

# Chemical analysis

## Heavy metals, organics, and inorganics

Air pollution monitoring from stacks, flues, and aerosols requires a filter that can withstand chemically harsh environments and high temperatures. High-purity quartz (SiO<sub>2</sub>) microfiber filters are favored for these reasons and their applicability for heavy metals analysis.

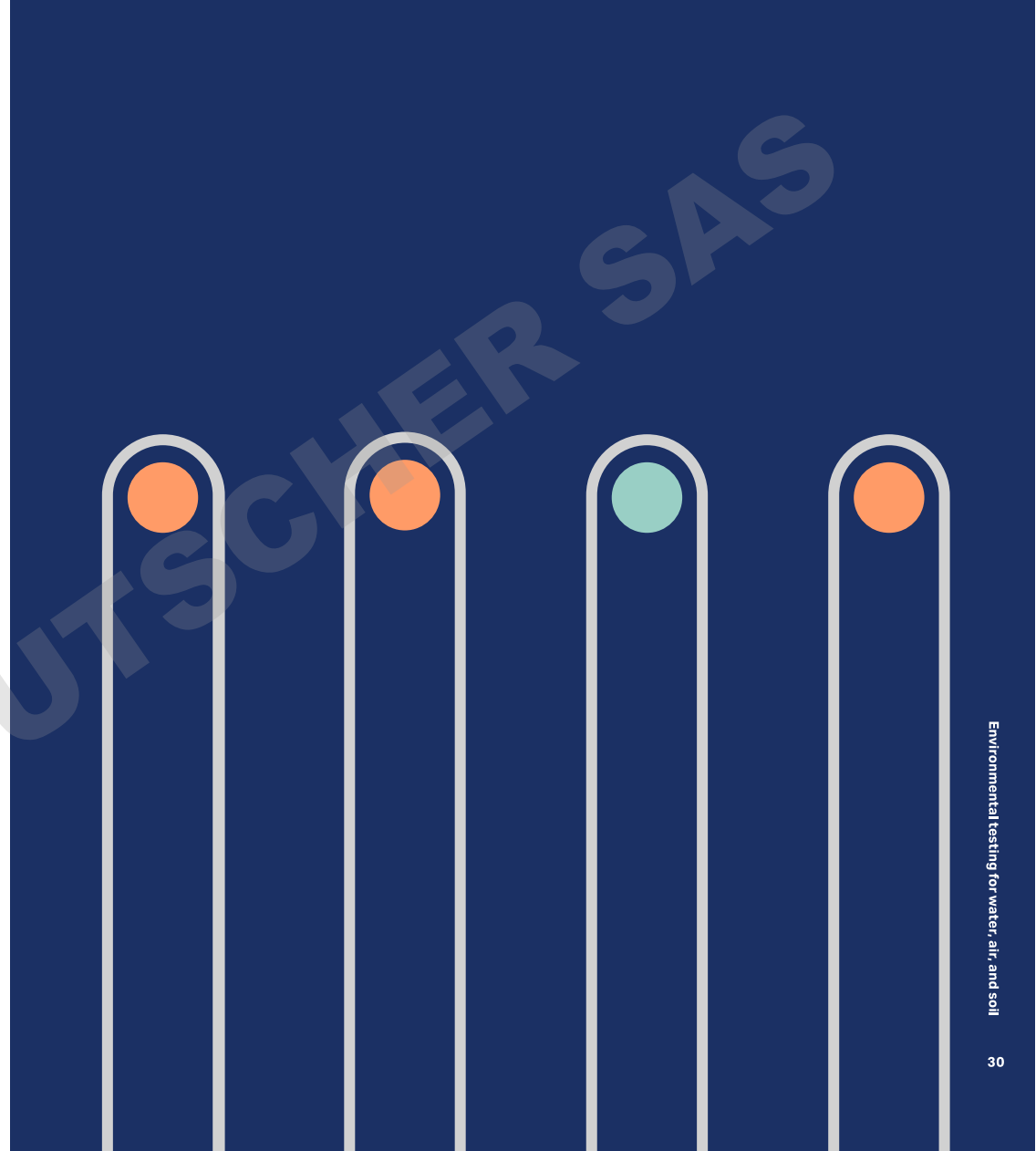
### Quartz fiber filters and thimbles

Cytiva offers two types of quartz filters — QM-A and QM-H. The low level of alkaline earth metals in these filters virtually eliminates artifact products of sulfates and nitrates (from SO<sub>2</sub> and NO<sub>2</sub>, respectively).

QM-H is a pure quartz fiber filter with low heavy metal content. Quartz thimbles are also available.

### Mixed cellulose ester membranes

Mixed cellulose membranes from Cytiva are designed to meet your environmental air monitoring requirements. These membranes are typically used in applications for the determination of metals in airborne particulates.



What are you testing for?	Product	Characteristics and benefits		
Heavy metals	<ul style="list-style-type: none"> <li>• <b>Quartz fiber filters such as QM-A and QM-H</b> Ordering information p. 34</li> <li>• <b>EPM 2000 glass fiber filters</b> Ordering information p. 28</li> </ul>	<table border="0"> <tr> <td> <b>QM-A</b> <ul style="list-style-type: none"> <li>• High-purity quartz microfiber</li> <li>• Used for air sampling, particularly at high temperatures up to 500°C</li> </ul> </td> <td> <b>QM-H</b> <ul style="list-style-type: none"> <li>• 100% pure quartz</li> <li>• Can be used up to 900°C</li> <li>• Low heavy metal content</li> </ul> </td> </tr> </table>	<b>QM-A</b> <ul style="list-style-type: none"> <li>• High-purity quartz microfiber</li> <li>• Used for air sampling, particularly at high temperatures up to 500°C</li> </ul>	<b>QM-H</b> <ul style="list-style-type: none"> <li>• 100% pure quartz</li> <li>• Can be used up to 900°C</li> <li>• Low heavy metal content</li> </ul>
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Other organic or inorganic chemicals (such as ozone, volatile organic carbons, SO <sub>2</sub> , NO <sub>2</sub> , CO, Benzoate)	<ul style="list-style-type: none"> <li>• <b>Glass fiber filters such as GF/A</b> Ordering information p. 28</li> <li>• <b>Quartz fiber filters such as QM-A and QM-H</b> Ordering information p. 34</li> <li>• <b>Cellulose filters*</b></li> <li>• <b>PTFE membranes</b> Ordering information p. 27</li> </ul>	<b>Quartz fiber thimbles</b> <ul style="list-style-type: none"> <li>• Made from high-purity quartz microfiber</li> <li>• Able to withstand high temperatures up to 800°C</li> <li>• Suitable for both solvent extraction and air sampling applications</li> </ul>		

\* Please contact your Cytiva representative for information on cellulose filters



Fig 10. QM-A quartz fiber filter

# Asbestos testing

Asbestos analysis is commonly undertaken by a number of microscopy techniques such as Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Phase Contrast Microscopy (PCM). These methods usually involve sampling and/or observation, both of which involve the use of membrane filters such as polycarbonate or mixed cellulose ester membranes.



Fig 11. Asbestos fibers on a Cyclopore membrane.

### Optical analysis for asbestos sampling

Cytiva provides Whatman membranes for the main asbestos sampling methods.

### Transmission electron microscopy method

Two membrane materials are typically recommended for this method:

- Mixed ester membrane (e.g., WME membrane)
- Polycarbonate membrane (e.g., Whatman Cyclopore™ or Nuclepore membranes)

See the following tables for more information.

### Phase-contrast microscopy method

One of the techniques used to optically determine the asbestos fiber count is the “hot block” method. Crucial to this method is the membrane filter that is used to collect fibers from a defined volume of air. During processing the membrane is made transparent with acetone vapor. Mixed cellulose ester membrane from Cytiva is the recommendation for this application.

### Scanning electron microscopy method

Cytiva offers a range of polycarbonate membranes, Cyclopore and Nuclepore. Nuclepore is also available in a gold-coated format.

What are you testing for?	Product	Characteristics and benefits
Asbestos	<b>WME mixed cellulose ester membrane</b> Ordering information p. 35	<ul style="list-style-type: none"><li>• Typically used for Phase contrast microscopy (PCM) and Transmission electron microscopy (TEM)</li><li>• Cellulose mixed ester membrane</li><li>• Gridded, 0.8 µm pore size, 25 mm surface area with high loading capacity</li><li>• High flow rates</li></ul>
	<b>Nuclepore and Cyclopore</b> Ordering information p. 35	<ul style="list-style-type: none"><li>• Manufactured with proprietary Whatman technology for controlled pore size distribution</li><li>• Smooth, flat membrane; particles are retained on surface so are easily visible during optical analysis</li><li>• Nuclepore available in two versions: gold coated or not gold coated</li><li>• Typically used for electron microscopy</li></ul>

## Ordering information

### Quartz fiber filters

Product name	Dimensions	Product code	Quantity
QM-A quartz fiber filter	25 mm diam.	1851-025	100/pack
	37 mm diam.	1851-037	100/pack
	47 mm diam.	1851-047	100/pack
	50 mm diam.	1851-050	100/pack
	90 mm diam.	1851-090	100/pack
	8 × 10 inches (sheet)	1851-8866	100/pack
QM-H (100% pure) quartz fiber filter	37 mm diam.	1853-037-50	50/pack
	47 mm diam.	1853-047-50	50/pack
	50 mm diam.	1853-050-50	50/pack
	90 mm diam.	1853-090-50	50/pack
	150 mm diam.	1853-150-50	50/pack

### Glass fiber extraction thimbles, 1.5 mm thick

Dimensions*	Product code	Quantity
22 × 80 mm	10371011	25/pack
25 × 100 mm	10371019	25/pack
26 × 100 mm	10371023	25/pack
33 × 94 mm	10371042	25/pack
10 × 38 mm	10371103	25/pack

\* internal diameter × external length

### Quartz fiber extraction thimbles, 2 mm thick

Dimensions*	Product code	Quantity
25 × 90 mm	2812-259	10/pack

\* internal diameter × external length

## Membrane filters for asbestos sampling and analysis

Diameter		25 mm	37 mm	47 mm	
Membrane	Pore size	Product code	Product code	Product code	Quantity
Nuclepore polycarbonate membrane	0.2 µm	110606	-	111106	100/pack
	0.4 µm	110607	-	111107	100/pack
	0.4 µm gold coated	170607	-	-	50/pack
	0.8 µm	110609	110809	111109	100/pack
Cyclopore polycarbonate membrane	0.2 µm	7060-2502	-	7060-4702	100/pack
	0.4 µm	7060-2504	-	7060-4704	100/pack
	1.0 µm	-	-	7060-4710	100/pack
WME cellulose mixed ester membrane	0.8 µm	7148-002	-	-	100/pack