



## Operating Instructions

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# BioStage<sup>®</sup> Impactor Cat. No. 225-9611

## Introduction

The SKC BioStage viable cascade impactor meets NIOSH requirements and ACGIH recommendations for sampling indoor and outdoor mold and bacteria.

## Description

The BioStage comprises an inlet cone, precision-drilled 400-hole impactor stage, and a base that holds a standard-size agar plate. A high flow pump, such as the QuickTake<sup>®</sup> 30, pulls microorganisms in air through the holes (jets) where they are collected on the agar surface. BioStage has a SureLock positive seal (instead of bulky spring clamps) that ensures sample integrity. BioStage can be mounted on the QuickTake 30 pump or on a tripod stand.

The BioStage is operated at 28.3 L/min.

## Checking BioStage/Kit Contents

Use the table below to verify that you received all items associated with the Cat. No. ordered. If you are missing items, contact SKC at 800-752-8472 (U.S. only) or 724-941-9701.

If You Ordered Cat. No.	Your Package Should Contain
225-9611	BioStage <sup>‡</sup> single-stage viable cascade impactor
228-9530K	BioStage Pump Kit includes BioStage <sup>‡</sup> Sampler, QuickTake 30 <sup>Δ</sup> pump with Li-Ion battery, AC charger/adaptor (100-240 V), mounting bracket with inlet adapter, calibration adapter, cassette/tubing adapters, rotameter, and deluxe carry case

<sup>‡</sup> Requires microbiological media supplied by analytical laboratories. For lab list, go to [www.skcinc.com/lablocations](http://www.skcinc.com/lablocations).

<sup>Δ</sup> QuickTake 30 pump is **not** CE marked.

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## Required Equipment/Media

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- Appropriate agar in a 15 x 90 to 100-mm agar plate**  
Plastic or glass agar plates can be used. Verify with your agar supplier that the plates contain the proper volume of agar to achieve the appropriate agar height to maintain impactor cut-points. Store agar plates as directed by the supplier.

### ***Suggested Media***

**For Bacteria:** Tryptic Soy Agar (TSA) or Blood Agar Plates (BAP)

**For Mold:** Potato Dextrose Agar (PDA), Malt Extract Agar (MEA), Dichloran Glycerol 18 Agar (DG-18), or Corn Meal Agar (CMA)

- High flow pump, such as QuickTake 30 Sample Pump Cat. No. 228-9530**
- 1/4-inch ID tubing**
- 3/8-inch ID tubing**
- Luer adapters for 1/4 and 3/8-inch tubing**

For information on laboratories that can provide agar plates and analyze samples, search on Lab at [www.skccinc.com](http://www.skccinc.com).



*Clean the BioStage before the first use and between subsequent uses. See Clean and Sterilize.*



*Sanitize hands or wear disposable gloves. Sanitize hands and impactor any time contamination from handling is possible. Do not touch holes in the jet classification stage.*

# Operation

## Clean and Sterilize

### To clean the BioStage:

1. Disassemble the BioStage by removing the inlet cone and unscrewing and removing the jet classification stage from the base plate. Place the parts in an ultrasonic bath with a mild detergent-water solution.
2. Thoroughly rinse and air-dry them in a dust-free space.

### To sterilize the BioStage:

1. Remove the O-rings and set aside.
2. Immerse the other parts in 70% isopropanol or ethanol and air-dry. For field sterilization, O-rings and parts can be swabbed using a sterile gauze pad with 70% isopropanol or ethanol and air-dried.

*Note: During cleaning, visually inspect the condition of the O-ring in the inlet cone and in the base plate. Ensure the O-ring surface is smooth (i.e., without cracks, cuts, or other damage). Ensure the O-ring fits properly in the channel in the inlet cone and the base plate. The O-ring should lay flush with the upper lip of the channel. Replace if there is apparent damage, stretching, or thinning.*

## Assemble with Media

1. Remove the inlet cone by lifting it up and off.
2. Remove the jet classification stage by gently unscrewing it and lifting it up and off.

*Note: Visually inspect the condition of the O-ring in the inlet cone and in the base plate. Ensure the O-ring surface is smooth (i.e., without cracks, cuts, or other damage). Ensure the O-ring fits properly in the channel in the inlet cone and the base plate. The O-ring should lay flush with the upper lip of the channel. Replace if there is apparent damage, stretching, or thinning.*



Ensure refrigerated agar plates have been permitted to warm up to ambient temperature (approximately 20 minutes) before use.

3. Remove the lid from an agar plate and place the lid in a clean resealable bag. Place the agar plate on the three raised metal pins in the base plate of the impactor.



Do not operate without an agar plate in place.



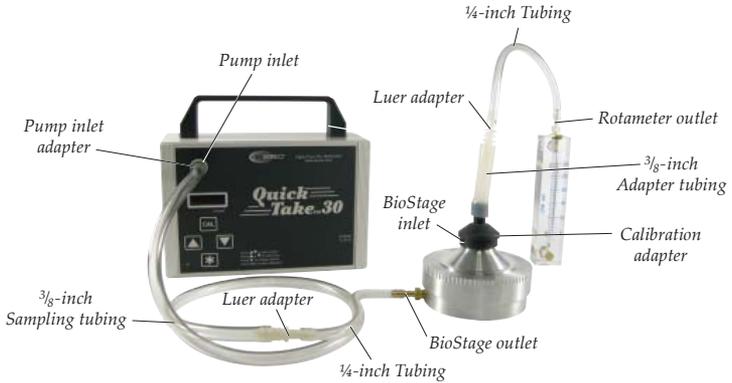
- Gently screw the jet classification stage back onto the base plate. Align and press the inlet cone onto the jet classification stage until a secure seal is established.



## Calibrate with a QuickTake 30 Sample Pump



Pump inlet adapter



QuickTake 30 pump and BioStage in calibration train

- Ensure the BioStage is fully assembled with a representative agar plate in place. See *Assemble with Media*.
- Insert the small end of the Luer adapter into the free end of the 1/4-inch ID tubing attached to the rotameter outlet.
- Insert the large end of the Luer adapter into the short length of the 3/8-inch adapter tubing.
- Install the free end of the adapter tubing onto the calibration adapter.
- Press the calibration adapter onto the BioStage inlet until a firm seal is established.
- Connect the BioStage outlet to one end of the 1/4-inch ID tubing.
- Insert the small end of a second Luer adapter into the free end of the 1/4-inch tubing.
- Insert the large end of the second Luer adapter into one end of the 3/8-inch sampling tubing and the pump inlet adapter into the other end.
- Insert the pump inlet adapter into the pump inlet.
- Calibrate the sample pump to 28.3 L/min. See *calibration procedure in QuickTake 30 Operating Instructions 40079*.
- When calibration is complete, remove the calibration adapter and tubing and flowmeter.

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## Sample

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### Read the following before sampling.

- Sanitize hands or wear disposable gloves. Sanitize hands and clean the BioStage Impactor in between samples.
- Never use agar that has expired, displays visible cracks, or has been contaminated.
- Allow agar plates to warm up to ambient temperature (approximately 20 minutes) before use.
- When sampling indoors, close all doors and windows that could affect airflow in the sampling area.

1. The BioStage outlet should be connected to the pump inlet with flexible tubing or using the Mounting Bracket accessory Cat. No. 228-9531. See *Operating Instructions 40066* supplied with that accessory. See right.
2. Remove the inlet cone and jet classification stage from the BioStage. Place a new, unexposed agar plate into the base plate (see *Assemble with Media*). Remove the lid from the agar plate and place in a clean resealable bag. Reassemble the impactor.
3. Turn on the pump and sample for 2 to 5 minutes.



*BioStage mounted on QuickTake 30 Pump with mounting bracket accessory*



*Sampling for too long can cause overgrowth of sample. Sampling times that are too short can cause false negatives.*

4. After sampling is complete, turn off the pump and disconnect the flexible tubing from the BioStage outlet. If the BioStage is mounted on the QuickTake 30 pump, remove the inlet adapter from the pump inlet and the inlet adapter tubing from the BioStage outlet.
5. Remove the inlet cone and jet classification stage and remove the agar plate (see *Remove the Agar Plate*). After sterilizing the sampler (see *Clean and Sterilize*), insert a fresh agar plate and reassemble the sampler (see *Assemble with Media*) to take additional samples. Repeat sampling as needed.

**Note:** *An additional indoor control sample should be taken in a non-complaint area. Outdoor samples should be collected for comparison to indoor samples. Clearly mark each sample. Sterilize the sampler between each sample period. See Clean and Sterilize.*

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## Remove the Agar Plate

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1. Remove the inlet cone and jet classification stage.
2. Remove the agar plate containing the sample and **replace its lid immediately**.
3. According to laboratory instructions, label the bottom of the agar plate with all pertinent sampling information. Seal the agar plate lid to the plate with tape and place in a sealable bag.
4. According to laboratory instructions, place the agar plate containing the sample in an ice chest with blue ice.



*Ensure the ice packs are not touching the plates to prevent freezing.*

5. According to laboratory instructions, immediately ship the agar plates containing the samples and a blank agar plate (*see Note below*) to a laboratory.

***Note:** NIOSH suggests that a representative agar plate be loaded into the BioStage and immediately unloaded to serve as a blank for each sample.*

## Maintenance

Clean the BioStage between uses (*see Clean and Sterilize*). Replace any O-rings that show apparent damage, stretching, or thinning.

## Accessories/Replacement Parts

Description	Cat. No.
QuickTake 30 Sample Pump, Rotameter, and Charger	
100-240 V	228-9530A
Calibration Adapter for BioStage, allows tubing to connect to BioStage inlet	P33100
Mounting Bracket for QuickTake 30, holds BioStage in place on pump during sampling, includes thumbscrews and inlet adapter	228-9531
Tripod Stand for BioStage Impactor	228-506
Replacement O-ring for Base Plate, ea	P32287
Replacement O-ring for Inlet Cone, pk/2	P31893

## SKC Limited Warranty and Return Policy

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# Appendix

## Performance Profile

<b>Flow Rate:</b>	28.3 L/min
<b>Material:</b>	<b>Inlet cone and base plate:</b> Precision-tooled autoclavable aluminum
	<b>O-rings:</b> Duro 50, BUNA-N ( <i>not autoclavable</i> )
<b>Jet Classification Stage:</b>	400 holes ( <i>0.25-mm hole diameter</i> )
<b>Median Cut-point (D<sub>50</sub>):</b>	0.6 µm
<b>Sample Media:</b>	15 x 90 to 100-mm agar plates*
<b>Analysis:</b>	Colony culture <sup>†</sup>
<b>Tubing:</b>	1/4-in ID

\* Consult a laboratory for information on appropriate agar choice.

† See References below for Yao, M. and Mainelis, G., "Analysis of Portable Impactor Performance for Enumeration of Viable Bioaerosols."

## References

Macher, J., (ed.) *Bioaerosols: Assessment and Control*, ACGIH, 1999

Samimi, B. and Shufutinsky, A., "Comparison of the Thermo-Andersen N6, the Aerotech A6, the SKC BioStage, and the SKC Micromedia Viable Samplers in Collecting Airborne Fungal Spores," *AHce 2005*, Anaheim, CA, Final Program, p. 43

Yao, M. and Mainelis, G., "Analysis of Portable Impactor Performance for Enumeration of Viable Bioaerosols," *Journal of Occupational and Environmental Hygiene*, 4:7, July 2007, pp. 514-524, DOI: 10.1080/15459620701407388

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