ANALYT MESSTECHNIK



INSTRUCTIONS FOR USE

SKC UMEx 100 Passive Sampler for Formaldehyde

Performance, sampling, laboratory analysis and the calculation of the result for the SKC UMEx 100 single-use passive sampler for formaldehyde, Cat. No. 500-100.

AMTC-IN-0052

Rev. 2 · October 2026

About this document

These instructions cover the SKC UMEx 100 Passive Sampler for Formaldehyde, Cat. No. 500-100: a single-use badge that collects formaldehyde without a pump. It tells you what the sampler can measure and under which conditions, how to take a sample and send it to the laboratory, and how the laboratory turns the result into an airborne concentration.

Read Safety (p. 4) and Product and supplied items (p. 5) first, then follow Before use (p. 7) and Procedure (p. 8) step by step; After use and sample handling (p. 9) says how to keep and ship the sample. Analysis and results (p. 9) is for your laboratory: send it with the samples. OSHA Method 1007 describes formaldehyde sampling with diffusive samplers; the method you work to sets the details, and these instructions do not replace it.

Keep these instructions for the lifetime of the product. The current revision is on the product page at analyt-mtc.com.

How these instructions mark information

⚠ CAUTION

A hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Practices not related to personal injury — damage to the product, the process or the sample.

Note
Information that helps understanding; never a hazard.

Document information

Title	SKC UMEx 100 Passive Sampler for Formaldehyde — Instructions for use
Document number	AMTC-IN-0052
Revision	Rev. 2 — October 2026
Applies to	SKC UMEx 100 Passive Sampler for Formaldehyde, Cat. No. 500-100
Language	English
Manufacturer	SKC Inc.

Revision history

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

SKC and UMEx are trademarks of their owners. Information in these instructions is subject to change without notice. © 2026 ANALYT-MTC Messtechnik GmbH. All rights reserved.

Contents

1 **Safety** 4
Intended use 4
Protecting the sample 4

2 **Product and supplied items** 5
Parts of the sampler 5
Conditions of use 6

3 **Before use** 7
Storage and shelf life 7
Before you start 7

4 **Procedure** 8
Sample step by step 8

5 **After use and sample handling** 9
Until the sample reaches the laboratory 9
Analysis and results 9
Desorption 9
HPLC determination 9
Calculating the concentration 10
Disposal 10

6 **Specifications** 11
Performance 11

7 **Ordering information** 12
Ordering information 12

8 **Service and contacts** 13

CHAPTER 1

Safety

Read this chapter before you use the sampler. Its safety messages are repeated in the steps where they apply.

Intended use

The SKC UMEx 100 Passive Sampler 500-100 collects formaldehyde and other aldehydes from air without a pump: 15-minute samples for the short-term exposure limit, personal samples of up to 12 hours, and indoor-air samples over 24 hours to 7 days. Use it only within the limits in Conditions of use (p. 6): not in air below 10 % relative humidity, and only where the ozone level is below 0.5 ppm. Each sampler is for single use only. Do not store samplers, unused or exposed, together with food.

Protecting the sample

NOTICE

No solvent-based markers. Permanent felt-tip markers and similar pens can give off volatile organic compounds (VOCs). The VOCs can reach the sampler and contaminate the sample. Do not write on the label or the pouch with such pens.

NOTICE

Formaldehyde in the atmosphere can enter the pouch and contaminate the background of the sampler. A small length of tape inside the pouch protects the background. Leave the tape inside the pouch at all times and send it to the laboratory with the sample.

NOTICE

Check the expiry date. The shelf life is limited, and an expired sampler can give an invalid result. Use only samplers within the expiry date printed on the packaging.

⚠ CAUTION

Do not store with food. Samplers stored next to food can contaminate it, and eating contaminated food can harm you. Store neither unused nor exposed samplers together with food.

NOTICE

Single use only. Never reuse a UMEx sampler. A reused sampler may not collect the sample reliably, so the result is then invalid.

CHAPTER 2

Product and supplied items

The SKC UMEx 100 is a small, single-use passive sampler for formaldehyde and other aldehydes. It needs no pump: a green sliding cover opens the sampler to start the sample and closes it to stop.

Formaldehyde diffuses through the diffusion plate onto a tape treated with 2,4-dinitrophenylhydrazine (DNPH), where it forms a stable hydrazone. The laboratory extracts the hydrazone with a solvent and measures it by high-performance liquid chromatography (HPLC) with UV detection. Each sampler holds two tapes: one for the sample and one that stays covered and serves as the blank, so one badge gives both.

Its fairly high sampling rate and the sensitive analysis let you use the same sampler for:

- 15-minute samples (short-term exposure limit, STEL) in the ppm range;
- personal monitoring for up to 12 hours;
- indoor-air monitoring over 24 hours to 7 days.

Parts of the sampler

The body carries a clip for the collar. The diffusion plate sits over the two reactive tapes: the sample tape lies under its perforated part, the blank tape, marked by an indentation, under its closed part. The sliding cover moves between the *on* position, with the diffusion plate exposed, and the *off* position, with the plate covered.

The sampler comes sealed in a pouch. Keep the pouch: it protects the sampler on its way to the laboratory. A small length of tape inside it, similar to the reactive tape, protects the background of the sampler should any formaldehyde get into the pouch.



Figure 2-1. The UMEx 100 sampler.

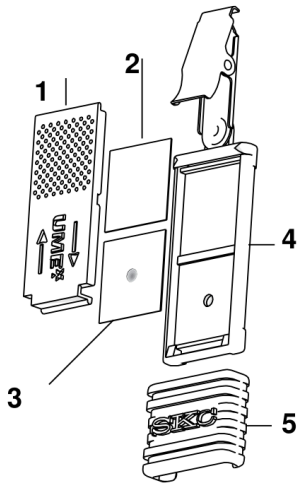


Figure 2-2. Exploded view. (1) Diffusion plate. (2) Reactive tape, sample. (3) Reactive tape, blank. (4) Body with clip. (5) Sliding cover.

Conditions of use

Condition	Effect on the sample
Temperature	No effect on the sampling rate between 10 and 30 °C.
Humidity	No effect from 10 to 80 % relative humidity.
Air velocity	No effect from 5 to 100 cm/s. Below 5 cm/s, for samples of 1 to 7 days, the sampling rate is 20.4 mL/min.
Other compounds	The sampler is highly specific for formaldehyde. Large amounts of other carbonyl compounds may reduce the uptake of formaldehyde.

Note
Not below 10 % relative humidity. Do not use the sampler in air drier than 10 % RH.

Note
Ozone below 0.5 ppm only. Use the sampler only where the ozone level is below 0.5 ppm.

Note
If formalin is the source of the formaldehyde you sample, ask Analyt-MTC for SKC's field study information before you plan the measurement.

CHAPTER 3

Before use

Storage and shelf life

Before use	at 4 °C (39.2 °F) or below
After use	at 4 °C (39.2 °F) or below; analyse within 3 weeks
Shelf life	limited: see the expiry date on the packaging

⚠ CAUTION

Do not store with food. Samplers stored next to food can contaminate it, and eating contaminated food can harm you. Store neither unused nor exposed samplers together with food.

Before you start

NOTICE

Check the expiry date. The shelf life is limited, and an expired sampler can give an invalid result. Use only samplers within the expiry date printed on the packaging.

NOTICE

Single use only. Never reuse a UMEx sampler. A reused sampler may not collect the sample reliably, so the result is then invalid.

NOTICE

No solvent-based markers. Permanent felt-tip markers and similar pens can give off volatile organic compounds (VOCs). The VOCs can reach the sampler and contaminate the sample. Do not write on the label or the pouch with such pens.

CHAPTER 4

Procedure

Sample step by step

NOTICE

Formaldehyde in the atmosphere can enter the pouch and contaminate the background of the sampler. A small length of tape inside the pouch protects the background. Leave the tape inside the pouch at all times and send it to the laboratory with the sample.

1. Open the pouch and take out the sampler. **Keep the pouch**: you need it to protect the sampler on its way to the laboratory. Store it away from anything that may give off formaldehyde.
2. On the label on the back of the sampler, write the date, the location and the start time of the sample.
3. For a personal sample, clip the sampler to the worker's collar. For an area sample, place it at a suitable point in the area.
4. Slide the cover to *on*, so that the diffusion plate is exposed. The sample has started.
5. At the end of the sampling time, slide the cover to *off*, so that the diffusion plate is covered. The sample has stopped.
6. Write the stop time on the label.
7. Put the sampler back in its original pouch straight away and seal the pouch. Send it to an accredited laboratory with the sample information. **Ship by express.**

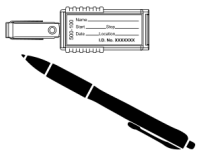


Figure 4-1. Steps 2 and 6: the label.

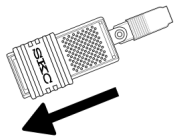


Figure 4-2. Step 4: cover to *on*.

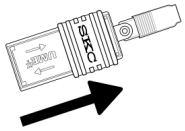


Figure 4-3. Step 5: cover to *off*.



Figure 4-4. Step 7: back into the pouch.

CHAPTER 5

After use and sample handling

Until the sample reaches the laboratory

Keep the sealed pouch at 4 °C (39.2 °F) or below, away from food, and make sure the laboratory can analyse it within 3 weeks of sampling (see Storage and shelf life (p. 7)). No separate field blank is needed: each sampler carries its own blank tape. Pass Analysis and results (p. 9) on to the laboratory with the samples.

Analysis and results

This section is for the laboratory. It gives the desorption and HPLC conditions specific to the UMEx 100 and the calculation from the measured hydrazone to the airborne concentration of formaldehyde. Item numbers in brackets refer to Figure 2-2 (p. 5).

Desorption

1. Take the sampler out of the pouch and pull the sliding cover (5) off the sampler.
2. With forceps cleaned in acetonitrile, lift the reactive tape out of each section: the sample tape (2) and the blank tape (3), which you recognise by its indentation. Keep the two tapes apart so that they do not get mixed up.
3. Put each tape in its own sealed 4 mL glass vial with 3 mL of acetonitrile and shake it by hand for one minute. This desorbs the formaldehyde 2,4-dinitrophenylhydrazone from the tape.

> **Note**
> Instead of the blank tape of each sampler, you can also correct for the background with a lot blank. Each box of samplers contains one lot blank.

HPLC determination

Injection volume	10 µL of the desorption solution
Column	octadecylsilane (C18)
Mobile phase	33 % water in methanol
Detection	UV absorption at 365 nm
External standard	synthesised formaldehyde 2,4-dinitrophenylhydrazone

Other conditions may also be suitable. The detection limit depends on the sensitivity of the instrument.

Calculating the concentration

> **Note**
> **Always subtract the blank.** Subtract the formaldehyde found on the blank tape from that on the sample tape before you calculate the air concentration.

1. Convert the hydrazone concentration measured against the standards into formaldehyde, with the molecular weights of formaldehyde (30.03) and of its 2,4-dinitrophenylhydrazone (210.21):

   c_F (µg/mL) = c_H (µg/mL) × 30.03 / 210.21

2. Calculate the mass of formaldehyde collected:

   m (µg) = c_F (µg/mL) × V_d (mL)

3. Calculate the volume of air sampled:

   V (L) = t (min) × U (mL/min) / 1000

4. Calculate the concentration in air:

   C (mg/m³) = m (µg) / V (L)

5. If you need it in parts per million:

   C (ppm) = C (mg/m³) × 24.45 / 30.03

Symbol	Meaning
c_H	concentration of formaldehyde 2,4-dinitrophenylhydrazone in the desorption solution, blank subtracted
c_F	the same, expressed as formaldehyde
V_d	desorption volume, 3 mL
m	mass of formaldehyde collected
t	sampling time, in minutes
U	sampling rate: 28.6 mL/min for samples of 15 minutes to 24 hours; 20.4 mL/min for 7-day samples (below 5 cm/s)
V	volume of air sampled, in litres
C	airborne concentration of formaldehyde
24.45	constant for converting mg/m³ to ppm

References

- OSHA Method 1007, Formaldehyde (Diffusive Samplers), May 2005.
- Levin, J.O., Lindahl, R. and Andersson, K.: A passive sampler for formaldehyde in air using 2,4-dinitrophenylhydrazine-coated glass fiber filters. Environmental Science and Technology 20 (12), 1986, pp. 1273–1276.
- Levin, J.O. et al.: High-performance liquid chromatographic determination of formaldehyde in air in the ppb and ppm range using diffusive sampling and hydrazone formation. Environmental Technology Letters 9, 1988, pp. 1423–1430.
- Levin, J.O. and Lindahl, R.: Diffusive air sampling of reactive compounds — a review. Analyst 119, January 1994, pp. 79–83.

Disposal

Dispose of used samplers and their packaging under local regulations.

CHAPTER 6

Specifications

Performance

Sampling rate, 15 min–24 h	28.6 mL/min, relative standard deviation 7.6 %, at air velocities of 5–100 cm/s
Sampling rate, 1–7 days	20.4 mL/min, at air velocities below 5 cm/s; use it for 7-day samples when you calculate (see Calculating the concentration (p. 10))
Validation range	0.06–3.0 ppm
Lower detection limits	15 min: 200 ppb (0.24 mg/m³) 8 h: 5 ppb (0.006 mg/m³) 24 h: 2 ppb (0.002 mg/m³) 7 days: 0.2 ppb (0.0002 mg/m³)
Capacity	29 µg per sample
Accuracy	±25 %, better than the OSHA requirement
Detection principle	stable DNPH-hydrazone formed in the presence of formaldehyde
Analysis	solvent extraction, HPLC with UV detection
Dimensions	3.4 × 1.1 × 0.35 in (8.6 × 2.8 × 0.89 cm)
Weight	0.38 oz (10.9 g)

Sampling rates for other aldehydes: ask Analyt-MTC.

CHAPTER 7

Ordering information

Order from Analyt-MTC with the order codes.

Ordering information

Description	Pack	Order code
UMEx 100 Passive Sampler for formaldehyde and other aldehydes*	10	500-100
ACCESSORIES		
Treated tape, for quality control only	50	P20084
Stand for area sampling		690-302

* Limited shelf life; store at 4 °C (39.2 °F) or below, not together with food. Single use only: never reuse a UMEx sampler.

CHAPTER 8

Service and contacts

Contact and support

ANALYT-MTC Messtechnik GmbH

German Headquarters

Klosterrunsstraße 18, 79379 Müllheim
Germany

+49 7631 5545

info@analyt-mtc.de

French Subsidiary

175 Avenue d'Alsace, 68000 Colmar
France

+33 3 89 41 47 78

info@analyt-mtc.fr

www.analyt-mtc.com

Before you call

Have the following at hand so that Analyt-MTC can help you quickly:

- the catalogue number of the samplers;
- the lot number and expiry date on the pouch;
- what you want to measure, for how long, and where.

Contact Analyt-MTC for samplers, accessories, technical questions, sampling rates for other aldehydes and warranty matters concerning your SKC UMEx 100 samplers. Warranty is handled under Analyt-MTC's terms of sale. Analyt-MTC's contact details are in this chapter and on the back cover.

ANALYT-MTC Messtechnik GmbH

Sales, service and calibration

German Headquarters
Klosterrunsstraße 18, 79379 Müllheim
Germany
+49 7631 5545
info@analyt-mtc.de

French Subsidiary
175 Avenue d'Alsace, 68000 Colmar
France
+33 3 89 41 47 78
info@analyt-mtc.fr

www.analyt-mtc.com

AMTC-IN-0052 · Rev. 2 · 2026-10

© 2026 ANALYT-MTC Messtechnik GmbH. All rights reserved. Subject to technical changes without notice.