Operating Instructions

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# GS-1 Single-inlet Cyclone
## Cat. No. 225-105

## Introduction

### Description

The GS-1 Cyclone is a 10-mm lightweight conductive plastic sampler with single inlet designed for use with either a Diesel Particulate Matter (DPM) Cassette or a standard three-piece 37-mm cassette and filter (25 mm with adapter accessory) for collecting respirable dust particles. The GS-1 Cyclone conforms to the ISO 7708/CEN criteria of a 4-µm 50% cut-point at 2 L/min with minimum bias *(see References)*. The cyclone may be operated at 1.7 or 2 L/min to meet MSHA DPM sampling requirements or at 3 L/min for a 3.5-µm cut-point to meet the MSHA for silica standard. The GS-1 Cyclone is supplied with 37-mm cassette adapter, bowl adapter, and grit pot.

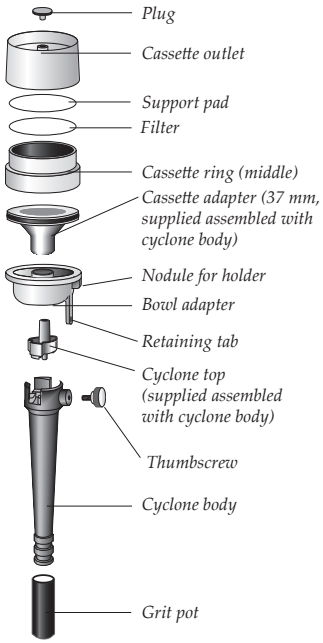


***Figure 1.***
*GS-1 Cyclone with standard 37-mm cassette installed - exploded view*

### Required Equipment

- ☑ **Sample pump capable of specified flow rate**
- ☑ **1/4-inch ID (3/8-inch OD) Tygon® tubing for calibration train**
- ☑ **Electronic calibrator**
- ☑ **Calibration Jar (Cat. No. 225-111)**
- ☑ **Cassette Holder (Cat. No. 225-1)**
- ☑ **Filter Cassettes sampling media (225 Series)**

# Getting Started

## Assembling Cyclone with Standard 37 or 25-mm 3-piece Cassette *(Figure 1)*

The GS-1 Cyclone is supplied fully assembled with bowl adapter and 37-mm cassette adapter. A 25-mm cassette adapter is sold separately as Cat. No. 225-101.

1. Determine cassette diameter to be used with cyclone.
   a. If using a 37-mm cassette, proceed to Step 2.
   b. If using a 25-mm cassette, remove 37-mm cassette adapter assembled on cyclone (pull it off the top of the cyclone) and replace with the 25-mm cassette adapter accessory (align with cyclone top and press on until firmly seated).
2. Disassemble a three-piece cassette and set aside the inlet section (usually marked "inlet"). Keep the inlet section for closing the cassette after sampling.
3. Select a filter and support pad as specified in the sampling method. Place support pad into cassette outlet section and place filter on top of support pad. Insert cassette ring (middle) section into cassette outlet section. Ensure a firm seal.
4. Hold cyclone upside down (cassette adapter facing downward). Insert cassette adapter into cassette middle ring section. Press until a firm seal is established.
5. Ensure thumbscrew on cyclone is secure and that the grit pot remains on the cyclone body during calibration and sampling.

## Inserting Cyclone/Cassette Assembly in 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 small round nodule on the rim of the bowl adapter 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 spring-supported rubber tubing) into the cassette outlet.

***See Form 40081 for using the GS-1 Cyclone with a DPM Cassette.***

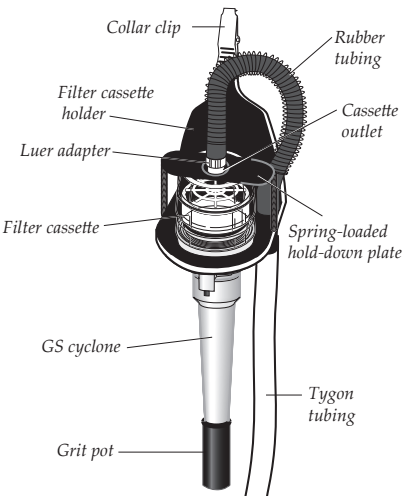


***Figure 2.***
*GS-1 Cyclone/cassette assembly in holder (Cat. No. 225-1)*

# Operation

## Calibration

| | |
|---|---|
| **Flow rate:** | • **2 L/min for 4-µm 50% cut-point** *(see References)*<br>• **3 L/min for a 3.5-µm cut-point** *(MSHA silica standard)*<br>• **1.7 or 2 L/min for removing large particles when sampling with DPM Cassette** *(MSHA DPM Sampling)* |

1. Prepare a cyclone/cassette assembly *(Figures 1 and 2)*. **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 Cat. No. 225-1 during calibration.**

2. Place cyclone/cassette assembly into an airtight calibration jar that contains an inlet and outlet (Cat. No. 225-111; *Figure 3)*.
3. Using flexible tubing, connect outlet of calibrator to inlet of calibration jar.
4. Run tubing from outlet of cyclone/cassette assembly through the outlet of the calibration jar and to the inlet of a sample pump. If using the Calibration Jar (Cat. No. 225-111), connect the Luer adapter inside the jar lid to the cassette outlet. Connect jar outlet tubing to the sample pump inlet.
5. Turn on pump and calibrate to desired flow rate following directions in the pump and calibrator operating instructions.
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.

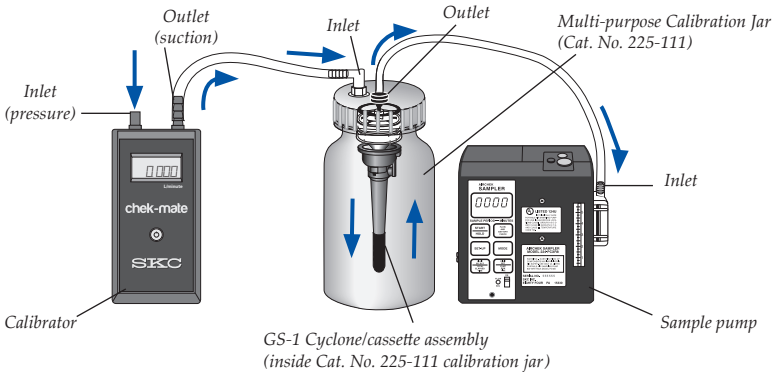


***Figure 3.***
*GS-1 Cyclone/cassette assembly in calibration jar*

## Sampling

Check the sampling method being used for flow rate and sampling media requirements.

1. Calibrate pump to desired flow rate using representative sampling media. *See Calibration*.

**Leave grit pot in place during calibration and sampling.**

2. Ensure a fresh cassette has been installed on the cyclone and the cyclone/cassette assembly has been inserted into the cassette holder. *See Inserting Cyclone/Cassette Assembly in Cassette Holder*.
3. Using the Tygon tubing attached to the cassette holder, connect the holder containing the cyclone/cassette assembly to the inlet of the calibrated sample pump.
4. Clip holder near the breathing zone and clip pump to the worker's belt.
5. Start pump and record pertinent details.
6. Sample for the time specified in the method.
7. Turn off pump when sampling is complete and record pertinent details.
8. Remove cyclone/cassette assembly from holder and immediately cap cassette outlet.
9. Separate cassette from cyclone and immediately replace the inlet section of the cassette. Cap the inlet with the provided plug.
10. Package cassette and send it with all data to a laboratory for analysis.

**Discard particles that were collected in the cyclone's grit pot.**

# Maintenance

## 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 cyclone.**

# References

*Trakumas, S., et al., Performance Assessment of Personal Respirable Cyclone Samplers, AIHce Presentation 191, 2003, https://bit.ly/3GqxJ1C (PowerPoint presentation)*

*OSHA Final Rule on Respirable Crystalline Silica, www.osha.gov/silica/*

# Accessories/Replacement Parts

| Description | Cat. No. |
|---|---|
| **Filter Cassette/Cyclone Holder,** for DPM cassette or standard 25 or 37-mm 3-piece filter cassettes with or without a cyclone, *required when using DPM Cassette with GS-1 Cyclone* | **225-1** |
| **Replacement Cassette Adapters** | |
| 25-mm cassettes | **225-101** |
| 37-mm cassettes (*supplied with cyclone*) | **225-102** |
| **Replacement Bowl Adapter** | **225-108** |
| **Replacement Grit Pots,** pk/25 | **P225012** |
| **Standard-size Multi-purpose Calibration Jar** | **225-111** |

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