Hahnemühle

PAPER MAKES THE DIFFERENCE



Safe Environmental Analytics

Sampling • Sample Preparation •Analysis







Objective:

An optimal filter material simplifies and supports the contamination-free sampling of suspended solids from water, particles from exhaust fumes, or chemicals from soil samples. Of decisive importance for this is an uncomplicated sampling process with a dependable filter material. Their consistent performance makes our ultrapure filter papers the ideal choice wherever unambiguous analytical results are required. Our filter papers count as a dependable tool in all areas subject to stringent requirements (DIN, EPA, ASTM ...).



Filter paper

Thanks to their high and unvarying quality, Hahnemühle filter papers reliably support users in all critical analyses. The ashless filter papers (0.004 % ash on average) are recommended for quantitative analyses, gravimetric routine tests and the preparation of samples for instrumental analysis.

Grade	Properties	Weight [gsm]	Application
589/1	Fast, quantitative	79	Heavy metals in water
604	Fast, qualitative	79	Soot separation: domestic fuel, combustion engines
597L	Medium-fast, qualitative	81	Soot determination in exhaust fumes
1573	Fast, high wet strength	88	As a belt filter for filtering sewage sludge
1574	Medium-fast, high wet strength, acid- and alkali-resistant	90	Emission control in exhaust air

Glass fibre filters

Hahnemühle glass fibre filters are made from 100 % borosilicate microfibres. They retain fine particles down to 1 µm from liquids, and even aerosols with 0.3 – 0.5 µm from air and gases. Their large surface area (ca. 2 m^2/g) ensures an extraordinary retention capacity. The extremely low metal content of glass fibre filters enables clear analysis results. The high flow speed and great air permeability allow for large sample volumes.

Grade	Binder	Retention rate BS4400 [%]	Filter class EN779	Weight [gsm]	Thickness [µm]	Max. temperature [°C]
GF 8	inorg.	99	n.d.	75	350	500
GF 9	inorg.	99.97	U15	70	350	500
GF 6	inorg.	99.97	H14	80	350	500
GF 10	org.	99.97	H13	70	350	180
GF 15	org.	97	n.d.	54	180	180
GF 3362	inorg.	99.99	n.d.	130	500	500
GF 50	none	99.993	H14	56	290	500
GF 52	none	99.995	U15	54	280	500
GF 51	none	99.993	H13	140	1000	500
GF 55	none	99.999	U15	75	400	500

Glass fibre filter applications:

Grade GF 6



- Deposition of (radioactive) aerosols
- Monitoring of nuclear power plants
- Gravimetric analysis of organic and inorganic contaminations in water and waste water as per DIN 38409

Grade GF 8 and GF 9



- Immissions measurement
- Dust measurement in the air and gases
- Efficiency monitoring for filtration and dedusting
- Combustion air monitoring in power plants and the steel and iron industry
- Gravimetric measurement of dust created at workplaces and in production processes, cleaning of indoor air
- Measuring the dust content of technical gases

Grade GF 10 and GF 15



- High mechanical stability
- Usable as filter belt in air filtration machines / measurement devices
- Separation of soot

Grade GF 3362



- High density and thickness
- Particularly suitable as filter belt in air filtration machines / measurement devices
- Soot separation in gas analysers

Grade GF 50



- Measurement of immission and emission levels: general and special air pollution checks
- Sampling of airborne particulate matter < 30 µm as per Directive 80/779/EEC.
- Exhaust fume control: particle determination
- Determination of inorganic lead and other metals by means of isokinetic probes (up to 500 °C)
- Water pollution testing: determination of total values for suspended matter
- Determination of algae and bacteria in water and waste water analysis

Grade GF 51



- Quantification of suspended matter
- Pre-filter for membrane to prevent clogging

Grade GF 52



- Determination of suspended matter in drinking water, waste water and industrial waste as per European specification EN 872 and/or standard method 2540 D
- Inspection and analysis of drinking water or waste water, including processes for cleaning aqueous solutions with a low content of fine particles
- Biochemical tests: analysis of carbohydrates, cell cultures, scintillation counting of DNA, RNA, proteins and polysaccharides in liquids

Grade GF 55



- Sample and solvent filtration for HPLC
- Gravimetric analysis of pigments
- Elimination of finely suspended carbon materials in liquids to be filtered





Quartz fibre filters

Its low metal content makes quartz glass perfectly suitable for trace analysis, as opposed to normal glass. Our quartz fibre filters are distinguished by an excellent chemical stability with hardly any loss of filter material. This even permits them to be used under extreme conditions with acid gases (HCl, SO_2, SO_3, H_2SO_4, NO and NO_3), chemical solvents, bases, acids (except for hydrofluoric acid), alkaline substances and extreme temperatures up to 1,000 °C.

Grade	Binder	Retention rate BS4400 [%]	Weight [gsm]	Thickness [mm]	Max. temperature [°C]
QFH	none	99.999	85	0.45	1000

The benefits of quartz fibre filters become particularly apparent in the following applications:

- Applications requiring maximum filter purity where the metal content and carbon are concerned
- Filtration and analysis of acidic and alkaline gases and solvents
- Immissions: sampling and evaluation of suspended particulate matter (SPM) and total quantity of suspended particles (TSP), PM 10 and PM 2.5 particles and other pollutants as per US EPA and EN 23210 specifications
- Emissions: exhaust air monitoring in industrial flue pipes and smoke ducts

Glass fibre and quartz fibre extraction thimbles

In comparison with glass fibre thimbles, quartz fibre thimbles show a higher purity and greater toughness. They offer an excellent chemical stability with virtually no loss of filter material through chemical reactions, even under extreme conditions with acid gases (HCl, SO_2, SO_3, H_2SO_4, NO and NO_3), except for hydrofluoric acid. Their physical stability also permits application in high temperatures of up to 1,000 °C.

Grade	Binder	Retention rate BS4400 [%]	Max. temperature [°C]
CFV Glass	none	> 99	500
CFQ Quartz	none	99,99	1000

Glass and quartz fibre filters are preferably used for:

- Monitoring gas emissions in industrial furnaces
- Gravimetric determination of dust in hot gases
- Collection of dust particles or aerosols from air and gas streams







Membrane filters

The use of membranes in sampling and sample analysis enables a targeted separation of specific particle sizes and direct analysis on the filter material, such as gravimetry.

Membrane type	Pore size [µm]	Thickness [µm]	Flow rate (ml/min/cm²)*	Bubble point ** [bar]	
Cellulose nitrate, NC	0.45	130	70	2.4	
	0.65	130	130	2.0	
	0.8	130	200	1.7	
Mixed cellulose ester, MCE	0.45	150	51	2.1	

* Initial flow rate with pre-filtered water at 10 psi or 0.7 bar

** Measured using isopropanol

Membranes are used in the following areas of sampling and sample analysis:

Cellulose nitrate

- Particle size determination
- Particle analysis
- Liquid-solid separation in suspensions for determining pollution levels
- Determination of sludge samples in sewage plants (0.8 µm)

Mixed cellulose ester

- Gravimetric analytics, liquid-solid separation in suspensions for determining the pollution level (in sewage plants etc)
- Analysis of particles in air or water





Objective:

Fast and reproducible sample preparation is an essential requirement for efficient and dependable analysis. The selection of Hahnemühle products shown here will ensure a fast preparation of your samples for sensitive instrumental measurements with a minimum of extractable substances. Our qualitative and quantitative filter papers and cellulose thimbles provide the best conditions for undistorted measurement results. Our products are exclusively made from strictly selected raw materials.

Filter papers

A good preparation is meant to exclude contamination of the sample to be tested. This is why the filter paper used must be of such a high purity that the analytical findings will satisfy all applicable requirements. With an ash content of around 0.08 %, our filter papers for qualitative analysis harbour a very low risk of the sample being contaminated.
For particularly critical tests, the filter papers for quantitative analysis should be used. They have the highest available purity. They are washed with concentrated acid and rinsed with water in the manufacturing process. This helps them achieve the extremely low ash level of 0.004 % on average.

Grade	Properties	Weight	Application
589/3	Slow quantitative filter paper	84	Determination of chemical elements in water using gravimetry and colorimetry
589/5	Medium-fast quantitative filter paper	84	Soil analysis: separation of solids in water extraction
602h	Slow qualitative filter paper	84	Sample preparation for separating small particles down to 2 µm





Cellulose thimbles

Made from binder-free and ultrapure cellulose, these thimbles are ideal for dependable and fast analytics in environmental monitoring. They are suitable for Soxhlet, Tecator or similar appliances for extracting specific constituents from solids with a suitable solvent.

- Determination of resins and fats
- Analysis of pesticides, polyaromatic hydrocarbons and dioxins
- Extraction of fat-soluble substances from soil samples and other composites

Cellulose / Synthetic fleece

The paper grade 0048 made from a mixture of cellulose and synthetic fibres is particularly suitable for rough pre-purification and the separation of particles sized over 100 µm. Thanks to a thickness of 1 mm, the load mass is well-suited for greater quantities of contaminants.

- For separating particles exceeding 0.1 mm in size
- For determining a sample‘s degree of whiteness

Membranes

Whatever the properties of the sample, a suitable membrane with performance features to match can be selected from an extensive range, see table: “Resistance of the various membrane types”. The loose membrane circles are available in various diameters, depending on the sample volume.

Application of the various membrane types:

Cellulose nitrate membrane:

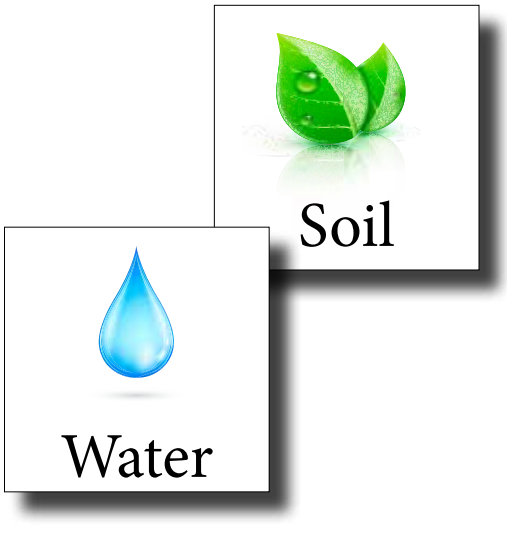
- Pre-filtration and purification of samples before further testing
- Extraction of contaminated soil with water as per DIN 38414-4 (0.45 µm)

Cellulose acetate membrane:

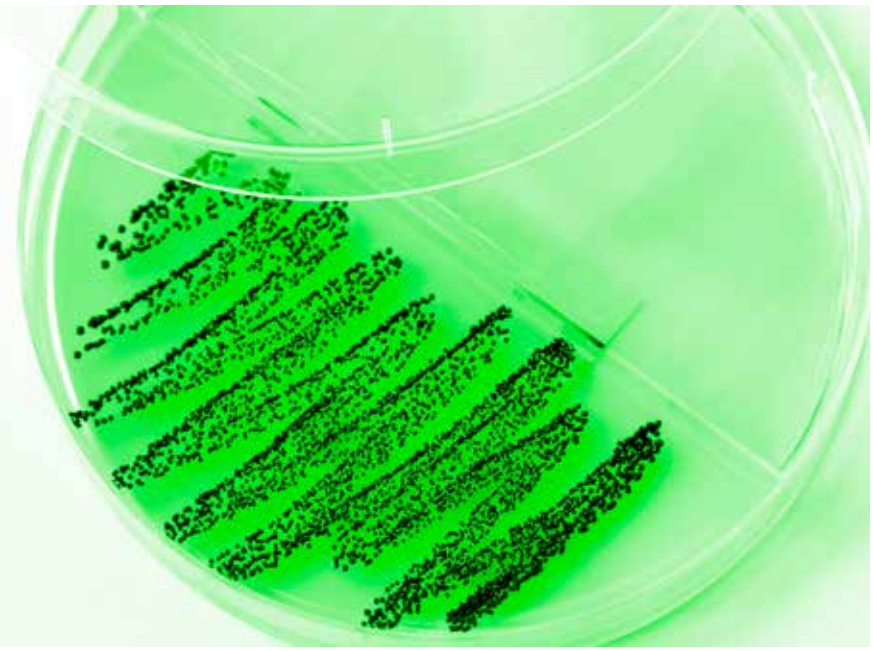
- Extraction of contaminated soil with water as per DIN 38414-4 (0.45 µm)
- Pre-filtration for determining metals using atomic absorption spectrometry

Mixed cellulose ester membrane:

- Pre-filtration and purification of samples before further tests (0.45 µm)



Microbiological tests



Objective:

Membrane filtration is an established method for enriching and isolating bacteria in the monitoring of environmental pollution by microbiological contaminations. Even from large sample volumes and low numbers, bacteria can be concentrated and selectively bred for analysis. Hahnemühle offers membrane circles with gridlines that will not affect bacterial growth but simplify the counting of the cultures.

For routine tests, our monitors with white and black cellulose nitrate membranes as ready-to-use disposable filtration units allow the risk of secondary contamination by membrane transfer to the culture medium to be minimized.

Sterile membrane discs

- The membranes with a pore size of 0.45 µm are used for micro-organism counts (microbiological analysis)
- Membranes with grid lines are ideal for microbiological analysis (bacterial counts) of water, pharmaceuticals, beverages, cosmetics, etc.

We offer a broad range of various formats:

- White membranes, used in general laboratory applications
- Black membranes for counts of fungi and yeasts (the higher contrast allows easier counting)
- Gridded membranes (black grid on white membrane or white grid on black membrane) for counts of colonies as a standard method of quantification
  - Clearly defined sections (3.1 x 3.1 mm grid)
  - Special ink, non-toxic and totally free from bacterial growth inhibitors
- Sterilised membranes (packaged in individual blisters) to ensure that the filter is not contaminated

Wasser

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Monitors ready to use

For colony counting, for microbiological testing of pharmaceuticals, cosmetics, food, beverages, water and other liquids with high sample through put

- With a gridded cellulose nitrate membrane filter and cellulose pad
- Available in black and white
- Just remove the 100 ml funnel to convert to a petri dish
- Ready to use – can be adapted to multi-branch by adapter
- Available as sterile filter and individually packaged

The pre-sterilised units consist of a membrane and a cellulose pad underneath. After the filtration step the monitor is quickly transformed into a petri dish - without touching the membrane disc. Beside the grids on the membrane the magnifier, which is integrated into the cover of the 100 ml container, simplifies the counting on the membrane surface. The membrane is not welded on the housing and can easily be removed.

These sterile monitors are individually packed and offered as pack with 50 pieces:

- Monitor with black Cellulose Nitrate Membrane 0.45 µm sterile, 47 mm diameter, with grid, 50 pcs.
- Monitor with white Cellulose Nitrate Membrane 0.45 µm, sterile, 47 mm diameter, with grid, 50 pcs.



Water

Syringe filters

Hahnemühle offers you high-grade disposable filters in constant premium quality. Leading environmental analysis companies put their trust in the dependable performance of these products in their sample preparation. Loose membrane circles of the same type are also available for larger sample quantities.

Resistance of the various membrane types, which are available as filter circle or syringe filter:

Membrane type	Sample type	pH range	Resistance
CA cellulose acetate	Aqueous, slightly acidic or alkaline	4 - 8	Alcohols, oils, hydrocarbons
NC cellulose nitrate	Aqueous, slightly acidic or alkaline	4 - 8	Alcohols, oils, hydrocarbons
MCE mixed cellulose ester	Aqueous, slightly acidic or alkaline	4 - 8	Alcohols, oils, hydrocarbons
CR regenerated cellulose	Aqueous and organic solutions	3 - 12	All alcohols, hydrocarbons and solvents
NY nylon	Aqueous and organic solutions	3 - 14	All alcohols, hydrocarbons and solvents
PTFE teflon	Organic solutions, highly acidic or alkaline	1 - 14	All solvents, all acids and bases, oxidants

Technical properties:

Membrane diameter	13 mm	25 mm	30 mm
Housing material	Polypropylene	Polypropylene	Polypropylene
Fitting inlet	female Luer-Lock	female Luer-Lock	female Luer-Lock
Fitting outlet	male Luer-Slip	male Luer-Slip	male Luer-Slip
Filter area (cm^2)	1.09	4.08	5.39
Sample volume (ml)	1-10	10-100	>100
Dead volume (µl)	<25	<100	<200



Application-specific filters

Objective:

The specific and targeted determination of specified substances calls for a suitable and selective filter medium. In this respect, Hahnemühle offers filter papers with special separation properties and a grade-specific quality control. Additives like activated carbon or kieselguhr lend the paper filter specific properties enabling targeted analysis in sample processing. Filter media for soil analysis are strictly controlled separately for low content of specific target molecules such as nitrate.



Grade	Properties	Weight [gsm]	Thickness [mm]
508	Medium-fast, 35 % activated carbon	360	0.52
287	Medium-fast, 35 % kieselguhr	154	0.35
512	Slow, extremely low phosphorus content	76	0.16
2095	Medium-fast, extremely low nitrogen content	85	0.17
Carrier029	Absorbent glass fibre sample holder	56	0.29
Carrier040	Absorbent glass fibre sample holder	75	0.40

Activated carbon filter paper

Grade 508

- For separating very fine, semi-colloidal turbidities
- Clarification of extracts from soil suspensions
- Separation of protein precipitates
- Clarification before refractometry







Sample preparation

Kieselguhr filter paper

Grade 287:

- For separating very fine, semi-colloidal turbidities
- Clarification of cloudy and coloured extracts and solutions before polarimetry and refractometry
- Adsorption of iodine-131 from the air

Low-phosphate filter paper

- Specifically for analysing alkaline earth metals and trace elements in soil samples
- Extremely low content in phosphor

Grade 512:

- For determining potassium and phosphorous after Egnér, Riehm and Lederle
- For sample preparation in soil analysis

Grade 2095:

- Extremely low nitrogen content, ca. 0.05 mg / 110 mm circle
- Filtration of precipitations in samples for the Kjeldahl determination of nitrogen

Sample holder for moisture measurement

Carrier 029 and Carrier 040:

- This carrier papers for measuring water content is an ideal sample holder for all commonly used moisture measurement systems using halogen and infrared radiation
- Even distribution of liquid and viscous samples in the loose glass fibre matrix



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Filter papers

Grade	Diameter	Form	Units / package	Article number
589/1	125 mm	Filter Circles	100	DP5891125
589/1	150 mm	Filter Circles	100	DP5891150
595	150mm	Folded Filters	100	DF595150
595	240 mm	Folded Filters	100	DF595240
1573	185 mm	Filter Circles	100	DP1573185
597	125 mm	Filter Circles	100	DP597125

The filter papers are available as filter circles and folded filters with the following standard sizes in millimetres: 6* – 12.5* – 12.7* – 40.5 – 47 – 55 – 70 – 90 – 110 – 125– 150 – 185 – 240 – 320 (folded filters from 70 mm). The package contains 100 units. *1,000 units!
Other formats, sheets, rolls and special cuts are available upon request.

Glass and quartz fibre filters

Grade	Diameter	Form	Units / package	Article number
GF6	150 mm	Filter Circles	100	GF6150
GF50	90 mm	Filter Circles	100	GF50090
QFH	47 mm	Filter Circles	50	QFH047

The glass and quartz fibre filters are available as filter circles in the following standard sizes (in millimetres):
25 – 37 – 42.5 – 47 – 50 – 55 – 70 – 90 – 110 – 125 – 142 – 150, and as a 203 mm x 254 mm sheet. The package contains 50 units.
GF: 100 units, QF: 50 units
Other formats, sheets, rolls and special cuts are available upon request.

The grades Carrier 029 and Carrier 040 are available as 90 mm filter circles.
The order number is GF 029090 or GF 040090. Package size is 100 units.

Cellulose extraction thimbles

Soxhlet thimbles (Grade 900)	
Ø 19 x 90 mm	90019090
Ø 22 x 80 mm	90022080
Ø 25 x 60 mm	90025060
Ø 25 x 80 mm	90025080
Ø 25 x 100 mm	90025100
Ø 28 x 100 mm	90028100
Ø 30 x 80 mm	90030080
Ø 30 x 90 mm	90030090
Ø 30 x 100 mm	90030100
Ø 33 x 60 mm	90033060

Soxhlet thimbles (Grade 900)	
Ø 33 x 80 mm	90033080
Ø 33 x 90 mm	90033090
Ø 33 x 94 mm	90033094
Ø 33 x 100 mm	90033100
Ø 33 x 118 mm	90033118
Ø 33 x 205 mm	90033205
Ø 35 x 150 mm	90035150
Ø 40 x 150 mm	90040150
Ø 43 x 123 mm	90043123
Ø 48 x 145 mm	90048145

Tecator thimbles (Grade 901)	
Ø 26 x 60 mm	90126060

Package: 25 units per package
Grade 900 format: inner diameter x height
Grade 901 format: outer diameter x height

Glass fibre thimbles

Size	CFV Grade
Ø 19 x 90 mm	CFV19090
Ø 22 x 80 mm	CFV22080
Ø 25 x 100 mm	CFV25100
Ø 26 x 60 mm	CFV26060

Size	CFV Grade
Ø 30 x 100 mm	CFV30100
Ø 33 x 94 mm	CFV33094
Ø 43 x 123 mm	CFV43123

Format: inner diameter x height. Package: 25 units per package
Other sizes are available upon request.

Membranes

Membranes	Article number	Pore size	Properties	Diameter	Units / Package
Cellulose acetate	AC02047BL	0.2 µm	white	47 mm	100
Cellulose acetate	AC04525BL	0.45 µm	white	25 mm	100
Cellulose acetate	AC04547BL	0.45 µm	white	47 mm	100
Cellulose acetate	AC04550BL	0.45 µm	white	50 mm	100
Cellulose nitrate	NC04525BL	0.45 µm	white	25 mm	100
Cellulose nitrate	NC04547BL	0.45 µm	white	47 mm	100
Cellulose nitrate	NC04550BL	0.45 µm	white	50 mm	100
Cellulose nitrate	NC08047BL	0.8 µm	white	47 mm	100
Cellulose nitrate	NCS02047BC	0.2 µm	white, sterile, grid	47 mm	100
Cellulose nitrate	NCS04547BC	0.45 µm	white, sterile, grid	47 mm	100
Cellulose nitrate	NCS04547BL	0.45 µm	white, sterile	47 mm	100
Cellulose nitrate	NCS04547NC	0.45 µm	black, sterile, grid	47 mm	100
Cellulose nitrate	NCS04550NC	0.45 µm	black, sterile, grid	50 mm	100
Mixed cellulose ester	MCE02050BL	0.2 µm	white	50 mm	100
Mixed cellulose ester	MCE04547BL	0.45 µm	white	47 mm	100
Mixed cellulose ester	MCES02047BC	0.2 µm	white, sterile, grid	47 mm	100
Mixed cellulose ester	MCES02050BC	0.2 µm	white, sterile, grid	50 mm	100
Mixed cellulose ester	MCES04547BC	0.45 µm	white, sterile, grid	47 mm	100
Mixed cellulose ester	MCES04550BC	0.45 µm	white, sterile, grid	50 mm	100
Nylon	NY02047BL	0.2 µm		47 mm	100
Nylon	NY04547BL	0.45 µm		47 mm	100
PTFE	PT02047BL	0.2 µm		47 mm	100
PTFE	PT04525BL	0.45 µm		25 mm	100
PTFE	PT04547BL	0.45 µm		47 mm	100

Other pore sizes, diameters, designs and package sizes available upon request.

Monitors ready to use

Membranes	Article number	Pore size	Properties	Diameter	Units / Package
Cellulose nitrate	ENCS04547NC	0.45 µm	black, sterile, grid	47 mm	50
Cellulose nitrate	ENCS04547BC	0.45 µm	white, sterile, grid	47 mm	50

Syringe filters

Cellulose acetate 0.2 µm, non-sterile		
Order number	Diameter	Package size
SAC02025100	25 mm	100

Cellulose acetate, 0.2 µm, sterile		
Order number	Diameter	Package size
SACS0202550	25 mm	50
SACS0203050	30 mm	50

Cellulose acetate, 0.45 µm, non-sterile		
Order number	Diameter	Package size
SAC04525100	25 mm	100
SAC04525500	25 mm	500
SAC04530100	30 mm	100
SAC04530500	30 mm	500

Cellulose acetate, 0.45 µm, sterile		
Order number	Diameter	Package size
SACS0452550	25 mm	50
SACS0453050	30 mm	50

Nylon, 0.2 µm, non-sterile		
Order number	Diameter	Package size
SNY02013100	13 mm	100
SNY02025100	25 mm	100
SNY02025500	25 mm	500

Nylon, 0.45 µm, non-sterile		
Order number	Diameter	Package size
SNY04513100	13 mm	100
SNY04525100	25 mm	100
SNY04525500	25 mm	500

Regenerated cellulose, 0.2 µm, non-sterile		
Order number	Diameter	Package size
SCR02013100	13 mm	100
SCR02025100	25 mm	100

Regenerated cellulose, 0.45 µm, non-sterile		
Order number	Diameter	Package size
SCR04513100	13 mm	100
SCR04525100	25 mm	100
SCR04530100	30 mm	100

PTFE 0.2 µm, non-sterile		
Order number	Diameter	Package size
SPT02013100	13 mm	100
SPT02025100	25 mm	100

PTFE, 0.45 µm, non-sterile		
Order number	Diameter	Package size
SPT04513100	13 mm	100
SPT04525100	25 mm	100
SPT04525500	25 mm	500
SPT04530100	30 mm	100

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Hahnemühle FineArt GmbH

Hahnemühle FineArt GmbH is one of Germany's oldest paper manufacturers. The company has dedicated itself to the production of premium filter papers for decades. The Albet® LabScience brand offers users a comprehensive range of articles for day-to-day laboratory work. Besides filter papers, this range is also complemented by membranes and syringe filters. Many leading companies from the pharmaceutical, chemical, food and beverage industries, as well as environmental monitoring, place their trust in the products from Hahnemühle.

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