

TECHNICAL NOTE

SKC chek-mate Flowmeter

How current standards classify the flowmeters used to set and verify personal sampling pump flow, and where the SKC chek-mate flowmeter fits.

AMTC-TN-0001

About this note

Pump flow is set and checked with a flowmeter, and the name given to that flowmeter has changed. Older documents call a traceably calibrated flowmeter a “primary standard” and one without traceable calibration a “secondary standard”. Current practice drops both terms. This note explains the terminology that replaces them, what the standards ask of the flowmeter, and how the SKC chek-mate flowmeter meets those requirements.

It is written for occupational hygienists and for anyone who sets up personal sampling pumps or audits flow records. Classifying flowmeters (p. 4) covers the standards. The SKC chek-mate flowmeter (p. 6) covers the instrument and lists the references.

How to use the flowmeter — switching on, connecting it to a pump, averaging, CalChek and the battery — is in the operating manual of the SKC chek-mate flowmeter. Models and part numbers are in its specification sheet.

How this note marks information

> **Note**
> Information that helps understanding; never a hazard.

Document information

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Revision history

Rev.	Date	Change
2	October 2026	Quality programme: new document type, number and identity pages.
1	October 2026	First issue.

This note is general information. It does not replace the applicable regulations and standards, the operating instructions of your equipment, or legal advice, and it is not the final word on any legal or regulatory question. Where a standard is cited, the current edition of that standard applies.

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CHAPTER 1

Classifying flowmeters

Why the flow rate is verified

The air volume of a sample is the flow rate multiplied by the sampling time, so an error in the flow rate becomes an error in the reported concentration. A flow rate that is off also changes how well the sampler collects and how much the results scatter. Occupational and environmental health and safety (OEHS) hygienists therefore check the flow rate of each sampling pump, to the extent the method for the contaminant requires.

Pump flow is checked with several kinds of flowmeter, for example manual wet-cell (soap-bubble), dry-cell (piston-style), thermal mass and orifice flowmeters, or rotameters.

The pump standard: ISO 13137

Personal sampling pumps must comply with ISO 13137:2022. It sets the performance requirements for battery-powered pumps used for personal sampling of chemical and biological agents in workplace air, and the laboratory tests that show whether a pump meets them. For those tests it limits the uncertainty of the test instruments, as Table 1-1 (p. 4) shows.

Table 1-1. Uncertainty of the test instruments under ISO 13137

Test instrument	Uncertainty
Volume flowmeter	Within ±2 %
Volume meter	Within ±2 %
Pressure gauge	Within ±2 %
Timer	Within ±2 %
Thermometer	Within ±2 %

“Working standard” replaces primary and secondary

Older guidance called a flowmeter with traceable calibration a “primary standard” and one without a “secondary standard”. ASTM D5337-23, the standard practice for setting and verifying the flow rate of personal sampling pumps, drops both terms for this use: in metrology they mean something else. Every flowmeter used to set and verify pump flow is a **working standard**, with or without traceable calibration.

Flowmeter	Older term	Term under ASTM D5337-23
Calibration traceable to national or international standards	Primary standard	Working standard, with traceable calibration
No traceable calibration	Secondary standard	Working standard, without traceable calibration

Traceability and accreditation

The name changes, the requirement does not. ASTM D5337-23 asks for flowmeters with demonstrated traceability to national and international standards, re-established at regular intervals —

generally once a year. The calibration laboratory should be accredited to ISO/IEC 17025 by an accreditation body that itself works to ISO/IEC 17011.

In the United States, OSHA does not define primary or secondary calibration standards. Its Technical Manual (Section II, Chapter 1) describes how to verify sampling pump flow and compares the strengths and weaknesses of the flowmeter types.

CHAPTER 2

The SKC chek-mate flowmeter

How it measures

The SKC chek-mate is a differential-pressure flowmeter. Air from the pump passes a fixed orifice, and a sensor measures the pressure drop across it. Built-in sensors correct the reading automatically for changes in air temperature and atmospheric pressure, so the display shows the volumetric flow rate directly. Unlike a piston-style flowmeter, it has no moving parts and works in any orientation. It is light and simple to use, and its averaging function, a moving average of the flow on the display, makes a flow check quicker. Figure 2-1 (p. 6) shows the controls and connections.

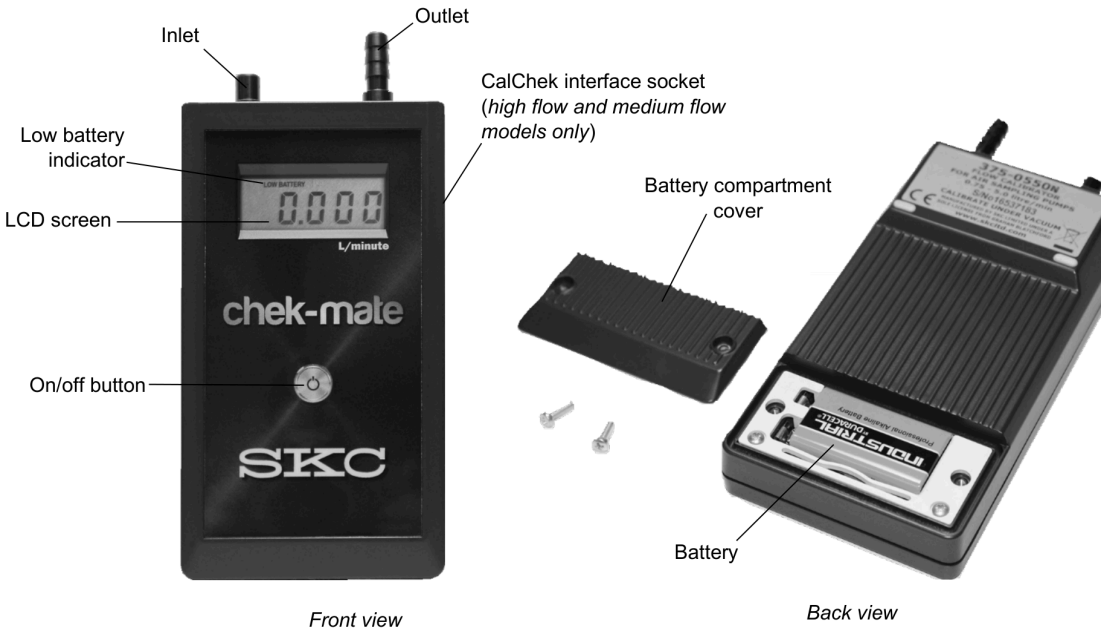


Figure 2-1. The chek-mate flowmeter: front view (left) and back view with the battery compartment cover removed (right). The CalChek interface socket is on the high flow and medium flow models only.

Calibration and accuracy

Every chek-mate is calibrated in the SKC Calibration Laboratory, which is accredited to ISO/IEC 17025:2017. The calibration is traceable to the standards of NIST (United States), the United Kingdom or ISO; the model you order determines which, and its calibration certificate states it.

Each of the three models covers one flow range, with the certified accuracy shown in Table 2-1 (p. 6).

Table 2-1. chek-mate models, flow ranges and certified accuracy

Model	Flow range	±1 % of reading	±2.5 % of reading
High flow	5–30 L/min	5–30 L/min	—
Medium flow	0.50–5 L/min	0.75–5 L/min	0.50–0.75 L/min
Low flow	20–500 mL/min	50–500 mL/min	20–50 mL/min

A working standard under ASTM D5337 and ISO 13137

- **Traceable calibration.** It is calibrated against traceable national standards in an ISO/IEC 17025:2017-accredited laboratory, as ASTM D5337-23 asks.
- **Uncertainty.** Within the ranges certified at ±1 % of reading, its uncertainty is inside the ±2 % limit for a test flowmeter. The pump standard: ISO 13137 (p. 4) gives that limit.
- **Classification.** It is therefore a working standard with traceable calibration for setting and verifying pump flow — in the same class as soap-bubble, dry-cell and piston-style flowmeters.

> **Note**
> Renew the traceable calibration generally once a year. Traceability and accreditation (p. 4) explains why. For recalibration of your chek-mate, contact Analyt-MTC; Contacts (p. 8) lists how.

References

1. ISO 13137:2022, *Workplace atmospheres — Pumps for personal sampling of chemical and biological agents — Requirements and test methods*.
2. ASTM D5337-23, *Standard Practice for Setting and Verifying the Flow Rate of Personal Sampling Pumps*.
3. OSHA Technical Manual, Section II, Chapter 1. Occupational Safety and Health Administration, USA.

CHAPTER 3

Contacts

Contact and support

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Calibration and certificates

Contact Analyt-MTC for recalibration of your chek-mate, for repair and for advice on flow verification. Have at hand:

- the model (high, medium or low flow) and the serial number;
- the date of the last calibration certificate.

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