

# Operating Instructions



863 Valley View Road, Eighty Four PA 15330 USA

Tel: 724-941-9701 Fax: 724-941-1369 e-mail: skctech@skcinc.com

## Button Aerosol Sampler Catalog No. 225-360

The patented SKC Button Aerosol Sampler\* is a reusable filter sampler with a porous curved-surface sampling inlet designed to improve the collection characteristics of inhalable dust (<100  $\mu\text{m}$  aerodynamic diameter†) including bioaerosols for total (non-viable plus viable) microbial count.

While closely following the ACGIH/ISO sampling criteria for inhalable particulate mass at 4 L/min, the Button Sampler's design also minimizes wind sensitivity, provides superior filter collection uniformity and low intersample variation, and can be used in any orientation. Sample analysis for inhalable dust is performed gravimetrically using NIOSH Method 0500. Metals can be analyzed using direct-reading techniques (e.g., NIOSH Method 7702). Fungal spore analysis includes microscopy, immunoassay, or polymerase chain reaction (PCR).



SKC Button Aerosol  
Sampler

† Very large particles (>100  $\mu\text{m}$ ) are thought to be less inhalable, but may enter the inlets of some samplers by projection or sedimentation. The Button Aerosol Sampler design minimizes collection of these particles.

### Performance Profile

**Flow Rate:** 4 L/min  
The Button Sampler closely follows the ACGIH/ISO inhalability curve at 4 L/min. This provides optimum sampling. Sampling efficiency is maintained within  $\pm 30\%$  at flows ranging from 2 to 5 L/min

**Construction:** Sampling inlet: conductive stainless steel  
Body: aluminum  
Support screen: stainless steel

**Filters:** 25 mm select as specified by the method<sup>∞</sup>

**Analysis:** Inhalable dust: Gravimetric (GR)  
Fungal spores: Epifluorescence microscopy, immunoassay, or polymerase chain reaction (PCR)  
Metals: X-ray Fluorescence (XRF)

\* Patent Nos. 5,954,845 and 5,958,111

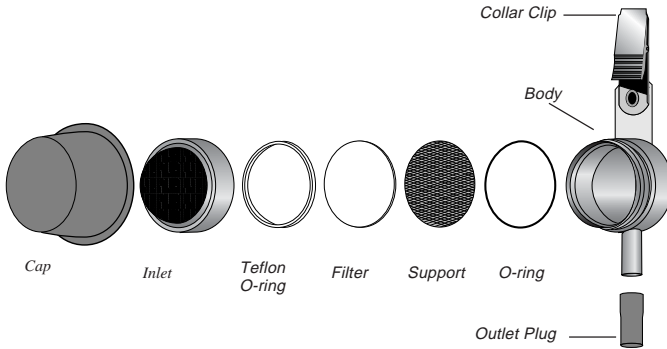
<sup>∞</sup>Back pressure on Teflon filters can vary within the same lot.

## Operation

Wear gloves and use forceps when handling filters.

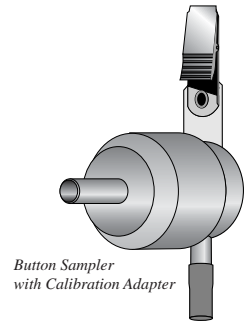
1. Place a 25 mm filter in the conductive plastic transport case and weigh. Record weight.
2. Unscrew the inlet of the sampler counterclockwise until it comes off.
3. Remove the weighed filter from the transport case and place it on top of the support screen inside the sampler.
4. Place the Teflon O-ring on top of the filter.
5. Replace the inlet and **very gently** turn clockwise until moderately tight.

**Caution:** Excessive tightening of the inlet section can twist and tear the filter.



## Calibration

1. Using flexible tubing, connect the outlet of the Button Sampler to the inlet of a sampling pump.
2. Place the calibration adapter outlet onto the Button Sampler inlet, and connect the calibration adapter inlet to a primary standard calibrator.
3. Calibrate to 4 L/min following the instructions in the pump and calibrator operating instructions.
4. Disconnect the calibrator and calibration adapter. Replace the filter used to set the flow with a fresh weighed filter for sample collection.



**Note:** If using the Button Sampler with protective shield for abrasive blasting sampling, calibrate the Button Sampler without shield using the Calibration Adapter. Following calibration, push shield onto sampler inlet and sample.

## Sampling

1. Ensure the flow rate has been calibrated (*see Calibration*).
2. Using flexible tubing, connect the outlet of the Button Sampler to the inlet of a sampling pump such as a 224-XR Series Universal Sampler.
3. For personal sampling, clip the Button Sampler onto a worker's collar or pocket near the breathing zone. Clip the pump onto the worker's belt or place it in a protective pouch. Start the pump and record the start time, worker location, and flow rate.

4. For area sampling, position the Button Sampler to avoid cross-drafts and direct projection of the particles into the inlet.
5. At the end of the sampling period, stop the pump and record the stop time.

## Sample Shipment

1. When sampling is complete, very gently unscrew the sampler inlet and use forceps to remove the Teflon O-ring.
2. Using forceps, carefully remove the filter from the sampler.
3. If gravimetric analysis is to be employed, place the filter in the conductive plastic transport case. If an analytical technique is to be used, place the filter in a sealed glass vial to eliminate losses during transport.
4. Ship plastic transport case or glass vial with pertinent sampling information to an accredited laboratory for analysis.

## Analysis

Dependent upon the hazard of interest, samples taken with the Button Sampler can be analyzed using gravimetric analysis, analytical techniques such as x-ray fluorescence, atomic absorption (AA), and inductively coupled plasma (ICP), and growth culture, microscopy, and other assays for determination of fungal spores, endotoxin, and bacteria.

If gravimetric analysis is used, weigh the filter inside the transport case and subtract the preweight from the postweight. The net weight will be the dust collected.

## Using the Button Sampler as an Abrasive Blasting Sampler for Heavy Metals<sup>‡</sup>

SKC has designed a protective shield for the Button Sampler for use when sampling in abrasive blasting environments. The shield protects the filter from shredding or being overloaded by large particles thrust onto the sampler during blasting. Tested by the U.S. Military during recent abrasive blasting operations, the Button Sampler with protective shield (Abrasive Blasting Sampler for Heavy Metals) withstood very high particle concentrations and provided recoverable samples and meaningful exposure information. The shield is very easy to use, simply push it onto the sampler inlet, and sample (*see Sampling*).

*‡ The Button Sampler with shield is **not** suitable for sampling silica. Silica is commonly found in abrasive blasting. However, sampling for silica using OSHA Method ID 142 requires a cyclone.*

## Using the Button Sampler to collect Inhalable Bioaerosols

The patented SKC Button Aerosol Sampler provides superior collection of inhalable particles including bacteria and fungal spores. Use the Button Sampler with a 25 mm membrane filter<sup>∞</sup> such as MCE or PVC to collect bioaerosols for total (viable plus non-viable) microbial count. Using SKC gelatin filters with the Button Sampler increases the survival of stress-sensitive microorganisms during sampling. The Button Sampler is used with a sample pump capable of 4 L/min for personal inhalable particulate sampling following the ACGIH/ISO criteria.

**Caution:** *Gelatin filters dissolve when placed on an agar plate.*

<sup>∞</sup> *Back pressure on Teflon filters can vary within the same lot.*

## References

Kalatoor, S., Grinshpun, S., Willeke, K., "New Aerosol Sampler with Low Wind Sensitivity and Good Filter Collection Uniformity," *Atmospheric Environment*, Vol. 29, No. 10 (1995), pp. 1105-1112.

Hauck, B., Grinshpun, S., Reponen, A., Reponen, T., Willeke, K., Bornschein, R., "Field Testing of New Aerosol Sampling Method With a Porous Curved Surface as Inlet," *American Industrial Hygiene Association Journal*, Vol. 58, No. 10 (1997), pp. 713-719.

Aizenberg, V., England, A., Grinshpun, S., Willeke, K., Carlton, G., "Metal Exposures Among Abrasive Blasting Workers at Four U.S. Air Force Facilities," *Applied Occupational and Environmental Hygiene*, Vol. 15, No. 10 (2000), pp. 766-772.

Aizenberg, V., Grinshpun, S., Willeke, K., Smith, J., Baron, P.A., "Performance Characteristics of the Button Personal Inhalable Aerosol Sampler," *AIHA Journal*, Vol. 61, May/June 2000, pp. 398-404.

## Optional Accessories

Description	Catalog No.
<b>Button Sampler</b>	<b>225-360</b>
<b>Button Sampler Calibration Adapter</b>	<b>225-361</b>
<b>Protective Shield for abrasive blasting sampling</b>	<b>225-366</b>
<b>Transport Case for 25 mm filters, conductive plastic</b>	<b>225-67</b>

Filters (25 mm) <sup>Δ</sup>	Catalog No.
<b>Glass fiber, 1.0 μm, pk/500</b>	<b>225-702</b>
<b>Teflon (PTFE) with PMP support (Teflo®)<sup>∞</sup>, 3.0 μm, pk/50</b>	<b>225-1711<sup>∞</sup></b>
<b>Polyvinyl chloride (PVC), 5.0 μm, pk/100</b>	<b>225-8-04</b>
<b>Mixed cellulose ester (MCE), 1.2 μm, pk/100</b>	<b>225-1912</b>
<b>Gelatin, presterilized, pk/50</b>	<b>225-9551</b>

<sup>Δ</sup> A pore size of 1.0 μm or higher is recommended for use with the Button Sampler due to back pressure limitations of personal samplers.

<sup>∞</sup> Back pressure on Teflon filters can vary within the same lot.

## Cleaning

Using mild soapy water, clean all parts of the SKC Button Sampler before further sampling. The Button Sampler can be brushed and /or wiped with a clean dust-free tissue, air dried, blown dry, or wiped with isopropyl alcohol. Take particular care in cleaning the first O-ring.

*Notice: This operating instruction may not address all safety concerns (if any) associated with this product and its use. The user is responsible for determining and following the appropriate safety and health practices and regulatory limitations (if any) before using the product. The information contained in this document should not be construed as legal advice, opinion, or as a final authority on legal or regulatory procedures.*