



# Particulate monitoring

## Manual air sampling

Two of the most significant fractions of suspended particulate matter are the respirable fraction ( $< 2.5 \mu\text{m}$ ) and the inhalable fraction ( $< 10 \mu\text{m}$ ). Two important tests performed in air monitoring of particulate matter, PM 2.5 and PM 10, pertain to these two fractions. Whatman glass fiber filters from GE are recommended for gravimetric determination of airborne particulates, such as PM 10, stack sampling, and absorption methods of air pollution monitoring.

In the analysis of collected particulate matter, care should be given to the choice of the filter medium used. The filter medium should give little or no background level for the elements and/or compounds being analyzed and should cause minimal interference in the determination.

### Glass fiber filters and thimbles

Whatman glass microfiber filters (such as GF/A and EPM 2000) and quartz filters (such as QM-A) are particularly suitable for gravimetric determination of particulates due to the high retention efficiency of the media combined with rapid flow characteristics,

low pressure drop, high loading capacity, and low affinity for moisture. PTFE membranes are often used for specific gravimetric analyses (e.g., PM 2.5 monitoring or vehicle emissions testing) according to the employed methodology.




Stack gases are often monitored at high temperatures for which glass microfiber or quartz filters, such as QM-A or thimbles, are appropriate.

### PTFE membranes

Whatman TE type and PM 2.5 are chemically resistant and possess low chemical background interference (e.g., metals), allowing the user to carry out sensitive determinations.

Whatman TE membranes are general purpose PTFE membrane filters that have multiple applications in environmental analysis.

PM 2.5 filters are used for the measurement of fine particulate matter in the atmosphere for the EPA PM 2.5 reference method (under the requirements of 40 CFR Part 50 Appendix L).

▶ What are you testing for?	▶ Product	▶ Characteristics and benefits	
Particulate manual sampling: normal environment	<ul style="list-style-type: none"> <li>• Glass fiber filters such as GF/A and EPM 2000</li> <li>• PTFE TE type</li> <li>• Glass fiber thimbles</li> <li>• PM 2.5 membranes</li> </ul> Ordering information for all products p. 16  	<p><b>GF/A</b></p> <ul style="list-style-type: none"> <li>• Binder free</li> <li>• Glass fiber</li> <li>• Fine particle retention</li> <li>• High flow rate</li> <li>• Good loading capacity</li> </ul> <p><b>EPM 2000</b></p> <ul style="list-style-type: none"> <li>• Binder free</li> <li>• Glass fiber</li> <li>• Used in high-volume PM-10 air sampling equipment</li> <li>• Detailed chemical analysis of trace pollutants</li> </ul> <p><b>Glass fiber thimbles</b></p> <ul style="list-style-type: none"> <li>• Binder and binder free</li> <li>• Glass fiber</li> <li>• Used at temperatures up to 500°C</li> </ul> <p><b>GF 10</b></p> <ul style="list-style-type: none"> <li>• Binder</li> <li>• Glass fiber</li> <li>• Extreme mechanical stability</li> <li>• Used up to 180°C</li> </ul>	<p><b>TE type PTFE membranes</b></p> <ul style="list-style-type: none"> <li>• Suitable for filtration of gases and liquids</li> <li>• Resistant to most acids, alkalis, and solvents such as sodium hydroxide and hexane</li> <li>• Laminated onto a nonwoven polypropylene support material</li> <li>• Increased durability for aggressive testing environments</li> <li>• Hydrophobic characteristics prevent passage of aqueous aerosols (e.g., during venting applications)</li> </ul> <p><b>PM 2.5 membranes</b></p> <ul style="list-style-type: none"> <li>• Used for PM 2.5 ambient air monitoring</li> <li>• Conform to EPA PM 2.5 reference method under the requirements of 40 CFR Part 50 Appendix L</li> <li>• Do not contain glues or adhesives</li> <li>• Sequentially numbered for easy traceability of the filter</li> <li>• Chemically resistant polypropylene support ring, which eliminates curling and makes the filter robot-friendly</li> <li>• Retain a minimum of 99.7% of 0.3 µm size particulates</li> </ul>
Particulate manual sampling: aggressive environment (high temperature and acidic)	<ul style="list-style-type: none"> <li>• Quartz fiber filter such as QM-A and QM-H</li> <li>• Quartz fiber thimbles</li> </ul> Ordering information for all products p. 19 	<p><b>QM-A quartz fiber filters</b></p> <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> <p><b>QM-H quartz fiber filters</b></p> <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>	<p><b>Quartz fiber thimbles</b></p> <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>
Particulate automated sampling	<ul style="list-style-type: none"> <li>• Glass microfiber reels</li> </ul> Ordering information p. 16	<ul style="list-style-type: none"> <li>• Binder</li> <li>• Glass fiber</li> </ul>	<ul style="list-style-type: none"> <li>• Extreme mechanical stability</li> <li>• Used up to 180°C</li> </ul>
Radioactivity	<ul style="list-style-type: none"> <li>• Grade 72</li> <li>• SAS cards for static air sampling*</li> <li>• PAS cards for personal air sampling*</li> <li>• Glass fiber filters such as GF/A</li> </ul> Ordering information p. 16	<p><b>Grade 72</b></p> <ul style="list-style-type: none"> <li>• Glass fiber/cellulose</li> <li>• Used to absorb radioactive iodine in air pollution monitoring and in nuclear installations</li> </ul>	
Metal chemical analysis	<ul style="list-style-type: none"> <li>• Mixed cellulose ester membranes</li> </ul> Ordering information p. 16	<ul style="list-style-type: none"> <li>• Typically used in applications for the determination of metals in airborne particulates</li> </ul>	

\* Please contact your GE Healthcare representative for information on SAS and PAS cards

## Ordering information – manual air sampling

### Membrane filters

Diameter		25 mm	37 mm	46.2 mm	47 mm	50 mm	
Membrane type	Pore size	Product code	Product code	Product code	Product code	Product code	Quantity
PM 2.5 PTFE membrane	2 µm	–	–	7592-104	–	–	50/pack
TE type PTFE membrane	0.2 µm	10411405	–	–	10411411	10411413	50/pack
	0.45 µm	10411305	–	–	10411311	10411313	50/pack
	1 µm	10411205	–	–	10411211	10411213	50/pack
	5 µm	–	10411108	–	10411111	10411113	50/pack
Mixed cellulose ester membrane	0.2 µm	10401706	–	–	10401712	10401714	100/pack
	0.45 µm	10401606	–	–	10401612	10401614	100/pack
	0.8 µm	10400906	10400909	–	10400912	10400914	100/pack
	3 µm	10400706	–	–	10400712	10400714	100/pack

### Glass fiber filters, circles and sheets

Dimensions	25 mm	37 mm	47 mm	50 mm	90 mm	8 × 10 inches (sheet)	
Membrane type	Product code	Product code	Product code	Product code	Product code	Product code	Quantity
GF/A	1820-025	1820-037	1820-047	1820-050	1820-090	1820-866	100/pack
EPM 2000	–	–	1882-047	–	–	1882-866	100/pack
GF 10	–	–	–	–	10370305	–	100/pack
GF 10	–	–	10370319	10370302	–	–	200/pack
Grade 72	–	–	1872-047	–	–	–	100/pack

### Glass fiber thimbles

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

\*internal diameter × external length

Other dimensions available for thimbles (with or without binder). Please contact your GE Healthcare representative.

## Automated air sampling

GE's microfiber filter can be customized in reel format for automated air sampling systems (Fig 9).

### Glass fiber filters with binder, reels

Dimensions	70 mm × 50 m	35 mm × 30 m	40 mm × 42 m	50 mm × 100 m	
Grade	Product code	Product code	Product code	Product code	Quantity
GF 10	10370384	10370392	10370393	10370394	1/pack

Other reel dimensions are available. Please contact your GE Healthcare representative.



Fig 9. Glass fiber reel for automated samplers.