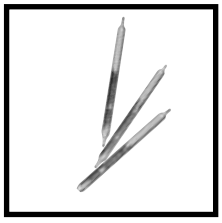
Application Guide

Sampling Train — Single Sorbent Sample Tube



Sorbent tube sampling is the NIOSH/OSHA-approved method for collecting most hazardous gases and vapors from the air. The sorbent tube is glass with breakable end tips and contains a specially prepared high-activity sorbent. Most tubes have two sections: one for sample collection and the other for backup. This configuration provides a check against saturation of the primary sorbent bed. This Application Guide demonstrates how to set up a **Sampling Train Using Sorbent Sample Tubes**.

Required Equipment

1. An **air sampling pump** capable of sampling at the recommended flow rate with the sampling medium in line, such as:
   - SKC 210 Pocket Pump® with Single Tube Holder Cat. No. 222-3 Series
   - SKC Universal Series Sampler with Adjustable Low Flow Holder Cat. No. 224-26 Series
   - SKC AirChek® 2000 Sampler with Constant Pressure Controller Cat. No. 224-26-CPC and Adjustable Low Flow Holder Cat. No. 224-26 Series
   - SKC AirChek 52 Sampler with Constant Pressure Controller Cat. No. 224-26-CPC and Adjustable Low Flow Holder Cat. No. 224-26 Series
   - SKC AirChek XR5000 Sampler with Constant Pressure Controller Cat. No. 224-26-CPC and Adjustable Low Flow Holder Cat. No. 224-26 Series
2. An **airflow calibrator,** such as:
   - Defender Primary Standard Calibrator 717 Series
3. The **sorbent sample tube** specified in the method
4. The **appropriate protective tube cover**

Optional Equipment

1. SKC **Tube Breaker** Cat. No. 222-3-50 (for 6 and 7-mm OD tubes) or 222-3-51 (for 8 and 10-mm OD tubes)

Introduction

The illustrations in this guide show sampling trains using an SKC Universal Series Sampler and a 210 Pocket Pump. If using a Universal Sampler, use an adjustable low flow holder for sampling at flow rates below 1000 ml/min. A low flow holder is not necessary for flow rates greater than 1000 ml/min. If using a low flow Pocket Pump, use a single tube holder. To determine the correct flow rate for the chemical of interest, refer to the appropriate analytical method. *See the operating instructions for the pump to ensure that it is capable of sampling at the correct flow rate.*

1. Preparing the Sorbent Tube

Using a tube breaker, break off both ends of a representative sorbent tube to provide an opening of at least one-half the internal diameter of the tube. This tube will be used for calibrating the flow and not for collecting the sample.

2. Setting up the Calibration Train with Adjustable Low Flow Holder — See Figure 1

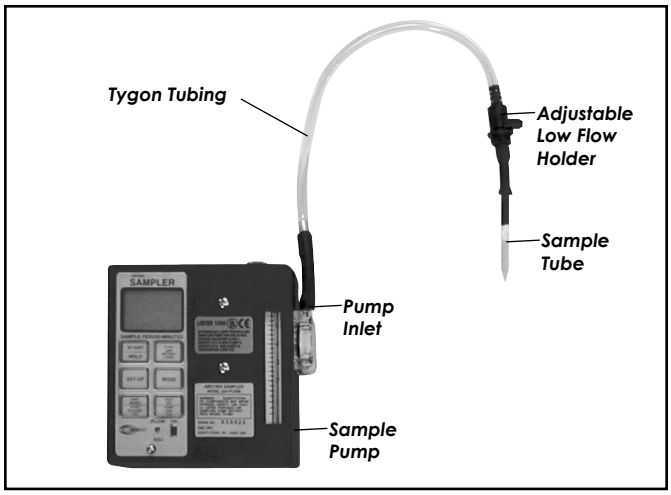


Figure 1. Sampling train using an adjustable low flow holder and Universal Series Sampler

If using a Universal Series Sampler, ensure that it is in the low flow mode. *See pump operating instructions.* With flexible tubing, connect the adjustable low flow holder to the sampler inlet. Place the sorbent tube into the black rubber sleeve of the adjustable low flow holder. The printed arrow on the sorbent tube shows the direction of airflow and should point toward the tube holder. If there is no arrow printed on the tube, insert the end of the tube with the smallest sorbent section (backup section) into the tube holder.

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Sampling Train — Single Sorbent Sample Tube

With Single (non-adjustable) Tube Holder — See Figure 2

Using a low flow pump, connect flexible tubing from the pump inlet to the tube holder. Place the sorbent tube into the black rubber sleeve of the tube holder. The printed arrow on the sorbent tube shows the direction of air flow and should point toward the pump. If there is no arrow printed on the tube, insert the end of the tube with the smallest sorbent section (backup section) into the tube holder.

3. Calibrating the Flow Rate — See Figure 2

Ensure pump has run for 5 minutes before calibrating. To calibrate the flow rate, connect the open end of the sorbent tube to an external calibrator. Calibrate to the flow rate specified in the analytical method for the chemical of interest. If using a 224-26 Series Adjustable Low Flow Holder, use the flow adjust screw on the holder to adjust flow rate. *See the pump and calibrator operating instructions for calibrating the flow rate.* When the flow rate has been calibrated and verified, remove the sorbent tube used to calibrate the flow and set it aside. This tube will be used to verify the flow rate after sampling. Record the pre-sample flow rate. Remove the external calibrator.

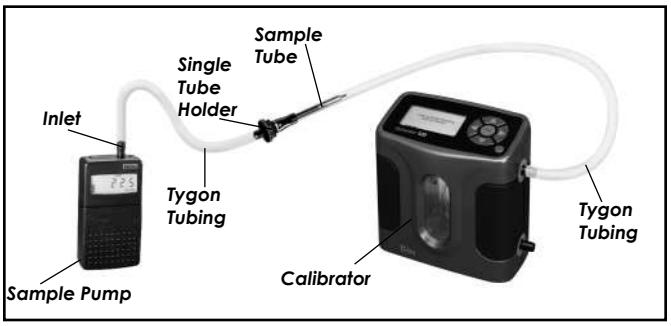

Figure 2. Calibration train using a single (non-adjustable) tube holder and Pocket Pump

4. Sampling — See Figure 3

When ready to start sampling, break off both ends of a new sorbent tube in the same manner used for calibrating the flow. Insert the sorbent tube into the rubber sleeve of the adjustable low flow holder or single tube holder with the smallest sorbent section in the holder. Place the protective cover over the sorbent tube, clip the tube to a worker's collar, and attach the pump to the worker's belt. The sorbent tube should be placed in a vertical position during sampling. Turn on the pump and note the start time and any other sampling information.

5. After Sampling

At the end of the sampling period, turn off the pump and note the ending time. Remove the sorbent tube, seal the ends of the tube with the caps provided, and record pertinent sampling information.

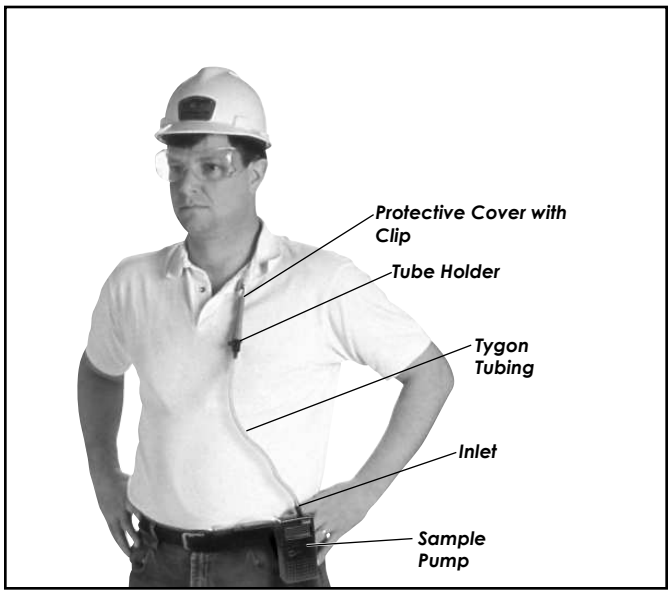

Figure 3. Worker wearing a sorbent tube sampling train

Using a calibrator, calibrate the flow rate with a representative sorbent tube in line to verify that the flow has not changed by more than 5%.

Submit field blanks from the same lot number as the sample tubes. Field blanks should be subjected to exactly the same handling as the samples (break, seal, and transport) except that no air is drawn through them.

Pack the sample sorbent tubes, field blanks, and all pertinent information securely for shipment to a laboratory for analysis.

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