This manual covers the following kit:
510-2000
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Introduction

This kit has been designed to comply with MDHS method 52/4 obtainable from the Health & Safety Executive for the testing of Chromic Acid Mist.

We strongly recommend reading MDHS 52/4 prior to commencing any sampling.

**Synopsis of the method**

Using an IOM sampler to hold an alkali treated filter paper, an air sample is taken at 2 litres per minute over the time period of one hour.

The sampling head can be positioned over a tank with the optional positioning clamp.

After sampling, the filter paper is removed from the sampling head and using the chemical kit and comparator, an analysis and quantification can be made of the Chromic Acid Mist levels.

**Getting started**

Refer to your air sampling pump manual for detailed descriptions on setting the pump sampling flow rate and sample time period. The flow rate must be set using an external calibration device such as a rotameter or other flow calibrator. This must be done with the filter sampling head assembled and inline.

For convenience we recommend an SKC Universal Deluxe air sampling pump which can be set to automatically stop after one hour.

This manual contains all the information required to process the filter with the chemical kit that you have purchased.
CAUTION!

Observe precautions and use suitable personal protective equipment when handling the treated filters and chemicals provided, as they may cause harm to health.

We recommend only using stainless steel forceps/tweezers to handle alkali treated filters.

Material Safety Data Sheets are provided at the rear of this manual.
Sampling

Tips and advice on setting up a sampling train (the sample pump, sample head fitted with a filter and the connecting tubing) can be found in the SKC Step by Step guide.

The process of loading a filter paper and calibrating this sampling train is similar to the set up required for inhalable dust sampling using an IOM sampler.

If you do not have this guide, a free copy can be downloaded from the SKC website at - www.skcltd.com

**Loading the filter paper**

The IOM sampler incorporates a two piece cassette and the filter is loaded into the cassette which is then placed inside the sampler.

The front cover of the sampler is then screwed into the body of the sampler.

Diagram showing the positioning of the filter paper within an IOM Sampler.

*Note that the filter is cream/ white in colour.*

*A blue paper if present is a separator only and is not used in sampling.*
**Calibration**

Assuming an IOM sampler, SKC Universal pump, and rotameter for calibration.

The IOM sampler with filter is clamped down onto the foam seal on top of the rotameter ensuring a good seal with no leaks. With the toolkit the flow is adjusted by turning the flow adjustment screw.

This is located to the bottom left side of the universal sampler and marked ‘flow adjust’. Adjust to 2 litre/min.

As the screw is turned the float or ball should move up or down inside the rotameter tube.

For other types of sampler or calibrator, or for more indepth directions, refer to the equipment manuals.
The chemicals

The kit contains the following chemicals:

- 1,5 Diphenylcarbazide 0.125g vial 10 off
- Sulphuric acid 0.25 M, 500 ml 1 off
- Acetone 250 ml 1 off
- De-ionised water 500 ml 1 off

Use only 25 mm alkali-treated filter membranes prepared in accordance with MDHS 52/4.

1,5 diphenylcarbazide solution 0.25% w/v is obtained by transferring the contents of one vial (0.125 g) to the 60 ml plastic bottle labelled Diphenylcarbazide 0.25% w/v.

Using the 25 ml measuring cylinder, transfer 25 ml acetone to the bottle and swirl until the powder has dissolved. Measure 25 ml deionised water and add to the bottle. Replace the cap tightly and mix thoroughly.

Protect from light.

There is sufficient reagent for 24 determinations of hexavalent chromium.
The apparatus

The kit comprises:

1 off  Alkali treated filter membranes (pack of 24)
10 off 1,5 Diphenylcarbazide 0.125g vial
1 off  Sulphuric Acid 500ml
1 off  Acetone 250ml
1 off  De-ionised Water 500ml
3 off  Plastic beaker
1 off  Glass measuring cylinder 25ml
1 off  Glass measuring cylinder 10ml
1 off  Glass measuring cylinder 5ml
1 off  Plastic bottle labeled 60ml
5 off  Comparator moulded cell and cap 10ml
1 off  Wash bottle 250ml
1 off  Forceps
1 off  Lovibond comparator with CrVI disc 26620
1 off  Handbook with health and safety data

A holding clamp to position the filter head above the facility tank is available as an optional extra.
The comparator

The Lovibond 2000 comparator fitted with chromium VI comparator disc 26620 covers the range 0 - 0.1 mg chromium VI per cubic metre of air in steps of:

0.00  0.01  0.02  0.03  0.04  0.05  0.06  0.07  0.08  0.09  0.10

This is suitable for the measurement of 120 litres of sample drawn at 2 litre/minute for 60 minutes.

Removing the filter paper for analysis

1. Transfer your sampling system to a clean, non hazardous area to perform the analysis.
2. Remove the filter using forceps, taking care not to cause damage, and place the filter into a 50 ml plastic beaker.
3. Using the 10 ml measuring cylinder, add 8 ml 0.25M sulphuric acid to the beaker.
4. Wait 10 minutes for dissolution of any hexavalent chromium to take place, swirling the solution occasionally.
5. Using the 5 ml measuring cylinder add 2 ml diphenylcarbazide solution to the beaker and swirl to mix. Allow to stand for 10 minutes.
6. Transfer one new unused filter membrane to a clean 50 ml plastic beaker using forceps and repeat steps 3 - 5 above.
7. Fill a comparator cell to the 10 ml mark with the ‘sample’ solution and place in the right hand compartment of the Lovibond comparator. Place a second cell containing deionised water in
left hand compartment.

8. Check that the comparator colour standards disc Chromium 66200 is inserted. Hold the comparator against good north daylight (not fluorescent lighting) and rotate comparator disc until a match with the ‘sample’ solution is obtained.

9. The value appearing in the window of the comparator is the amount of hexavalent chromium in milligrams per cubic metre (mg/m³) of air based on a sample volume of 120 litres. Note this value.

10. Repeat steps 7 to 9 above using the solution from step 6. Note the reading for reference. In ideal conditions there should be no reading from this solution as it was made with a clean unused filter. If a reading is obtained this highlights a problem with procedures:
   • check on the purity of the reagents and filters
   • check for contamination caused by unclean apparatus

11. Record the results (see page 10).

12. Clean all apparatus between measurements and at the end of testing. The sampling head and cassette should be cleaned to avoid cross-contamination between samples.
Record keeping

Ensure all results obtained from sampling are adequately recorded!
This data must be kept for a period of time as defined in H.S.E. guidance, so it is vital to maintain these in an easy to retrieve format.
Each sample position should be clearly identified for record purposes and the results of the analysis recorded.
Record the facility identity, date of sampling, the identity of the person carrying out the test and the sampling position, in accordance with the guidelines laid out in MDHS 52/4 and by the H.S.E.

Results

Any result higher than normal or in excess of the maximum limit should be investigated to determine the reason.
If in doubt of how to proceed or if you are concerned about the results obtained, consult the Health & Safety Executive for guidance.
Refer to MDHS 52/4 and EH40 for further advice and exposure limit values.
For supplies and for further advice please contact SKC customer services at:

SKC Limited 11 Sunrise Park, Higher Shaftesbury Road, Blandford Forum, Dorset DT11 8ST
United Kingdom

T: +44 (0) 1258 480188   F: +44 (0) 1258 480184   E: info@skcltd.com   W: www.skcltd.com

- for items contained in the analysis kit, chemicals, replacement filters, and beakers
- for replacement comparator parts
- for sampling pumps and heads
- for calibration devices
- for servicing of pumps and calibrators
# Health and Safety Information Sheet

**Product:** ACETONE (PROPANONE)

**Properties:** Colourless, mobile liquid with characteristic odour. Boiling point 66°C. Miscible with water. Flammable. Flash point -18°C.

**Health Hazard:** Inhalation of vapour may cause dizziness, narcosis and coma. The liquid irritates the eyes and may cause severe damage. If swallowed may cause gastric irritation, narcosis and coma.

**Handling:** Good industrial hygiene practices should be observed. Avoid contact with skin or eyes. Avoid breathing vapour. Shut off all sources of ignition. Reacts violently with bromoform and chloroform in the presence of alkali. Decomposes violently with nitric/sulphuric acid mixtures. Can react violently with oxidising agents.

**Storage:** Store upright with container tightly closed in well-ventilated area. KEEP AWAY FROM CHILDREN.

**First Aid:**
- **Inhalation:** Remove from exposure, rest and keep warm.
- **Eyes:** Irrigate thoroughly with water. In severe cases OBTAIN MEDICAL ATTENTION.
- **Skin:** Wash thoroughly with water.
- **Ingestion:** If none has been swallowed, wash mouth out with plenty of water, ensuring none is swallowed. If any has been swallowed, do not induce vomiting; drink plenty of water. In severe cases OBTAIN MEDICAL ATTENTION.

**Spillage:** Shut off all sources of ignition. Mop up with plenty of water ensuring thorough dilution. Run to waste. Ventilate area well to allow evaporation of any remaining liquid and vapour to dispel.

**Fire:** Extinguish using water spray, dry powder or CO₂.

**Transport:** Hazard Class 3 (Flammable liquid). UN number 1090 Packing Group II
HEALTH AND SAFETY INFORMATION SHEET

PRODUCT : ALKALI-TREATED FILTER MEMBRANES

PROPERTIES : Durapore modified polyvinylidene fluoride sheet coated with thin film of sodium hydroxide.

HEALTH HAZARD : May cause irritation to eyes. May be harmful by ingestion.

HANDLING : Handle filters using stainless steel forceps. Good industrial hygiene practices should be observed.

STORAGE : Keep in closed container.

FIRST AID

Eyes : Irrigate thoroughly with water. If discomfort persists, OBTAIN MEDICAL ATTENTION.

Ingestion : Wash mouth with plenty of water. If any swallowed, drink Plenty of water. In severe cases, OBTAIN MEDICAL ATTENTION.

SPILLAGE : Sweep up and dispose to waste.

FIRE : Extinguish using water spray, dry powder, CO₂ or foam extinguisher.

TRANSPORT : Non-regulated.
HEALTH AND SAFETY INFORMATION SHEET

PRODUCT : SULPHURIC ACID SOLUTION 0.25M (0.5N)

PROPERTIES : Clear, colourless solution, completely miscible with water. The solution is acidic containing less than 2.5% wt H₂SO₄.

HEALTH HAZARD : None

HANDLING : Good industrial hygiene practices should be observed.

STORAGE : Keep in tightly closed container.

FIRST AID

Eyes : Irrigate thoroughly with water.

Skin : Wash thoroughly with water.

Ingestion : Drink plenty of water.

SPILLAGE : Mop up with plenty of water and run to waste.

FIRE : Water, carbon dioxide or dry chemical extinguisher.

TRANSPORT : Non-regulated.