a laboratory for collection liquid requirements.

- **Growth Culture** quantifies/characterizes airborne cultural bacteria and fungi.
- **Microscopic** enumerates and provides limited identification of total airborne bacteria and fungi.
- **Biochemical Assay** quantifies biological compounds based on reaction to a chemical.
- **Immunoassay** quantifies airborne allergens based on antibodies binding to a specific target antigen.
- **Polymerase Chain Reaction (PCR)** identifies bioaerosols by screening for a specific genus or species.

### BioSampler Applications

With BioSampler, locate sources of contamination, identify and measure levels of microorganisms, evaluate effectiveness of control measures, or monitor bioaerosol releases for many applications including:

- Indoor air quality investigations
- Infection control in hospitals and veterinary clinics
- Quantification of microorganisms in agricultural dust
- Biological research
- Infectious disease investigations in public buildings
- Workplace exposures in industries such as pulp and paper mills or wastewater treatment plants



BioSampler set up with BioLite pump

### References

Nevalainen, A., Willeke, K., Liebhaber, F., Pastuszka, J., Burge, H., and Henningson, E., *Bioaerosol Sampling: Aerosol Measurement Principles, Techniques, and Applications*, Van Nostrand Reinhold, New York, 1993, pp. 471-492

Lin, X., Willeke, K., Ulevicic, V., Grinshpun, S.A., "Effect of Sampling Time on the Collection of All-Glass Impingers," *Am. Ind. Hyg. Assoc. Journal*, v. 58, 1997, pp. 480-488

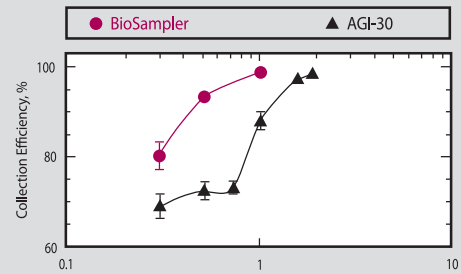
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### Performance Profile

Physical collection efficiency and biological collection efficiency are two performance characteristics that are critical to selecting the proper bioaerosol sampler. BioSampler collection efficiency is close to 100% over a wide range of particle sizes when operated at 12.5 L/min with water or a liquid of similar viscosity. For particles less than 1.0  $\mu\text{m}$  in diameter, collection efficiency decreases to approximately 90% at 0.5  $\mu\text{m}$  (see below).



Test particle: PSL (Polystyrene Latex Beads)

Collection fluid: 20-ml deionized water

Sampling flow rate: 12.5 L/min

### Ordering Information

Description	Cat. No.
<b>Deluxe BioSampler System</b> includes 1 BioSampler, two 20-ml collection vessels with caps, 1 BioSampler case with mounting rod, 1 ViaTrap* (120 ml), 1 BioLite pump (sonic flow), tubing/reducer, and rotameter	120 V 228-9615KD
<b>Basic BioSampler System</b> includes 1 BioSampler, one additional 20-ml collection vessel with cap, 1 mounting bracket, 1 BioLite pump (sonic flow), tubing/reducer, and rotameter	120 V 228-9615K
<b>BioSampler</b> , 3-piece glass, includes inlet section, outlet section, and collection vessel	20 ml 225-9595
(does not include ground joint cap)	20 ml pk/4 225-9595K4
Inlet and outlet sections are a matched set	5 ml 225-9593
<b>BioSampler Collection Vessel</b> (bottom) and ground joint cap, for transporting samples	20 ml 225-9596
<b>ViaTrap Collection Media</b> *, special mineral oil for bioaerosol sampling	5 ml 225-9596A
	120 ml 225-9598A
	500 ml 225-9598
	950 ml 225-9599
<b>BioSampler Mini Kit</b> includes 1 BioSampler, two 20-ml collection vessels (bottoms) with caps, 1 BioSampler case with mounting rod, and 1 ViaTrap (120 ml)	225-9597
<b>Sonic Flow Pumps</b> , in protective housing with vacuum gauge and valve to ensure sonic flow performance, supplied without orifices or rotameter, AC operation only	120 V, 60 Hz 228-9615
	230 V, 50 Hz 228-9620
<b>Glass Trap</b> , for area sampling to protect pump, can be used with or without sorbent	225-22
<b>Trap Sorbent</b> , 200 grams, silica gel/activated charcoal sorbent mix to remove vapors	225-22-02
<b>Mounting Bracket</b> , for mounting on BioLite pump	228-9611

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

### SKC Limited Warranty and Return Policy

SKC products are subject to the SKC Limited Warranty and Return Policy, which provides SKC's sole liability and the buyer's exclusive remedy. To view the complete SKC Limited Warranty and Return Policy, go to <http://www.skcinc.com/warranty>.