



Operating Instructions

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GS-3 Multiple-inlet Cyclone Catalog Nos. 225-100 and 225-103

Description

The GS-3 Cyclone is a 10-mm, lightweight, multiple-inlet, conductive plastic sampler that uses a standard three-piece cassette and filter for the collection of respirable dust particles. Designed to meet the ACGIH-CEN-ISO size-selection curve, the GS-3 Cyclone has a 50% cut-point of $4.0\ \mu\text{m}$ (with bias within ISO/NIOSH requirements) at $2.75\ \text{L}/\text{min}^*$ and $3.5\ \mu\text{m}$ at $3.7\ \text{L}/\text{min}^\dagger$

The GS-3 Cyclone can be used with a 25 or 37-mm three-piece cassette with the corresponding cassette adapter and filter.

Assembly (Figure 1)

The GS-3 Cyclone is supplied fully assembled with bowl adapter and 37 or 25-mm cassette adapter dependent upon model (Cat. Nos. 225-100 or 225-103, respectively). Replacement cassette adapters are available, allowing the user to adapt whichever model they are using to another cassette size.

1. Disassemble a three-piece cassette and set aside inlet section (usually marked "inlet"). Keep inlet section for closing the cassette after sampling.
2. Select a filter and support pad as specified in the sampling method. Place support pad into cassette outlet and place filter on top of support pad. Insert cassette ring (middle) section into cassette outlet. Ensure a firm seal.
3. Hold cyclone upside down (cassette adapter facing downward). Insert cassette adapter into cassette middle ring section. Press until a firm seal is established.
4. Ensure thumbscrew on cyclone is secure and that the grit pot remains on the cyclone body during sampling.

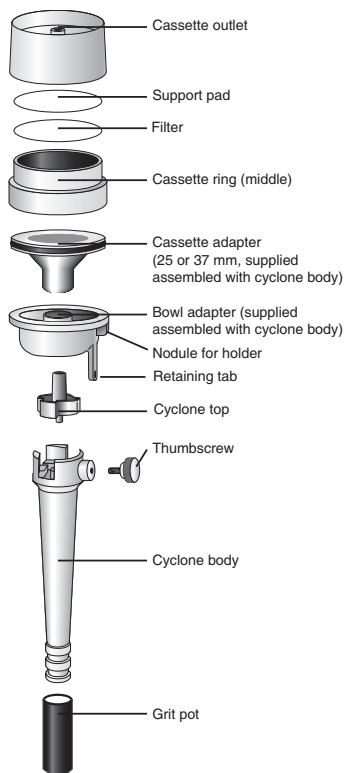


Figure 1
GS-3 Cyclone with Filter
Cassette — Exploded View

* Calibrated at U.K. Health and Safety Laboratories.

† Determined using experimental data obtained at flows from 2.0 to 4.0 L/min.

Inserting Cyclone/Cassette Assembly in 225-1 Cassette Holder (Figure 2)

1. Insert the cyclone body through the large opening of the cassette holder.
2. Ensure the cyclone/cassette assembly is seated firmly in the holder by inserting the cyclone's small round nodule on the rim into the notch in the cassette holder.
3. Remove the plug from the cassette outlet.
4. Secure the cyclone/cassette assembly in the holder by stretching the spring-loaded hold-down plate over the cassette outlet.
5. Insert the holder's Luer adapter (located on the end of the rubber tubing) into the cassette outlet.

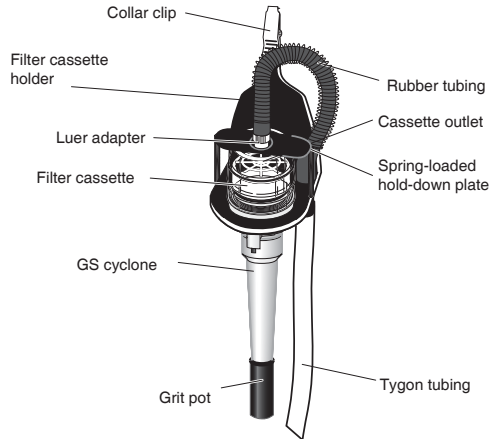


Figure 2

GS-3 Cyclone/Cassette Assembly
in Holder (Cat. No. 225-1)

Calibration

Option 1: Using a Calibration Jar (Figure 3)

1. Prepare a cyclone/cassette assembly (see Figure 1). Ensure grit pot remains on cyclone body during calibration.



SKC recommends using the smallest calibration jar possible. To achieve this, do NOT use Cassette Holder 225-1 during calibration.

2. Place cyclone/cassette assembly into an airtight calibration jar that contains an inlet and outlet (SKC Cat. No. 225-111, see Figure 3).
3. Using flexible tubing, connect inlet of calibrator to inlet of calibration jar.
4. Run tubing from outlet of cyclone/cassette assembly through outlet of calibration jar and to the inlet of a sample pump. If using the SKC 225-111 jar, connect the Luer adapter inside the jar to the cyclone/cassette outlet. Connect jar outlet to inlet of a sample pump.

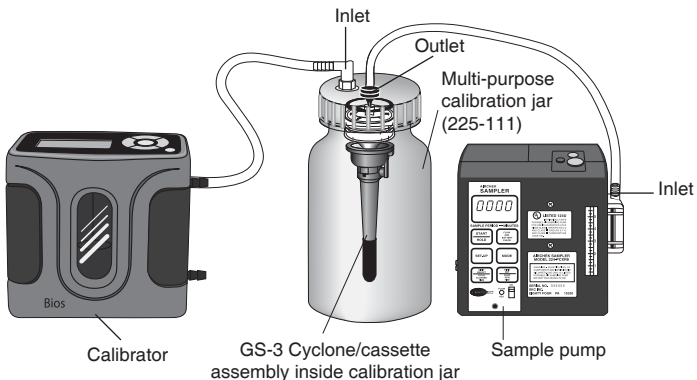


Figure 3

5. Turn on pump and calibrate to desired flow rate following directions in the pump and calibrator operating instructions.

Flow rate: 2.75 L/min for a 4.0- μ m cut-point*
 3.7 L/min for a 3.5- μ m cut-point†

6. After calibration, disassemble calibration jar, remove cyclone/cassette assembly, and replace cassette used for calibration with a fresh (unused) cassette to be used for sampling.

Option 2: Jarless Calibration (Figure 4)

This calibration option is recommended when using a Defender primary standard calibrator to calibrate personal air sample pumps for size-selective particulate sampling using particulate samplers that do not have their own calibration adapters.

1. Use a length of flexible tubing to attach the inlet of the sample pump to the suction port of a Defender calibrator.
2. Use the shortest length of tubing possible to attach the outlet of the cassette in a cyclone/cassette assembly to the pressure port of the Defender.
3. Set the Defender to take at least 20 flow measurements in order to average out the flow variations caused by direct connection of the pump to the calibrator. *See calibrator operating instructions for details.*

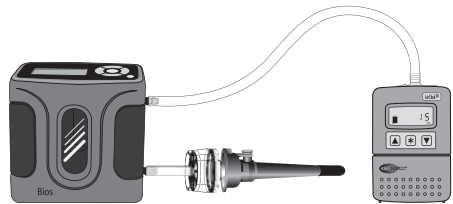


Figure 4. Jarless Calibration with Cyclone/Cassette Assembly and AirChek XR5000 Pump

Sampling

1. Ensure the flow rate has been set properly (*see Calibration*).



Leave grit pot in place during calibration and sampling.

2. Ensure fresh cassette has been installed on the cyclone and the cyclone/cassette assembly has been inserted into the cassette holder (*see holder instructions*).
3. Connect the Tygon® tubing attached to the cassette holder to the inlet of a constant flow personal sampling pump.
4. Clip the holder with the cyclone/cassette assembly onto a worker's collar or pocket as close to the breathing zone as possible.
5. Clip the pump onto the worker's belt or place it in a protective pouch. Start the pump and record pertinent details.
6. At the end of the sampling period, stop the pump and record pertinent details. Remove the cyclone/cassette assembly from the cassette holder. Immediately separate the cyclone from the cassette. Replace the inlet section of the cassette, seal the inlet and outlet sections with the provided plugs, and send the cassette and all data to a laboratory for analysis.



Particles collected in the grit pot do not represent any part of the respirable dust sample and should be discarded.

* Calibrated at U.K. Health and Safety Laboratories.

† Determined using experimental data obtained at flows from 2.0 to 4.0 L/min.

Cleaning

After sampling, clean all parts of the cyclone, including the interior of the grit pot, with mild soapy water. The cyclone can be wiped with a clean dust-free tissue, air dried, blown dry, or wiped with isopropyl alcohol.



Do not use strong solvents to clean the GS-3 Cyclone.

References

Gautam, M. and Sreenath, A., "Performance of a Respirable Multi-Inlet Cyclone Sampler", *J. Aerosol Sci.*, Vol. 28. No. 7, pp. 1265-1281, 1997 (copy available from SKC)

Trakumas, S., et. al., *Performance Assessment of Personal Respirable Cyclone Samplers*, AIHce Presentation 191, 2003

Ordering Information

Description	Cat. No.
GS-3 Cyclone with Cassette Adapter	
25 mm	225-103
37 mm	225-100
Replacement Cassette Adapter	
25 mm	225-101
37 mm	225-102
Replacement Bowl Adapter	225-108
Replacement Grit Pots, pk/25	P225012
Filter Cassette/Cyclone Holder for standard 25 or 37-mm 3-piece cassettes with or without a cyclone	225-1
Standard-size Multi-purpose Calibration Jar	225-111

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