ANALYT MESSTECHNIK



INSTRUCTIONS FOR USE

SKC UMEx 200 Passive Sampler for Sulphur Dioxide

Sampling sulphur dioxide (SO_2) with the SKC UMEx 200 passive sampler 500-200, and preparing, analysing and calculating the sample in the laboratory by ion chromatography.

AMTC-IN-0054

Rev. 2 · October 2026

About this document

These instructions cover the SKC UMEx 200 Passive Sampler 500-200 used for sulphur dioxide (SO_2). It takes you through taking a personal or area sample and sending it to the laboratory, and gives the laboratory the preparation, analysis and calculation for sulphur dioxide.

Read Safety (p. 4) and Product and supplied items (p. 5) first. Then follow Before use (p. 6), Procedure (p. 7) and After use and sample handling (p. 8) step by step. Pass Analysis (p. 8) on to your laboratory with the samples. The same sampler can also be analysed for nitrogen dioxide (NO_2); that procedure is in the separate SKC UMEx 200 operating instructions for nitrogen dioxide, AMTC-IN-0053.

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

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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.

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CHAPTER 1

Safety

Read this chapter before you use the sampler. Wear gloves for every step that touches the sampler or its tapes, in the field and in the laboratory.

Intended use

The SKC UMEx 200 measures sulphur dioxide in air without a pump, as a personal sample on a worker's collar or as an area sample. It is validated from 0.4 to 8 ppm for 15 minutes to 24 hours. Each sampler is for single use only.

Handling the samplers

⚠ CAUTION

Do not store with food. Samplers stored next to food can contaminate it, and eating contaminated food can harm you. Keep the samplers, used or unused, away from food.

NOTICE

Single use only. Never reuse a UMEx 200 sampler. A reused sampler may not collect the sample reliably, so the result is then invalid.

⚠ CAUTION

The tape is chemically treated. Wear gloves whenever you handle the sampler or the tape.

NOTICE

Expired samplers. An expired sampler can give an invalid result. Do not use a sampler after the last day of the month shown on the pouch.

CHAPTER 2

Product and supplied items

The SKC UMEx 200 is a light, single-use badge that measures sulphur dioxide in the air without a pump. Clip it to a worker's collar for personal sampling or place it in the area you want to monitor.

Sulphur dioxide diffuses through the diffusion plate at a sampling rate of 15.2 mL/min and is collected on a tape treated with triethanolamine (TEA). The sampler holds two sections of this tape: one is the sample, the other is the blank (correction) for the same sampler. A sliding cover opens and closes the sampler, so you start and stop sampling by hand, for anything from 15 minutes to 24 hours. The laboratory extracts the tapes with water and analyses them for sulphate by ion chromatography.

Each sampler comes in its own aluminised pouch, which you keep to return it to the laboratory.

Parts of the sampler

The body (4) carries the collar clip (3) and holds the two sections of reactive tape behind the diffusion plate (1). The upper section (2) collects the sample. The lower section (6) is the blank/correction; it has a small indentation so that the laboratory can tell it apart from the sample.

The yellow sliding cover (5) closes the sampler. Slid to the "on" position, it starts sampling; slid back to "off", it stops it. The back of the sampler has spaces for the date, the location and the start and stop times.



Figure 2-1. The UMEx 200 sampler.

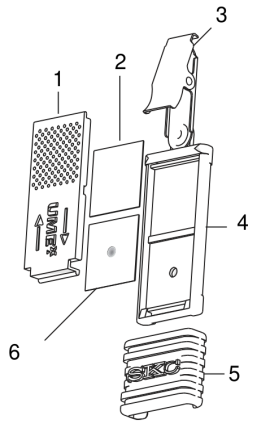


Figure 2-2. Exploded view. (1) Diffusion plate. (2) Reactive tape, sample. (3) Collar clip. (4) Body. (5) Sliding cover. (6) Reactive tape, blank/correction.

CHAPTER 3

Before use

The sampler comes ready to use and needs no pump. The numbers in brackets refer to Figure 2-2 (p. 5).

Before you start

- Store unused samplers at ambient temperature. The shelf life is limited: check the expiration date on the pouch.
- Check the expiration date on the label on the outside of the pouch.
- Wear gloves for every step that touches the sampler.
- Have a pen ready for the spaces on the back of the sampler.

NOTICE

Expired samplers. An expired sampler can give an invalid result. Do not use a sampler after the last day of the month shown on the pouch.

CHAPTER 4

Procedure

Take the sample

NOTICE

Do not reuse the sampler. The UMEx 200 is designed for single use only. A reused sampler may not collect the sample reliably, so the result is then invalid.

1. Open the aluminised pouch and take out the sampler. Keep the pouch: the sampler goes back into it after sampling and travels in it to the laboratory. Store the pouch away from anything that could give off sulphur dioxide.
2. Write the date and the location in the spaces on the back of the sampler.
3. For personal sampling, clip the sampler to the worker's collar. For area sampling, place it where you want to measure.
4. To start sampling, slide the cover (5) to the "on" position. Write the start time on the back of the sampler.
5. When the sampling time is over, at most 24 hours, slide the cover back to the "off" position. Write the stop time on the back of the sampler.

CHAPTER 5

After use and sample handling

Send the sample

1. Put the sampler back into its original pouch immediately after sampling.
2. Seal the pouch.
3. Send the pouch to an accredited laboratory for analysis, together with the sampling information: date, location, start and stop times.

Sample storage

Exposed samplers can be kept at ambient temperature or at 4 °C (39.2 °F) or below. The laboratory must analyse them within 3 weeks of sampling.

Analysis

This chapter is for the laboratory. The sulphur dioxide collected on the tape is extracted with water and determined as sulphate by ion chromatography with conductivity detection. The numbers in brackets refer to Figure 2-2 (p. 5). Wear gloves when you handle the sampler and the tapes.

Calibration standards

Use commercially available sulphate standards suited to your application. Prepare a range of sulphate standards in deionised ultra-filtered (DIUF) water and treat them in the same way as the samples, as described in Preparing the sample (p. 8).

> **Note**
> **Dilute the standards 1:1.** For sulphur dioxide, the standards need a 1:1 dilution with 0.15 % hydrogen peroxide, as the sample extracts do.

Preparing the sample

1. Take the sampler out of its pouch and remove the sliding cover (5).
2. With clean forceps, lift the reactive tape out of each section and put each piece in a sealed vial. The upper section (2) gives the sample, the lower section (6), with the indentation, the blank/correction.
3. Put each tape into a 4 mL glass vial containing 2 mL of DIUF water. Place the vials on a vibrator or shaker for 20 minutes to desorb the sulphate.
4. Pipette 1 mL of each extract into a vial and dilute it with 1 mL of 0.15 % hydrogen peroxide. Shake well. This solution is analysed for sulphur dioxide.
5. If the sample is also to be analysed for nitrogen dioxide, transfer the remaining 1 mL of extract to an autosampler vial for that analysis.

> **Note**
> **Lot blank.** Instead of the blank/correction section, you can also correct for background with a lot blank. Each box of samplers contains one lot blank.

Ion chromatography

1. Analyse the extracts for sulphate by ion chromatography with conductivity detection.
2. Inject 20 µL of the extract onto a Dionex AS14A column, 4 × 250 mm, with an eluent of 8.0 mM sodium carbonate and 1.0 mM sodium bicarbonate.
3. Read the sulphate concentration from a calibration curve of the standards.

Calculating the result

1. Convert the sulphate concentration to sulphur dioxide:
   c_{SO_2} (µg/mL) = $c_{sulphate}$ (µg/mL) × 64.1 / 96.1
2. Calculate the total mass of sulphur dioxide on the tape from the desorption volume:
   m (µg) = c_{SO_2} (µg/mL) × 2 mL
3. Do this for the sample tape and for the blank/correction tape, and subtract the blank from the sample. Divide the result by 1000 to obtain the net mass in milligrams.
4. Calculate the volume of air sampled:
   V (L) = t (min) × 15.2 mL/min / 1000
5. Calculate the airborne concentration:
   C (ppm) = m_{net} (mg) × 24 450 / (V (L) × 64.1)

> **Note**
> **Always subtract the blank.** Subtract the sulphur dioxide found on the blank/correction tape from the sample tape before you calculate any air concentration.

Symbol	Meaning
$c_{sulphate}$, c_{SO_2}	concentration in the extract of sulphate and of sulphur dioxide, in µg/mL
64.1	molecular weight of sulphur dioxide, in g/mol
96.1	molecular weight of sulphate, in g/mol
2 mL	desorption volume
m, m_{net}	mass of sulphur dioxide on a tape; net mass, sample minus blank
t	sampling time, in minutes
15.2 mL/min	sampling rate for sulphur dioxide
V	volume of air sampled, in litres
24 450	constant for converting the result to ppm, with m in mg and V in litres
C	airborne concentration of sulphur dioxide, in ppm

Disposal

Dispose of used samplers and their packaging under local regulations.

CHAPTER 6

Specifications

Performance data for sulphur dioxide

Sampling rate	15.2 mL/min, relative standard deviation 16.5 %
Validated concentration range	0.4–8 ppm, for 15 minutes–24 hours
Lower detection limit	1.8 ppm (15 minutes); 52 ppb (8 hours); 17.4 ppb (24 hours)
Accuracy	±30 %
Collection medium	tape treated with triethanolamine (TEA), blank/correction section built in
Analysis	solvent extraction; ion chromatography (IC) with conductivity detection
Temperature	no effect on the sampling rate from 20 to 25 °C
Humidity	no effect from 20 to 80 % relative humidity
Air velocity	no effect from 5 to 100 cm/s
Interferences	none identified
Shelf life	limited; see the expiration date on the pouch
Storage before use	ambient temperature
Storage after use	ambient temperature or ≤ 4 °C (39.2 °F); analyse within 3 weeks
Dimensions	3.4 × 1.1 × 0.35 in (8.6 × 2.8 × 0.89 cm)
Weight	0.38 oz (10.9 g)
Sliding cover	yellow

Nitrogen dioxide can be analysed on the same sampler; its sampling rate is 17.3 mL/min.

CHAPTER 7

Ordering information

Order from Analyt-MTC with the order codes.

Ordering information

Description	Pack	Order code
UMEx 200 Passive Sampler for sulphur dioxide and/or nitrogen dioxide*	10	500-200
Treated tape for quality control, UMEx 200*	25	P20098
UMEx 100 Passive Sampler for formaldehyde and other aldehydes*†	10	500-100
UMEx 300 Passive Sampler for ammonia*†	10	500-300

UMEx 400 samplers, for aliphatic amines, must be stored at 4 °C (39.2 °F) or below. Ask Analyt-MTC for them.

* Limited shelf life. Do not store with food. For single use only; do not reuse the samplers.
† Must be stored at 4 °C (39.2 °F) or below.

CHAPTER 8

Service and contacts

Contact and support

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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 sampler, 500-200;
- the lot number and expiration date on the pouch;
- the sampling time you need (15 minutes to 24 hours) and whether you also want NO_2 results.

Contact Analyt-MTC for samplers, technical questions and warranty matters concerning your SKC UMEx 200 Passive Sampler. Warranty is handled under Analyt-MTC's terms of sale. Analyt-MTC's contact details are in this chapter and on the back cover.

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