Operating Instructions

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BioStage Impactors

The SKC BioStage® viable cascade impactor meets NIOSH requirements and ACGIH recommendations for sampling indoor and outdoor mold and fungi. 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 30, pulls microorganisms in air through the holes (jets) where they are collected on the agar surface. Testing demonstrates that BioStage provides performance equivalent to the industry-standard Andersen N-6. What sets BioStage apart from other samplers is its SureLock positive seal (instead of bulky spring clamps) that ensures sample integrity.

Standard BioStage contains a 400-hole jet classification stage and is operated at 28.3 L/min

BioStage 200 contains a 200-hole jet classification stage and is operated at 14.15 L/min

Specifications

Flow Rate:	**Standard BioStage:**	28.3 L/min
	BioStage 200:	14.15 L/min
Material:	**Inlet cone and base plate:**	Precision-tooled autoclavable aluminum
	O-rings:	Duro 50, BUNA-N *(not autoclavable)*
Jet Classification Stage:	**Standard BioStage:**	400 holes *(0.25-mm hole diameter)*
	BioStage 200:	200 holes *(0.25-mm hole diameter)*
Median Cut-point (D_{50}):	0.6 µm	
Sample Media:	15 x 90 to 100-mm agar plates*	
Analysis:	Colony culture†	
Tubing:	1/4-inch ID	

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

† *In situations where spore counts are high, positive-hole correction should be used. See Macher, J., "Positive-hole Correction of Multiple-jet Impactors for Collecting Viable Microorganisms," American Industrial Hygiene Journal, 50 (11), 1989, pp. 561-568, available at www.skcinc.com/pdf/Multiple_Jet_Impactors.pdf*

Sample Media

Use appropriate agar in a 15 x 90 to 100-mm agar plate with the Standard BioStage or the BioStage 200. 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 Fungi: Potato Dextrose Agar (PDA), Malt Extract Agar (MEA), Dichloran Glycerol 18 Agar (DG-18), or Corn Meal Agar (CMA)

For information on laboratories that can provide agar plates and analyze samples, see Laboratories at www.skcinc.com.

Caution: *Clean the BioStage before the first use and between subsequent uses. See Cleaning and Sterilizing.*

Caution: *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.*

Assembly

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.

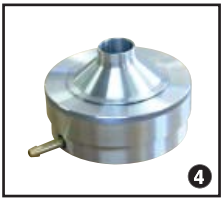
Note: *Visually inspect the condition of the O-ring in the inlet cone and in the base plate. Ensure the O-ring surface is smooth (i.e., without cracks, cuts, or other damage). Ensure the O-ring fits properly in the channel in the inlet cone and the base plate. The O-ring should lay flush with the upper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

Caution: *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.

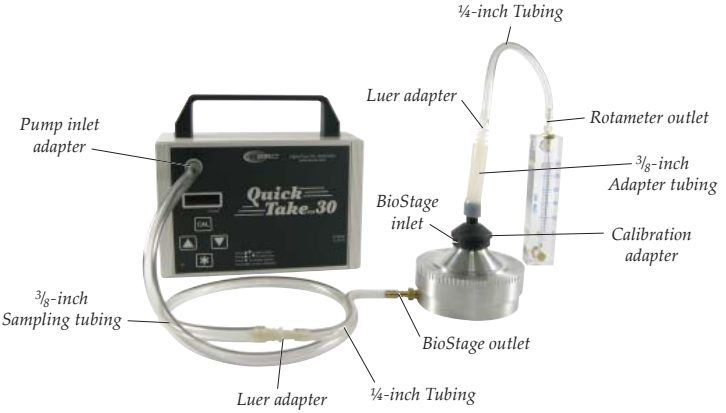
Caution: *Do not operate without an agar plate in place.*

4. 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.



Calibration with a QuickTake 30 Sample Pump

Pump inlet adapter



QuickTake® 30 pump and BioStage in calibration train

1. Ensure the BioStage is fully assembled with a representative agar plate in place.
2. Connect the rotameter outlet to one end of the ¼-inch ID tubing.
3. Insert the small end of a Luer adapter into the free end of ¼-inch tubing.
4. Insert the large end of the Luer adapter into the short length of the ⅜-inch adapter tubing.
5. Install the free end of the adapter tubing onto the calibration adapter.
6. Press the calibration adapter onto the BioStage inlet until a firm seal is established.
7. Connect the BioStage outlet to one end of the ¼-inch ID tubing.
8. Insert the small end of a second Luer adapter into the free end of the ¼-inch tubing.
9. Insert the large end of the second Luer adapter into one end of the ⅜-inch sampling tubing and the pump inlet adapter into the other end.
10. Insert the pump inlet adapter into the pump inlet.
11. Calibrate the sample pump to 28.3 L/min for a Standard BioStage or 14.15 L/min for BioStage 200.

The calibration adapter and rotameter are for use with both models of BioStage. See Accessories.

Sampling

Caution: *Sanitize hands or wear disposable gloves. Sanitize hands and clean the BioStage Impactor in between samples.*

Caution: *Never use agar that has expired, displays visible cracks, or has been contaminated.*

Caution: *Allow agar plates to warm up to ambient temperature (approximately 20 minutes) before use.*

Caution: *When sampling indoors, close all doors and windows that could affect airflow in the sampling area.*

1. Calibrate the flow rate (*see Calibration with a QuickTake 30 Sample Pump*).

2. Remove the calibration adapter, tubing, and flowmeter. The BioStage outlet should remain connected to the pump inlet with flexible tubing. If using the Mounting Bracket accessory (Cat. No. 228-9531), see Operating Instructions 40066 supplied with the accessory.

3. Remove the inlet cone and jet classification stage from the BioStage. Place a new, unexposed agar plate into the base plate (*see Assembly*). Remove the lid from the agar plate and place in a clean resealable bag. Reassemble the impactor.

BioStage mounted on QuickTake 30 Pump with mounting bracket accessory

4. Turn on the vacuum pump and sample for 2 to 5 minutes.

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

5. After sampling is complete, turn off the pump and disconnect the flexible tubing from the BioStage outlet.

6. Remove the agar plate (*see Removing the Agar Plate*), sterilize the sampler (*see Cleaning and Sterilizing*), and insert a fresh agar plate. Reassemble the sampler and take additional samples (*see Note below*). 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 Cleaning and Sterilizing).*

Removing the Agar Plate (Sample)

1. Remove the inlet cone and jet classification stage (*see Assembly, Steps 1 and 2*).

2. Remove the agar plate containing the sample and **replace its cover 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.

Caution: *Ensure 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 Blanks*) to a laboratory.

Blanks

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

Cleaning and Sterilizing

To clean the BioStage, disassemble and place the parts in an ultrasonic bath with a mild detergent-water solution. Thoroughly rinse and air dry in a dust-free space.

To Sterilize the BioStage:

a. Remove the O-rings and autoclave
b. Immerse in 70% isopropanol or ethanol and air dry

For field sterilization, 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.*

Ordering Information

BioStage	Cat. No.
Standard BioStage‡ single-stage viable cascade impactor (400 holes, 28.3 L/min)	**225-9611**
BioStage 200‡ single-stage viable cascade impactor (200 holes, 14.15 L/min)	**225-9610**
BioStage Pump Kit - DC includes Standard BioStage‡ Sampler, QuickTake 30Δ pump with battery, AC charger/ adapter (100-240 V), mounting bracket with inlet adapter, calibration adapter, field rotameter, tubing, and deluxe carry case	**228-9530K**

Accessories	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. *Suitable for both BioStage models*	**P33100**
Mounting Bracket for QuickTake 30, holds BioStage in place on pump during sampling	**228-9531**
Replacement O-ring for Base Plate, ea	**P32287**
Replacement O-ring for Inlet Cone, pk/2	**P31893**

‡ *Requires microbiological media supplied by analytical laboratories. For lab list, go to www.skcinc.com/labs/225-9611-labs.asp.*

Δ *QuickTake 30 pump is* ***not*** *CE marked.*

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.asp.

References

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