

SAMPLE SETUP GUIDE



Sampling Train — Calibrating a Pump Using an Electronic Calibrator

Personal sampling pumps are essential equipment for sampling airborne contaminants. However, determining airborne concentrations requires accurate knowledge of the volume of air sampled. Constancy of flow rate and equipment reliability are two important factors that affect air volume.

Some sample pumps feature a built-in rotameter, which is not a precision instrument and can provide only an approximation of pump flow rate. Flow rate should be measured with an instrument such as an electronic calibrator that bases measurement on the unchanging physical dimensions of an enclosed volume. A precision rotameter can also be used if its calibration is traceable to a primary standard and periodic calibration of the rotameter is performed. Some electronic calibrators, such as CalChek[®], provide advanced calibration options. The CalChek feature of the SKC chek-mate[®] Calibrator with CalChek provides direct communication with CalChek-ready sample pumps such as the SKC AirChek TOUCH for automatic calibration at a single flow point or multiple flow points. This Sample Setup Guide describes **Calibrating a Pump Using an Electronic Calibrator**. For calibration with a film flowmeter (non-electric), refer to Publication 1163.

Required Equipment

1. An **air sampling pump** capable of sampling at the recommended flow rate with the sampling medium in line, such as:
 - SKC Pocket Pump TOUCH
 - SKC AirChek[®] Series (low flow applications require the All-in-One Low Flow Single/Adjustable Holder Cat. No. 224-27 or Constant Pressure Controller Cat. No. 224-26-CPC and the Cat. No. 224-26 Series Adjustable Multiple-tube Low Flow Holder)
 - SKC AirLite (low flow applications require the All-in-One Low Flow Single/Adjustable Holder Cat. No. 224-27 or Constant Pressure Controller Cat. No. 224-26 Series Adjustable Multiple-tube Low Flow Holder)

- SKC Leland Legacy[®]
- SKC QuickTake[®] 30

2. An **electronic calibrator**, such as:
 - SKC Low Flow chek-mate Calibrator Cat. No. 375-00205N
 - SKC chek-mate Calibrator with CalChek Cat. No. 375-0550N
 - TSI 4146 Calibrator Cat. No. 740-4146
3. **Sampling medium** as specified in the method*
4. Any **additional equipment** specified in the method*
5. **CalChek Communication Cable** Cat. No. 375-200 for CalChek calibration, for use with chek-mate Calibrator with CalChek and AirChek TOUCH Sample Pump
6. **Pulsation Dampener** Cat. No. 375-100, for CalChek multiple-point automatic calibration (*chek-mate Calibrator with CalChek used with AirChek TOUCH Sample Pump*)

* Refer to the method and to the related Sample Setup Guide for preparing a sampling train: Pre-filter and Tube Publication 1164, Impingers Publication 1165, Filters and Cyclones Publication 1166, Air Sample Bags Publication 1167, Single Sorbent Sample

Introduction

This Sample Setup Guide provides general information about calibrating an air sampling pump using the chek-mate Calibrator. For details about the operation of a particular calibrator or sample pump, refer to the individual operating instructions.

1. Setting Up the Electronic Calibrator

Turn on the **chek-mate Calibrator** by pressing the on/off button (Figure 1).

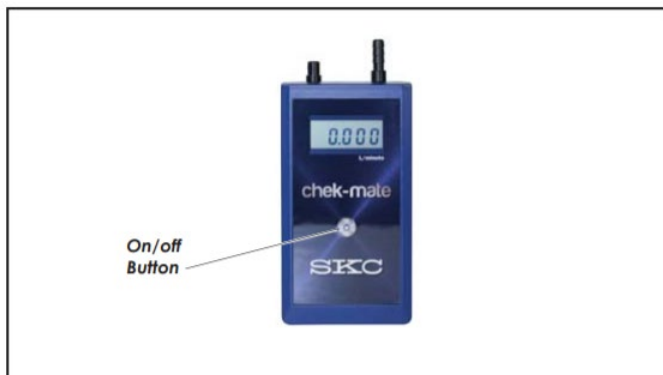


Figure 1. chek-mate Calibrator

2. Setting Up the Calibration Train

Manual Calibration (Figure 2)

Allow the pump to equilibrate from one temperature to another and to run for 5 minutes before calibrating. Prepare an appropriate train as specified in the method. Ensure that the pump is in the appropriate mode (high or low flow) for the desired flow rate and that any necessary flow accessories, such as a constant pressure controller (CPC) and low flow tube holder or All-in-One, are in place. Use flexible tubing to connect the calibrator outlet or suction port to the inlet of a representative sample medium. Use a second length of tubing to connect the sample medium outlet to the pump inlet. Use the shortest length possible to avoid kinks and bends.

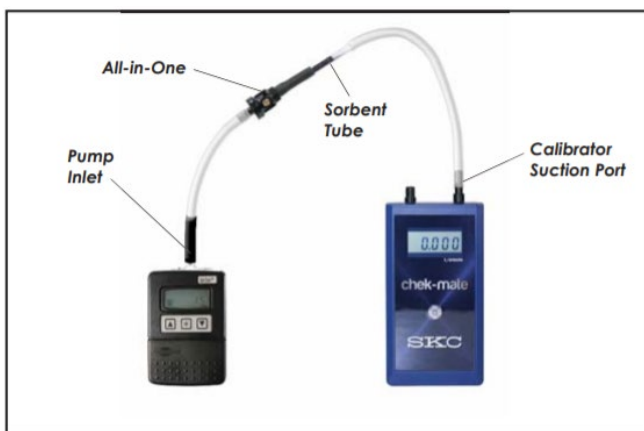


Figure 2. chek-mate Calibrator and XR5000 Sample Pump connected in a sorbent tube

If Using CalChek Feature (AirChek TOUCH Sample Pump) (Figure 3)

Allow the pump to run 5 minutes to stabilize. Prepare an appropriate train as specified in the method. Ensure that any necessary flow accessories, such as a constant pressure controller (CPC) and low flow tube holder, are in place. Use flexible tubing to connect the calibrator outlet or suction port to the inlet of a representative sample medium (see note below). Use a second length of tubing to connect the sample medium outlet to the pump inlet. Use the shortest length possible to avoid kinks and bends.

Note: *CalChek single-point calibration* is performed with a sample medium in line. **CalChek multiple-point (Full) calibration** is performed without a sample medium in line but requires the Pulsation Dampener Cat. No. 375-100 in its place. See pump operating instructions.

CalChek calibration is performed with the AirChek TOUCH pump installed on a Standard Charging Cradle or Charging e-Cradle that **must** be plugged into a standard wall outlet (100-240 V). Prepare the cradle by inserting the connector end of the power supply cable into the power port on the side of the cradle, and then inserting the wall cube end into a standard wall outlet (100-240 V). Align the contacts on the bottom edge of the pump with the contacts in the cradle and insert the pump in the cradle. Insert one end of the CalChek Communication Cable in the CalChek interface socket on the side of the chek-mate Calibrator with CalChek and the other end in the CalChek port on the back of the cradle.

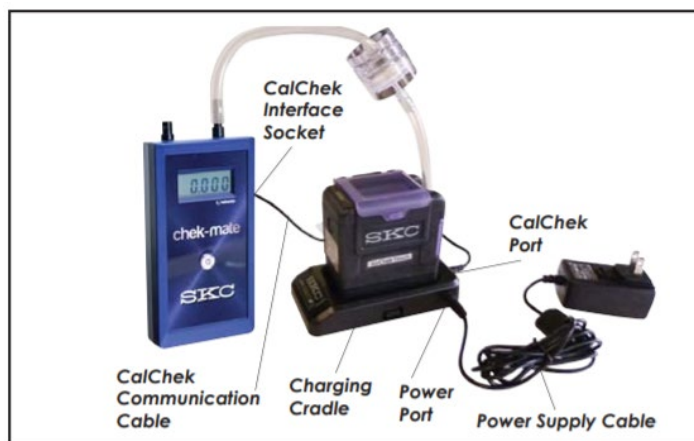


Figure 3. AirChek TOUCH Sample Pump with chek-mate Calibrator in CalChek single-point calibration train

3. Calibrating the Flow Rate

Manual Calibration

Ensure that the pump has run for 5 minutes before calibrating. Following operating instructions for the calibrator, adjust the flow rate on the pump until the appropriate flow rate is displayed. Take a minimum of three readings to verify flow. **Do not adjust the flow any further.** Record flow rate as the pre-sample flow rate.

If Using CalChek Feature (AirChek TOUCH Sample Pump)

Ensure that the pump has run for 5 minutes before calibrating. Set the pump to CalChek single-point or multiple-point (Full) calibration (*see pump operating instructions*).

If single-point calibration was selected, the calibrator will automatically calibrate the pump at a single flow point. If multiple-point (Full) calibration was selected, the calibrator will automatically calibrate at multiple points across a range of operational flow rates.

4. Setting Up the Sampling Train

When ready to begin sampling, remove the calibrator and representative sampling medium from the calibration train. If CalChek was used, remove the CalChek Communication Cable. Set these items aside to verify flow after sampling. Place a new unexposed sampling medium of the same type into the train.

5. Sampling

Attach the sampling medium to a worker's clothing in the breathing zone and the pump to the worker's belt. Run the pump and note sampling start time.

6. After Sampling

At the end of the sampling period, turn off the pump and note sampling end time. Remove the sampling medium and seal it. Refer to the sampling medium operating instructions for details. Record pertinent sampling information.

7. Verifying Flow

Reinstate the representative sampling medium and the calibrator in the sampling train. If using an AirChek TOUCH with CalChek, reinstall the CalChek Communication Cable (*see "If Using CalChek Feature" in Step 2*). Take three flow readings as outlined in Step 3 and record this value as the post-sample flow rate. **Do not adjust pump flow rate.** Compare the pre- and post-sample flow rates. Note in sampling documentation if the values differ by more than $\pm 5\%$. Report sample time and other relevant data to the laboratory.

8. Transporting Samples

Send the sealed sampling medium, blanks, and pertinent sampling information to a laboratory for analysis. *Consult sampling medium operating instructions for details.*

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