

SAMPLE SETUP GUIDE

Sampling Train — Cyclones

Cyclones are devices used with a filter cassette to collect respirable-size dust (particles small enough to reach the alveoli of the lung) for subsequent analysis. A filter is placed into a blank cassette (with inlet section removed) that is then mounted onto a cyclone (some cyclones may require an adapter). The filter/cassette cyclone assembly is installed in a filter cassette holder that clips in a worker's breathing zone. When sampling, respirable particles collect on the filter while larger particles fall into the bottom of the cyclone (grit pot). This Sample Setup Guide demonstrates how to set up a **Sampling Train Using Cyclones**.

Required Equipment

1. An **air sample pump** capable of sampling at the recommended flow rate with the sampling medium in line, such as:
 - SKC AirChek® Touch Series
2. A **flowmeter** such as:
 - SKC Medium Flow chek-mate® Flowmeter with CalChek Cat. Nos. 375-0550N, 375-0550, and 375-0550S
3. **Filters, support pads or screens, and blank cassettes** as specified in the method
4. **Cyclone**, size as specified in the method, such as:
 - SKC 37-mm Aluminum Cyclone Cat. No. 225-01-02
 - SKC 25-mm Aluminum Cyclone Cat. No. 225-01-01
5. **Cyclone Calibration Adapter** Cat. No. 225-01-03
6. **Filter Cassette Holder** Cat. No. 225-1

Optional Equipment

1. **Cassette shrink bands** Cat. No. 225-25 Series
2. **Luer adapter, PVC** Cat. No. 225-13-2



Introduction

See the appropriate analytical method to determine required sampling media. See individual cyclone operating instructions for the flow rate at which the cyclone will provide a 4- μ m cut-point meeting the ISO 7708/CEN criteria. See individual pump operating instructions to ensure the pump is capable of sampling at the required flow rate.

1. Preparing the Filter Cassette — Figure 1

The filter cassette holds the filter securely in place during sampling. The cassette consists of an inlet section, an outlet section, and possibly a middle ring or extension cowl. The cassette is used with the inlet section removed for mounting on the cyclone.



Figure 1. Assemble filter cassette for installation on cyclone

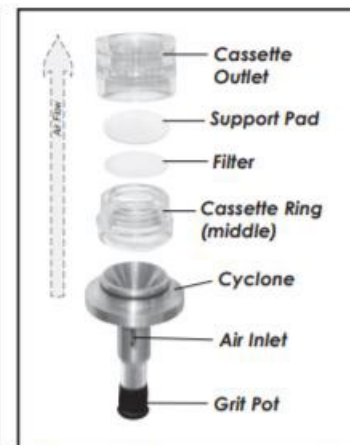


Figure 2. Filter assembly with a cyclone

Installing Cassette on Cyclone — Figure 2

To load the cassette, place the specified support pad or screen in the outlet section of the cassette, add the required filter, insert the cassette middle ring, and place the cyclone securely into this ring. Insert a plug into the cassette outlet.

2. Setting Up the Flow Rate Verification Train

To verify the flow, use a filter cassette that has been loaded with a filter representative of the type to be used in the field. Insert the calibration adapter over the cyclone stem and ensure that it fits securely to avoid leaks. Remove the plug from the cassette outlet and use flexible tubing to connect the cassette outlet to the sample pump inlet and the calibration adapter to the flowmeter outlet. A Luer adapter can be used to connect the filter cassette outlet to the tubing. **The cap on the stem of the cyclone (grit pot) should remain in place during flow rate verification and sampling.** Consult individual cyclone operating instructions for details.

3. Verifying the Flow Rate

Allow the pump to equilibrate from one temperature extreme to another and to run for 5 minutes before verifying flow rate. With the representative sampling medium in line, verify the flow rate specified for the cyclone used. To provide optimum particle size separation when using the SKC Aluminum Cyclone, the specified flow rate is 2.5 L/min for a 4- μ m cut-point, meeting the ISO 7708/CEN criteria. Other cyclone flow rates vary. See the cyclone, pump, and flowmeter operating instructions for specific instructions. When the flow rate has been verified, remove the filter cassette used for verification and set it aside. It will be used to verify the flow rate after sampling. Record the pre-sample flow rate. Remove the flowmeter and calibration adapter.

4. Sampling — Figure 3

When ready to start sampling, prepare a new filter cassette identical to the one used for verifying the flow rate. Mount the cassette on the cyclone as directed in Step 1. Insert the loaded cassette/cyclone assembly into a filter cassette holder with the cyclone stem facing down. Secure the cassette with the spring-loaded hold-down plate and insert the adapter on the end of the short piece of spring reinforced rubber tubing into the cassette outlet. Connect the long piece of Tygon tubing to the pump inlet. Clip the filter holder to a worker's collar in the breathing zone and the pump to the worker's belt. The cyclone stem should be in a vertical position facing down. Turn on the pump. Note the start time and any other pertinent sampling information.



Figure 3. Sampling train with filter cassette and Aluminum Cyclone in Filter Cassette Holder

5. After Sampling

At the end of the sampling period, turn off the pump and note the ending time. Remove the cyclone and discard the dust in the cap (grit pot). Remove the cassette from the cyclone and close the cassette by aligning and installing the inlet section; use hand to press down firmly and evenly on the inlet section. Use the caps provided to plug the inlet and outlet. When removing cassettes from the sampling train, handle carefully to avoid losing sample. If desired, seal the cassette with a cassette shrink band.

Reinstall the grit pot on the cyclone. Reinstall the flow rate verification train and verify that the flow has not changed by more than 5%.

Along with the sample filter cassette, submit field blanks from the same lot number as the sample filters. Field blanks should be subjected to exactly the same handling as the sample (load, seal, and transport) except that no air is drawn through them.

Pack the sample filter cassette, field blanks, and all pertinent sampling information securely for shipment to a laboratory for analysis.

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