

SAMPLE SETUP GUIDE

Sampling Train — Verifying Pump Flow Rate Using a chek-mate Flowmeter

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. Other pumps have an electronic flow sensor built in, which can provide a more accurate flow rate. No matter how accurately the pump displays the flow rate, the flow rate through the sampling train should be measured with an electronic flowmeter or a precision rotameter before and after sampling. The performance of any such flowmeter should be traceable to a primary standard; periodic calibration by an accredited laboratory is recommended. Some electronic flowmeters, such as the SKC chek-mate® Flowmeter with CalChek® (medium and high flow models), provide advanced options for flow rate verification. The CalChek feature provides direct communication with CalChek-ready sample pumps like the SKC AirChek TOUCH and Leland Legacy for automatic single flow rate verification. This Sample Setup Guide describes **Verifying Pump Flow Rate Using a chek-mate Flowmeter**. For flow rate verification with a film flowmeter (non-electronic), see 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® Touch 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 Leland Legacy®
- SKC QuickTake® 30

2. SKC chek-mate Flowmeter:

- Low Flow chek-mate Flowmeter Cat. Nos. 375-00205N, 375-00205, and 375-00205S
- Medium Flow chek-mate Flowmeter with CalChek Cat. Nos. 375-0550N, 375-0550, and 375-0550S
- High Flow chek-mate Flowmeter with CalChek Cat. Nos. 375-50300N, 375-50300, and 375-50300S

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 flow rate verification, for use with chek-mate Flowmeter with CalChek and AirChek TOUCH and Leland Legacy Sample Pumps

6. Pulsation Dampener Cat. No. 375-150, required for manual flow rate verification of high flow pumps and CalChek automatic flow rate verification (High Flow chek-mate Flowmeter with CalChek used with Leland Legacy 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 verifying flow rate of an air sampling pump using the chek-mate flowmeter. For details about the operation of a particular flowmeter or sample pump, refer to the individual operating instructions.

1. Setting Up the Electronic Flowmeter

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

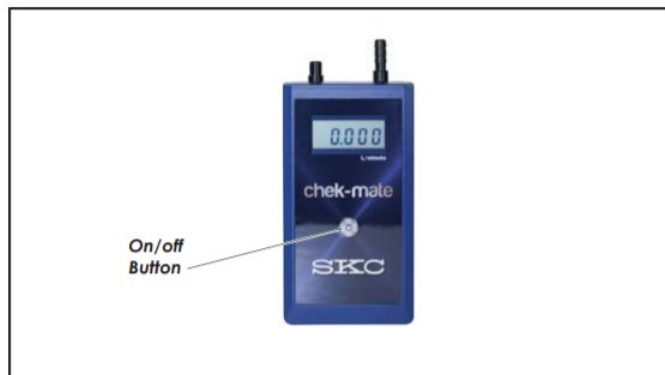


Figure 1. chek-mate Flowmeter

2. Setting Up the Flow Rate Verification Train

Manual Flow Rate Verification (Figure 2)

Allow the pump to equilibrate from one temperature to another and to run for 5 minutes before verifying flow rate. 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 the All-in-One or a constant pressure controller (CPC) and low flow tube holder, are in place. Use flexible tubing to connect the flowmeter outlet or suction port to the inlet of a representative sampling medium. **Note:** When using the High Flow chek-mate Flowmeter, Pulsation Dampener Cat. No. 375-150 is required in line. See flowmeter and pump operating instructions.

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.

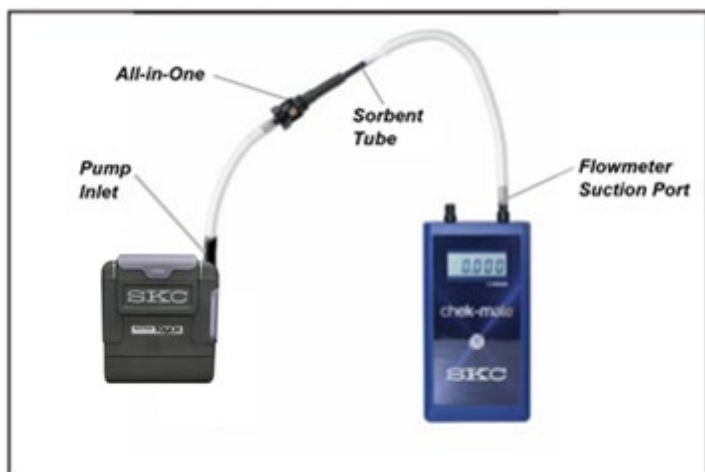


Figure 2. chek-mate Flowmeter and sample pump connected in a sorbent tube flow rate verification train

Jarless flow rate verification method (chek-mate

Flowmeter only): If a sampler does not have a calibration adapter, attach the sampler/medium to the chek-mate inlet using the shortest length of tubing possible and the sample pump to the chek-mate outlet (suction port). See Figure 3. **Note:** If using the High Flow chek-mate Flowmeter, place Pulsation Dampener Cat. No. 375-150 in line between flowmeter and pump. Proceed with flow rate verification per the instructions in Step 2 and pump operating instructions.



Figure 3. Jarless flow rate verification train

If Using CalChek Feature (Medium and High Flow chek-mate models only) – AirChek TOUCH and Leland Legacy Sample Pumps (Figures 4 and 5)

Allow the pump to run 5 minutes to stabilize. Prepare an appropriate train as specified in the method. Use flexible tubing to connect the flowmeter 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 flow rate verification is performed with a sample medium in line but also requires Pulsation Dampener Cat. No. 375-150 in line with the High Flow chek-mate Flowmeter and Leland Legacy Pump.

AirChek TOUCH pump: Perform CalChek flow rate verification with the 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 and the other end in the CalChek port on the back of the cradle. See Figure 4.

Leland Legacy pump: Insert one end of the CalChek Communication Cable in the CalChek interface socket on the side of the chek-mate and the other end in the data port on top of the pump. See Figure 5.

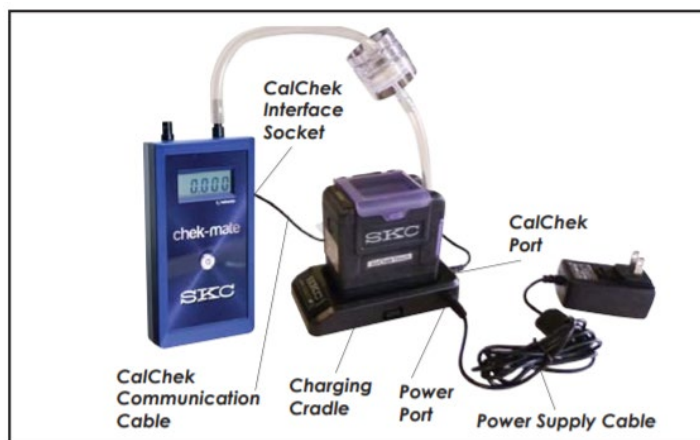


Figure 4. AirChek TOUCH Sample Pump with chek-mate Flowmeter in CalChek single-point flow verification train

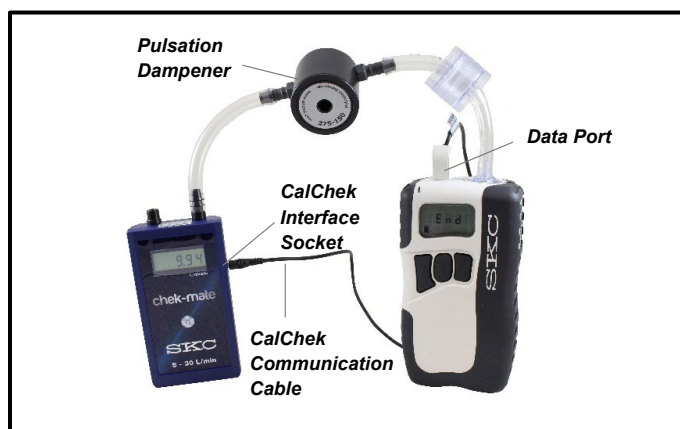


Figure 5. Leland Legacy Sample Pump with chek-mate Flowmeter in CalChek single-point flow verification train

3. Verifying the Flow Rate

Manual Flow Rate Verification

Ensure that the pump has run for 5 minutes before verifying flow rate. Following operating instructions for the flowmeter, 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 and Leland Legacy Sample Pumps

Ensure that the pump has run for 5 minutes before performing automatic flow rate verification. Set the pump to CalChek single-point flow rate verification per pump operating instructions. The flowmeter will automatically verify the pump flow rate at a set flow.

4. Setting Up the Sampling Train

When ready to begin sampling, remove the flowmeter (and pulsation dampener if used) and representative sampling medium from the flow rate verification 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 After Sampling

Reinstate the representative sampling medium and the flowmeter (and pulsation dampener if used) in the sampling train. If using CalChek-ready AirChek TOUCH or Leland Legacy, 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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