Hahnemühle
Life Science

life science

Industry & Laboratory | Product Profile & Application

Hahnemühle
Life Science

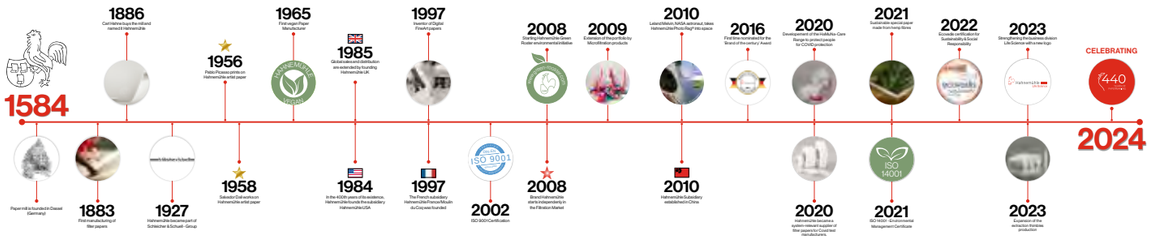
Preface

440 YEARS OF PAPERMAKING

Dear customer,
dear partner,

“We are proud to celebrate our 440th birthday and our path to excellence: From our beginnings as a small paper manufacturer to an internationally renowned brand with unrivalled quality and innovative strength. Our papers with the iconic ‘Rooster’ are trusted by generations of people worldwide,” says Jan Wölfle, CEO of the Hahnemühle Group.

Hahnemühle’s innovations include the first filter papers for chemical applications in the age of industrialisation - around 1880.



This was followed by equities paper for shares, which was exported as far away as Brazil. Artists such as Pablo Picasso printed lithographs on Hahnemühle paper, Salvador Dalí painted on it and today portraits of Queen Elizabeth II are exhibited on it in museums around the world. The paper from southern Lower Saxony conquers the world market and the paper manufactory becomes a paper factory.

“From the Renaissance to the digital age: For an incredible four centuries and four decades, we have been producing high-quality papers and applications that are at the forefront of art, science and industry,” adds Jan Wölfle.

Today’s portfolio includes artist papers, analogue and digital fine art, photo and commercial publsihing papers as well as services such as an app for these market-leading papers. In addition, customised papers for life science applications and technical speciality papers are “Made by Hahnemühle”. Hahnemühle also supplies the purest papers for rapid diagnostic tests such as PCR tests in the Corona era.

Our aim is to enable every individual to enjoy a better quality of life and a healthier life.

Jan Wölfle
CEO

Investments

Hahnemühle Life Science is making significant investments in an artificial intelligence (AI)-based, automated thimble production - a milestone in production

With the investment in a state-of-the-art thimble production, Hahnemühle Life Science has taken a pioneering step which heralds a new era in thimble production thanks to autonomous, self-monitoring and self-correcting robotics.

This system not only represents a step forward in terms of efficiency and precision, but also strengthens Hahnemühle's market position in the life science sector and in Germany as a center of innovation.
The new production line is equipped with advanced technology that makes it possible to monitor, optimize and adjust production processes in real time. It continuously collects and analyzes data from various measurement areas to ensure that production runs smoothly and the highest quality standards are met. Through the automatic adjustment of parameters, it can react quickly to changing conditions and minimize downtime.
Further information on our extraction thimbles can be found on page 89.

Through continuous investment in developments, the latest technologies and processes, as well as in our employees, we will continue to be an innovation leader in the market. Our aim is not just to serve the market, but to shape it.
Experience with us the pioneering spirit that drives us and be inspired by our passion for excellence.
Are you interested? Get in touch with us!

Fun Facts

Did you know that you often come across Hahnemühle filter papers in your life?

- ➔ when you move into your first home, because the quality of the cement used is checked with our papers
- ➔ during family planning, as a component in pregnancy tests
- ➔ when eating cake, because the quality of the sugar beet seeds is checked with our papers
- ➔ in the hospital during the initial examination of your newborn; as a sample carrier for blood samples
- ➔ when visiting the doctor in allergy tests, in urine and blood test strips
- ➔ in the quality control of your favorite drink, whether soft drinks, beer or wine
- ➔ on a city trip, because the air quality is also checked with Hahnemühle products
- ➔ in the shower, when checking for legionella in drinking water
- ➔ when checking the engine of your car
- ➔ while drinking wine in a cozy atmosphere

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Our product range for laboratories

Hahnemühle offers a globally recognised range of premium filter papers.
We laid the foundation for our success with the development and production of grades 589/1 to 589/6.
Our filter papers are produced for both liquid and air filtration technologies in various areas of application.
The premium-quality cellulose, cotton linters, glass fibre and quartz fibre raw materials are suitable for all laboratory and industrial applications.

Our portfolio includes:

- Filter papers made of cellulose, glass fibre and quartz fibre for quantitative and qualitative analysis, as well as for particle removal
- Absorbent papers sensitively detecting biological molecules such as antibodies and hormones
- Glass fibre filter for isolating DNA and RNA
- Extraction thimbles and crucibles made of cellulose, glass fibre and quartz fibre
- Glass fibre papers for determining contamination in air and gases
- Germination test papers in accordance with ISTA requirements
- Blotting papers
- Chromatography paper
- Antibiotic test papers
- Papers for surface protection
- Papers for beer analysis

The microfiltration range includes syringe filter and membrane filter for the reliable separation of microorganisms and particles in liquids, air and other gases.

Clarification and sterilizing filtration, sample preparation, sterile ventilation and medical applications are some typical applications for disposable filter holders. They are available with different pore sizes and with different hydrophilic or hydrophobic membranes.

- Syringe filter sterile and non-sterile with CA, CR, NY, PES and PTFE membranes
- Membrane filter sterile and non-sterile made of AC, NC, MCE, NY, PES and PTFE

We offer various membrane filter with pore sizes ranging from 0.2 µm to 8 µm for removing particles or collecting microorganisms from solutions for examination. From clarification and sample preparation, to sterile filtration, air filtration and aeration – and even microbiological control.

Contents

New introductions

Products by area of application

Medical diagnostics:
Materials for producing rapid diagnostic tests and molecular biology tools are subject to very stringent requirements. Hahnemühle absorbent papers and glass fibre media guarantee both high and consistent performance. These papers are produced using the purest raw materials, thereby ruling out interactions with the reagents applied to the finished test strips.

- Cotton linters and glass fibre papers for diagnostic test strips
- Papers for impregnation, sample absorption and wicking

Molecular biology:
Purifying and identifying biological material such as DNA, RNA, antibodies and so on is a key step in molecular biology tests. The production of tests for infections and allergies based on detection reactions with DNA, RNA, enzymes or antibodies on specimen carriers demands the utmost purity in the raw papers used for these highly sensitive test procedures, as well as a reliable yield.

- Glass microfibre papers for isolating DNA and RNA
- Quantitatively pure specimen carriers for detection reactions with enzymes or antibodies
- Blotting papers for protein identification after gel electrophoresis

Microbiology:
Membranes are a valuable aid in detecting or cleaning microorganisms or particles. We offer an excellent range of syringe and membrane filter for reliably filtering liquids, air and other gases. The syringe filter are, of course, HPLC-tested and do not suffer from bleed.

- Sterile and unsterile syringe filter with CA, CR, NY, PES and PTFE membranes
- Sterile and unsterile membrane filter made of AC, NC, MCE, NY, PES and PTFE

Pharmaceuticals:
Materials for producing pharmaceuticals and diagnostic chemicals are subject to very stringent requirements. Hahnemühle absorbent papers and glass fibre media guarantee both high and consistent performance. The purest raw materials are used to produce these filter, thereby ensuring as little contamination as possible.

- Filter papers for pharmaceutical quality control
- Wet-strength paper for filtering large volumes of biological fluids

Environmental analysis:
An optimum filter material simplifies and supports contamination-free sampling of suspended particles in water and particles in emissions or chemicals. Thanks to their consistent performance, our high-purity filter papers are ideal for situations that call for unambiguous analytical results. Our filter papers are considered a reliable tool in all areas that are subject to strict official requirements (DIN, EPA, ASTM, etc.).

- Air pollution
- Emission control
- Water
- Waste products

Food safety:
When it comes to quality assurance and raw material control, knowledge of ingredients is absolutely essential. Some of our high-quality filter grades have proven to be effective for analysis and strict monitoring work and are recommended by the Central European Commission for Brewing Analysis (MEBAK) in the publication 'Analytical methods in breweries – wort, beer and beer-based beverages'. Here, you will also find filter grades whose purity means they are suitable for process filtering foodstuffs and that offer certified conformity with US FDA recommendation 21 CFR and German Federal Institute for Risk Assessment (BfR) recommendations XXXVI and XXXVI/1.

- Fruit juice and nectar
- Wine and sparkling wine
- Beer, malt and beer-based beverages
- Edible and technical oils
- Sugar
- Milk and dairy products
- Meat and meat products

Agriculture:
Detecting and determining nutrients and trace elements is essential for optimising crop and livestock growth. Our filter papers' average ash content has been adjusted to meet these high standards in chemical analysis.
The special conditions for germination testing are established by the stringent ISTA requirements. Hahnemühle germination test papers comply with these international requirements and permit reliable statements to be made regarding seed's germination capacity.

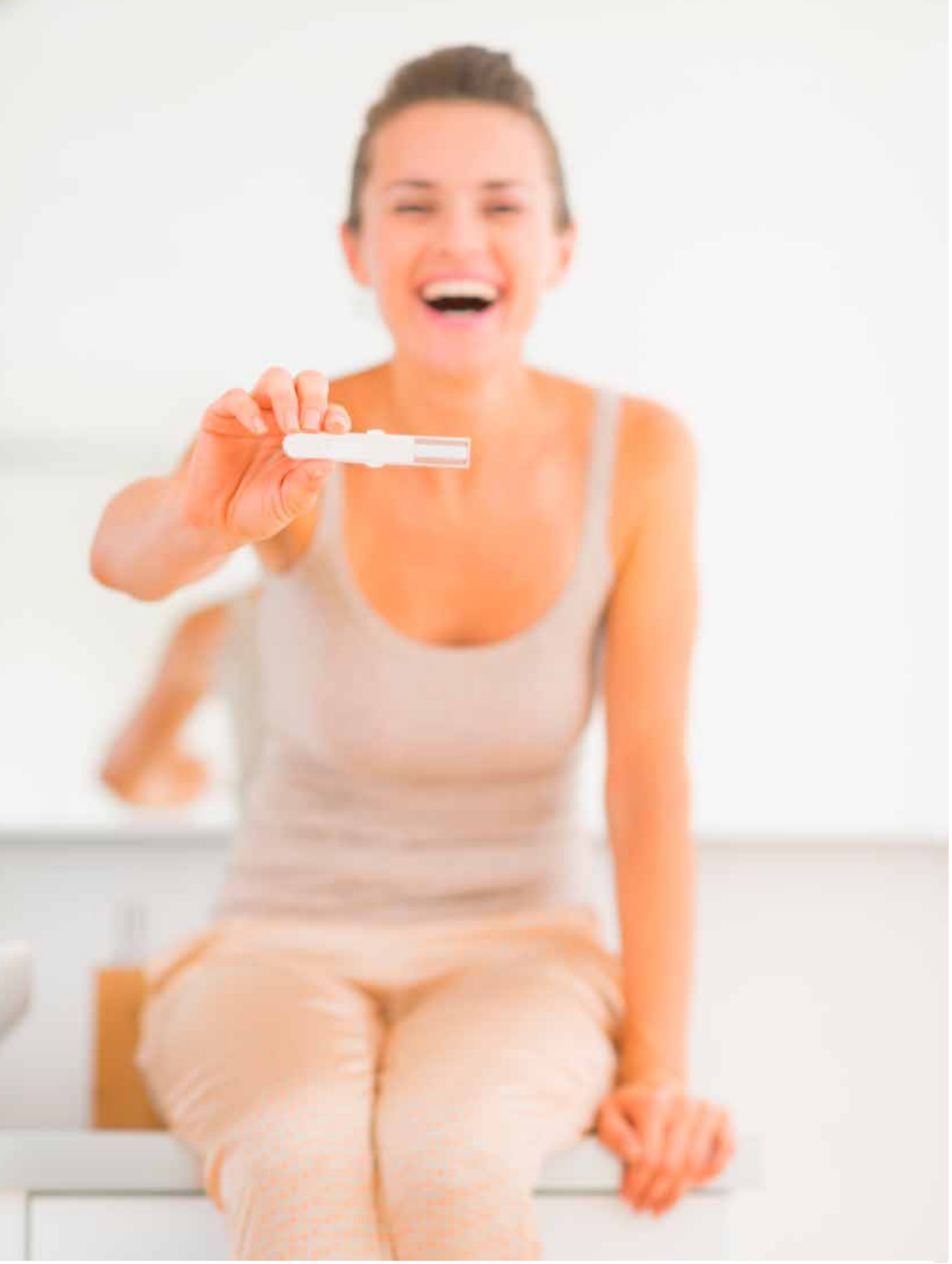
- Soil and fertiliser
- Animal feed
- Seed

Chemicals:
Every chemical reagent and pharmaceutical substance is only as good as the quality of the product. Maximum quality standards are among the key success factors for any company operating in the chemical and pharmaceutical sector. Hahnemühle supplies the purest quantitative filter papers. With an average ash content ranging from 0.004% to 0.002%, they are the purest papers on the filter market!

- Quality control
- Detergents
- Oil refineries
- Cement analysis

Technical special papers:
Our technical special papers have an enormous range of potential applications.
As well as absorbing liquids and protecting sensitive surfaces, they can be coated with adhesives and polymers and used to reinforce packaging. They also absorb and re-emit fragrances, protect surfaces as an intermediate layer and can be formed into stable structures and impregnated, not to mention their ability to transport fluids and fragrances by capillary action, and much more besides...

- Surface protection
- Pipe sleeves
- Adhesive tape
- Fragrance cards



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Medical diagnostics – point-of-care papers

Objectives in the production of dipsticks, lateral flow and flow-through tests for diagnostics in the point-of-care sector:

- Use of ultra-pure paper grades – linters and cellulose – without chemical additives to avoid interference in the detection reaction
- Homogeneous sheet structure with high hydrophilicity for consistent running characteristics in chromatography
- Use of papers and glass fibre media with high and consistent absorption capacity
- Some papers have a high wet strength for safe handling during reel-to-reel impregnation
- High consistency of paper quality – and particularly of thickness and capillary force – over the entire produced paper roll for reliable analysis results from one lot to the next
- Homogeneous dispersion of impregnation solutions
- High wet strength for safe handling during reel-to-reel impregnation

Hahnemühle absorptive papers are suitable for a multitude of diagnostic applications, such as:

- Screening for infectious diseases
- Pregnancy tests
- Drug screening
- Food and drink tests
- Environmental safety
- Veterinary diagnostics

We provide paper in the format you need!

Process	Water absorbency, g/100 cm²	Capillary rise (Klemm)	Grade	Thickness
Impregnation	1.20	-	597 L	0.17 mm
	1.20	75 mm/10 min	597 nf *	0.18 mm
	1.25	105 mm / 30 min	2043A	0.17 mm
	1.55	105 / 30 min	2043B	0.22 mm
	2.40	115 mm / 30 min	2316	0.30 mm
	2.5	150 mm / 30 min	7216	0.30 mm
	3.3	140 mm / 30 min	23SL *	0.45 mm
	3.35	125 mm / 10 min	2992	0.47 mm
	-	-	3605 *	0.8 mm
	7.40	155 min / 10 min	BP003	0.90 mm
	8.0	95 mm / 10 min	3730	0.97 mm
Absorption	2.70	65 mm / 10 min	BP002	0.35 mm
	7.40	155 mm / 10 min	BP003	0.90 mm
	-	170 mm / 30 min	2727	1.3 mm
	14.0	-	BP005	1.5 mm
Sample collection	1.20	-	597 L	0.17 mm
	3.35	125 mm / 10 min	2992	0.47 mm
	2.70	65 mm / 10 min	3469	0.35 mm
Sample application	-	90 mm / 10 min	GF 55	0.40 mm
	-	130 mm / 10 min	GF 51	1.0 mm
	1.25	105 mm / 30 min	2043A	0.17 mm
	1.55	105 / 30 min	2043B	0.22 mm
	2.5	150 mm / 30 min	7216	0.30 mm
	3.35	125 mm / 10 min	2992	0.47 mm
	7.40	155 min / 10 min	2668	0.90 mm
	-	170 mm / 30 min	2727	1.45 mm
Conjugate release	-	90 mm / 10 min	GF 55	0.40 mm
	-	130 mm / 10 min	GF 51	1.0 mm

* High wet strength

You will find suitable filter media on page 17 in the ‘Pharmaceuticals’ section for preparing larger quantities of biological materials by filtration.

Ordering information
All grades are available as rolls, sheets and custom cuts. Please don’t hesitate to contact us for further details and advice.

Molecular biology

Objectives in purifying and identifying biological material such as DNA, RNA, antibodies, etc.:
- Rapid isolation of DNA or RNA, e.g. from viruses such as SARS-CoV-2
- Sensitive detection of proteins, such as antibodies against bacteria and viruses, by blotting (Northern, Western and Southern blots)
- Easy production of diagnostic test systems for detecting infectious diseases via DNA, RNA or proteins
- Contamination-free specimen carrier for detection reactions with enzymes or antibodies (impregnation), e.g. allergy tests

For critical applications of this kind, the high-quality filter media from Hahnemühle offer:
- Absolute purity of the raw papers used for highly sensitive test procedures
- Reliable yield in the purification of DNA/RNA using glass fibre filter
- Good paper wet strength during blotting after gel electrophoresis

Method	Filter characteristics	Filter grade
Separating and isolating DNA and RNA from the digestion of cells, bacteria, viruses, etc., by filtration (including by centrifuge)	Glass microfibre paper without binders	GF 50, GF 51, GF 52
Tests for infections and allergies by detection reactions with enzymes or antibodies on specimen carriers	Ultra-pure absorbent and homogeneous filter papers with no contaminants	589/3, 2043A, 2043B, 7216
Tests for viral and bacterial infections by blotting after gel electrophoresis	Ultra-pure, absorbent and wet-strength blotting papers	BP002, BP003, BP005, 3730, 2727

The absorbent blotting papers made of high-purity cotton linters contain no additives whatsoever, thereby preventing interference during the transfer steps and, where applicable, the drying process. The strict conditions as part of quality control ensure maximum homogeneity of sheet structure, not to mention consistency of performance from one lot to the next. As many of these papers are incorporated into in vitro diagnostics or other medical devices, we take care to ensure contamination-free handling during production. Otherwise, enzymes that break down nucleic acids or proteins could adversely affect the subsequent detection process.

We offer suitable filter media with a good flow rate and high strength for preparing large quantities of biological materials by filtration. We provide paper in the format you need!

Production	Filter characteristics	Filter grade
Filter presses, filtration of reagents	Creped, medium-fast	2410
	Filter card, medium-fast	3605
	Fast – slow	2589A, 2590B, 2590C, 2589D, 2589E
	Hardened, fast, medium-fast	1573, 1574
	Slow, very slow	1575, 1577
Protective papers in filter presses	Medium-fast, wet strength, creped	2048, 2410
	Very slow, high wet strength (hardened)	1577
Filter papers and cards	Very fast, wet strength	1450nf
	Medium-fast, wet strength	3605, 572, 3205
	Slow, wet strength	2589d, 2989e
Creped papers	Very fast, wet strength, thick	520bII, 520b, 3144L
	Very fast, wet strength	520a

Ordering information
All grades are available as rolls, sheets and custom cuts. Please don't hesitate to contact us for further details and advice.

Microbiology

Objectives in filtration with membranes:
- Filtering aqueous solutions for biological analyses
- Isolating microorganisms from fluids for identification and quantification
- Sterilising aqueous media and pharmaceutical solutions and mixtures
- Particle retention in aqueous solutions or air with subsequent gravimetric analysis
- Clarifying solutions prior to further analyses such as chromatography
- Removing particles from solvents or aqueous solutions

The various microfilter media from Hahnemühle offer numerous advantages:
- Fast filtration with a high flow rate
- Uniform distribution of pore size
- Low non-specific absorption
- Stable structure for problem-free gravimetric analysis

Process	Filter characteristics	Filter grade
Detecting and quantifying microorganisms	Cellulose nitrate membranes with grid, 0.2 µm and 0.45 µm, sterile	NCS 045, NCS 020
Clarifying and sterilising biological fluids and culture media for biological and clinical analyses	Cellulose acetate membrane filter 0.2 µm and 0.45 µm	AC 020, AC 045
	PES membrane filter 0.2 µm and 0.45 µm	PES 020, PES 045
Analyses of cell solutions	Cellulose acetate or nitrate membrane filter, 0.45 µm	AC 045, NC 045
	Sterile syringe filter with cellulose acetate 0.2 µm and 0.45 µm	SACS 020, SACS 045
	Sterile syringe filter with PES 0.2 µm and 0.45 µm	SPESS 020, SPESS 045
HPLC preparation of biological samples	Syringe filter with nylon	SNY 020
	Syringe filter with regenerated cellulose	SCR 020
	Syringe filter with PES 0.2 µm	SPES 020
Filtering the mobile, organic phase	Nylon membrane, 0.2 µm	NY 020

Ordering information
You can find part numbers for membrane and syringe filter on page 146. Other versions are available on request.

Hahnemühle Life Science

Pharmaceuticals – Production and quality control

Target application:

- Monitoring purity, contamination and inspecting microbiological purity
- Clarification before analysis
- Gravimetric measurements
- Sample preparations before HPLC

Process	Technique	Type of Filter	Filter grade
Separation of solids from suspensions	Filtration (funnel, Büchner)	Filter papers for clarifying fluids	0860, 0858
Gravimetry	Filtration (funnel, Büchner)	Filter paper for quantitative analyses	589/1 589/2 589/3 589/4 589/5 589/6
Clarification of samples	Pre-filter for membranes	Glass microfibre filter	GF 9
Microbiological analysis	Detection of microorganisms	Cellulose nitrate membranes with grid, 0.45 µm and 0.2 µm, sterile	NCS 045 NCS 020
	Clarification of biological fluids	Cellulose acetate membrane filter, 0.2 µm and 0.45 µm	AC 020, AC 045
		PES membrane filter, 0.2 µm and 0.45 µm	PES 020, PES 045
		Sterile syringe filter with cellulose acetate 0.45 µm and 0.2 µm	SACS 045, SACS 020
		Sterile syringe filter with PES 0.45 µm and 0.2 µm	SPESS 020, SPESS 045
Identification of pathogens/ resistance against antibiotics or chemotherapeutics	Measurement of the inhibition zone on inoculated nutrient agar	Cotton linters paper of highest purity 0.35 mm 0.90 mm 0.73 mm	22 2668 3324
HPLC	Preparation of organic samples	Syringe filter with nylon	SNY 020 SCR 020
	Filtration of mobile phase	Nylon membrane, 0.2 µm	NY 020

Production	Type of Filter		Filter grade
Filter presses, filtration of reagents	Creped	medium-fast	2410
	Filter card	medium-fast	3605
		medium-fast - slow	2589A – 2589E
	Hardened	fast, medium-fast	1573, 1574
		slow, very slow	1575, 1577
Protective papers in filter presses	Medium-fast, wet strength, creped		2048, 2410
	Very slow, high wet strength (hardened)		1577
Filter papers and cards	Very fast, wet strength		1450nf
	Medium-fast, wet strength		3605, 572, 3205
	Slow, wet strength		2589d, 2989e
Creped papers	Very fast, wet strength, thick		520bII, 520b, 3144L
	Very fast, wet strength		520a

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

The average ash content of our quantitative papers goes down to 0.002% ash for the hardened quantitative papers. The purest paper in the filter market!

Hahnemühle Life Science

Food saftey

Fruit juice and nectar

Target application:

- Analysis of ingredients, contaminants and microbiological purity according to the § 64 LFBG German law for food, feed and utensils
- Particle separation and clarification before optical measurements
- Sample preparation before sensitive analyses such as HPLC

Process filtration:
The pure raw materials – linters and cellulose – are used in the production of these filter papers, which allow their use with food and beverages during production. For selected grades with different retention rates, the conformity to both the U.S. FDA recommendation 21 CFR and by the German BfR (Federal Institute for Risk Evaluation) recommendation XXXVI and XXXVI/1 can be approved.

Process	Technique	Type of Filter	Filter grade
Particle separation	Filtration (funnel/Büchner)	Filter paper for fast clarification of unsweetened juices	0858
		Filter paper for fast clarification of sweetened juice, viscous juice	0905
		Filter paper for qualitative analysis, low ash according to § 64 LFBG	604, 597, 595 593, 602h, 602eh
HPLC	Clarification of aqueous samples	0.2 µm cellulose acetate syringe filter 0.2 µm PES syringe filter 0.2 µm cellulose acetate membranes 0.2 µm PES membranes	SAC 020 SPES 020 AC 020 PES 020
	Clarification of organic samples	0.2 µm nylon syringe filter 0.2 µm nylon membranes	SNY 020 NY 020
	Filtration of mobile phase	0.45 µm nylon membranes	NY 045
	Clarification of juices	0.45 µm cellulose acetate syringe filter Cellulose acetate membrane	SAC 045 AC045
Microbiological analysis	Retention of microorganisms	White, sterile membranes cellulose nitrate 0.2 and 0.45 µm, gridded	NCS 045 NCS 020
		White, sterile membranes mixed cellulose ester, 0.2 and 0.45 µm, gridded	MCES 045 MCES 020
Spectrophotometry	Clarification of samples	Glass microfibre filter	GF 6, GF 55
Preparing fruit juice samples for photometric measurements (e.g. phosphate) according to § 64 LFBG	Filtration (funnel/Büchner)	Quantitative filter paper	589/1
Protection of apparatus and surfaces	Absorption	Absorbent paper with polyethylene layer	295 PE

Production	Type of Filter	Filter grade
Protective papers in filter presses	Medium-fast, wet strength, creped	2048, 2410, 2411
	Very slow, high wet strength (hardened)	1577
Papers and cards	Very fast, wet strength	1450nf
	Medium-fast, wet strength	3605, 572, 3205
Creped papers	Very fast, wet strength, thick	520bII, 520b, 3144L
	Very fast, wet strength	520a

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

Folded filter or creped filter papers are particularly suitable for quickly clarifying samples owing to the larger surface.

Hahnemühle Life Science

Food saftey

Wine and sparkling wine

Target application:
- Analysis of ingredients, contaminants and microbiological purity according to § 64 LFBG German law for food, feed and utensils
- Particle separation and clarification before optical measurements

Process filtration:
Depending on the type of contamination, various retention rates are available for wine clarification.
For selected grades, the conformity to both the U.S. FDA recommendation 21 CFR and by the German BfR recommendation XXXVI and XXXVI/1 can be approved.

Process	Technique	Type of Filter	Filter grade
Analysis of acids (sep. of malic acid)	Paper chromatography (malolactic fermentation)	Chromatography paper	3469, 2043 a
Particle separation	Filtration (funnel/Büchner)	Filter paper for qualitative analysis	604, 597, 595, 593 602, 602eh
	Preparation of samples (i.e. for L-Ascorbic acid analysis)	Grained paper for clarification of unsweetened juice	0858
		Creped filter paper for sweetened, viscous juice	0905
	Separation of PVPP (E1202)	Filter paper for clarification	400, 0858 as folded filter
	Separation of active carbon E1202)		
	Removal of turbidity	Low ash filter paper, Glass fibre	602h, GF 20
Removal of CO_2 and turbidities from wine and sparkling wine	Filtration	Hydrophilic Glass Fibre Filter Filter paper with Kieselguhr	GF 20 287
Gravimetric analysis	Measurement of ashes	Filter paper for quantitative analysis	589/3
Determining particle load	Separation of particles in suspensions	0.8 µm cellulose nitrate membrane	NC 080
HPLC	Clarification of aqueous samples	0.45 µm cellulose acetate or PES syringe filter	SAC 045, SPES 045
		0.45 µm cellulose acetate or PES membranes	AC 045, PES 045
Colour characteristics	Clarification of grape must / wine	0.45 µm cellulose acetate syringe filter	SAC 045
Spectrophotometry	Protection of the apparatus	0.45 µm cellulose acetate membranes	AC 045
Microbiological analysis	Detection of microorganisms	White, sterile cellulose nitrate membranes or mixed cellulose esters with grid, 0.2 and 0.45 µm	NCS 045, NCS 020 MCES 045, MCES 020
Sample preparation, Degasing	Pre-filtration	Glass microfibre filter	GF 20

Production	Type of Filter	Filter grade
Clarification of sweetened, viscous wines Papers and cards	Fast, wet strength	1450nf
	Medium-fast, wet strength	3205
	Creped, fast, wet strength	520a, 3144L, 520bII, 520b
Filtration of unsweetened wines	Fast, wet strength	572, 3205
	Grained, fast, wet strength	0858
	Creped, medium-fast, wet strength	2048

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

Over the course of development in brewery analytics, certain paper grades have become a fixture in ‘methods of analysis in brewing’. High-quality Hahnemühle filter papers are listed in the collection of methods produced by the Middle European Brewery Analysis Commission (MEBAK).

Hahnemühle Life Science

Food saftey

Beer, malt and beer-based beverages

Target application:

- Analysis of ingredients, contaminants and microbiological purity according to § 64 LFBG German law for food, feed and utensils
- Ideal for sample preparation and clarification. Useful for removing CO_2 and turbidities
- Measurement of nitrogen compounds, proteins and trace elements

Process[1)]	Technique	Type of Filter	Filter grade
Sample preparation for extract determination of malt	Filtration, funnel (Büchner)	Filter paper for clarification, grained	0858, 2555
Removal of CO_2 and turbidities from beer, wine and juices		Filter paper for qualitative analysis	602h, 597, GF 20
Determination of solids in wort (Labor Veritas method)			GF 52
Filtration of lees			597, GF52
Determination of the coagulateable proteins			597
Determination of the grade of fermentation			597
Sample preparation			595
Determination of solids and turbidity (Feld method)		Filter paper for quantitative analysis	589/1
Determination of nitrogen-compounds by phosphor molybdenum precipitation			589/2
Determination of carbohydrates by hydrolysis			589/2
Analysis of ash content in foodstuffs			589 /1
Determination of proteins in wort and beer via $MgSO_4$ precipitation			589 /1 589 /2
Drinking water: Determination of chemical elements, radioactive trace elements	Filtration, funnel (Büchner)	Filter paper for quantitative analysis	589/3
Measurement of nitrogen	Quantification of nitrogen	Weighing paper, low in nitrogen	360
Spectrophotometry	Colour of the malt	White cellulose acetate membranes with grid, 0.45 µm	AC 045
Microbiological analyses	Microorganism count	Black, sterile cellulose nitrate membranes with grid, 0.45 µm	NCS 045

1) *In the instructions in ‘Analytical methods in breweries - Wort, Beer, beer-based Beverages’, published by the Middle European Brewery Analysis Commission (MEBAK).*

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

The pure raw materials – linters and cellulose – used in the production of these filter papers permit their use in contact with food. For selected types, the conformity to both the U.S. FDA recommendation 21 CFR and by the German BfR (Federal Institute for Risk Evaluation) recommendation XXXVI and XXXVI/1 can be approved.

Hahnemühle Life Science

Food saftey

Edible oil and fat

Target application:
- Analysis of ingredients, contaminants and microbiological purity according to § 64 LFBG German law for food, feed and utensils.

Process filtration:
- The papers listed are suitable for use in filter presses
- Clarification and purification of edible oils
- Regeneration of lubricating oils, transformer and turbine oils
- Removal of turbidity and particles from used oil in fryers

Process	Technique	Type of Filter	Filter grade
Measurement of fats	Extraction with Soxhlet or Tecator	Cellulose extraction thimbles	900, 901
Particle separation	Clarification of essential oils	Filter paper for extra-fast filtration	3205, 1450nf
	Clarification of edible oils	Filter paper for very fine particles	BF
Analysis in line with § 64 LFBG	Filtration (funnel/Büchner)	Filter paper for qualitative analysis	604
Determination of the unsaponifable fraction in fats	Filtration (funnel/Büchner)	Filter paper for qualitative analysis	597, 595
Analysis of oil/fats	Fat extracting equipment	Filter paper with very high wet strength	1574
		Filter paper for quantitative analysis	589/5
Quantifying particles using gravimetry	Separation of solids in oil with petrol ether	Absorptive, dense paper	602h
HPLC	Clarification of organic samples	0.2 µm nylon syringe filter 0.2 µm nylon membranes	SNY 020 NY 020
	Filtration of mobile phase	0.45 µm nylon membranes	NY 045
Protection of apparatus and surfaces	Absorption	Absorbent paper with polyethylene layer	295 PE

Production	Type of Filter	Filter grade
Clarification and Purification	Fast, creped, for large particles	3144L, 2410, 2772
	Medium, creped, for small particles	610
	Fast, for coarse particles	1450nf
	Medium, for small particles	22, 2589c, 3605
	Slow, for small particles	2589d
Removal of particles from used oil in fryers	Very fast, wet strength	3144L, 1450nf

Note: The recommended grades for edible oils can even be used for technical oils with similar viscosity and particle properties.

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

The filter papers optimised for clarification of beet pulp extracts offer high filtration speed combined with high retention of particles.

Hahnemühle Life Science

Food saftey

Sugar

Target application:

- Analysis of ingredients, contaminants and microbiological purity according to the § 64 LFBG German law for food, feed and utensils.
- Clarification of dried beet pulp extracts
- Filtration of beet juice after addition of lead acetate for polarimetric sugar determination
- 3459 is recommended for Venema units according to the lead acetate method

Process	Technique	Type of Filter	Filter grade
Polarimetric determination of sugar	Clarification of dried beet pulp extracts	Fast filtration paper	3002
Venema, sodium, lead acetate	Clarification before polarimetric determination of sugar	Fast, creped filter paper	3459
Gravimetry	Filtration (funnel/Büchner)	Filter paper, quantitative analysis	589/1 589/2
HPLC	Clarification of organic samples	0.2 µm nylon syringe filter 0.2 µm nylon membranes	SNY 020 NY 020
	Filtration of mobile phase	0.45 µm nylon membranes	NY 045
Microbiological analysis	Detection of microorganisms	White, sterile cellulose nitrate membranes with grid, 0.2 and 0.45 µm	NCS 020 NCS 045
Improvement in filtration Clarification of samples	Pre-filter for membranes	Glass microfibre filter	GF 9
Analysis of sucrose	Clarification of samples of sugar syrup	0.45 µm cellulose acetate syringe filter 0.45 µm cellulose acetate membranes	SAC 045 AC 045
Protection of apparatus and surfaces	Absorption	Absorbent paper with polyethylene layer	295 PE

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

We keep the promise of a documented production process with 100% batch traceability down to the raw material used.

Hahnemühle Life Science

Food saftey

Milk and milk products

Target application:

- Analysis of ingredients, contaminants and inspection of microbiological purity according to the § 64 LFBG German law for food, feed and utensils
- Gravimetric analysis and detection of metal particles
- Determination of whiteness

Process	Technique	Type of Filter	Filter grade
Chemical Analysis in line with §64 LFBG	Filtration (funnel/Büchner)	Filter paper for qualitative analysis	604, 595, 597
Gravimetric analysis according to § 64 LFBG		Filter paper for quantitative analysis	589/1, 589/2, 589/3
Detection of metals in fats		Filter paper for clarification	0858
Measurement of solids in suspensions	Filtration, weighing	Glass microfibre filter	GF 52
HPLC	Clarification of organic samples	0.45 µm nylon syringe filter	SNY 045
Microbiological analysis	Microorganism count	White, sterile cellulose nitrate membranes with grid, 0.2 and 0.45 µm	NCS 045, NCS 020
Degree of whiteness of milk	Sample collection	Filter made from cellulose/synthetic fibres	0048
Protection of apparatus and surfaces	Absorption	Absorbent paper with polyethylene layer	295 PE

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

Hahnemühle FineArt GmbH offer outstanding products suitable for common processes in the analysis of food and the detection of contaminants. We are very aware of the purity and reliability which customers expect from tools for their specific filtration application.

Food saftey

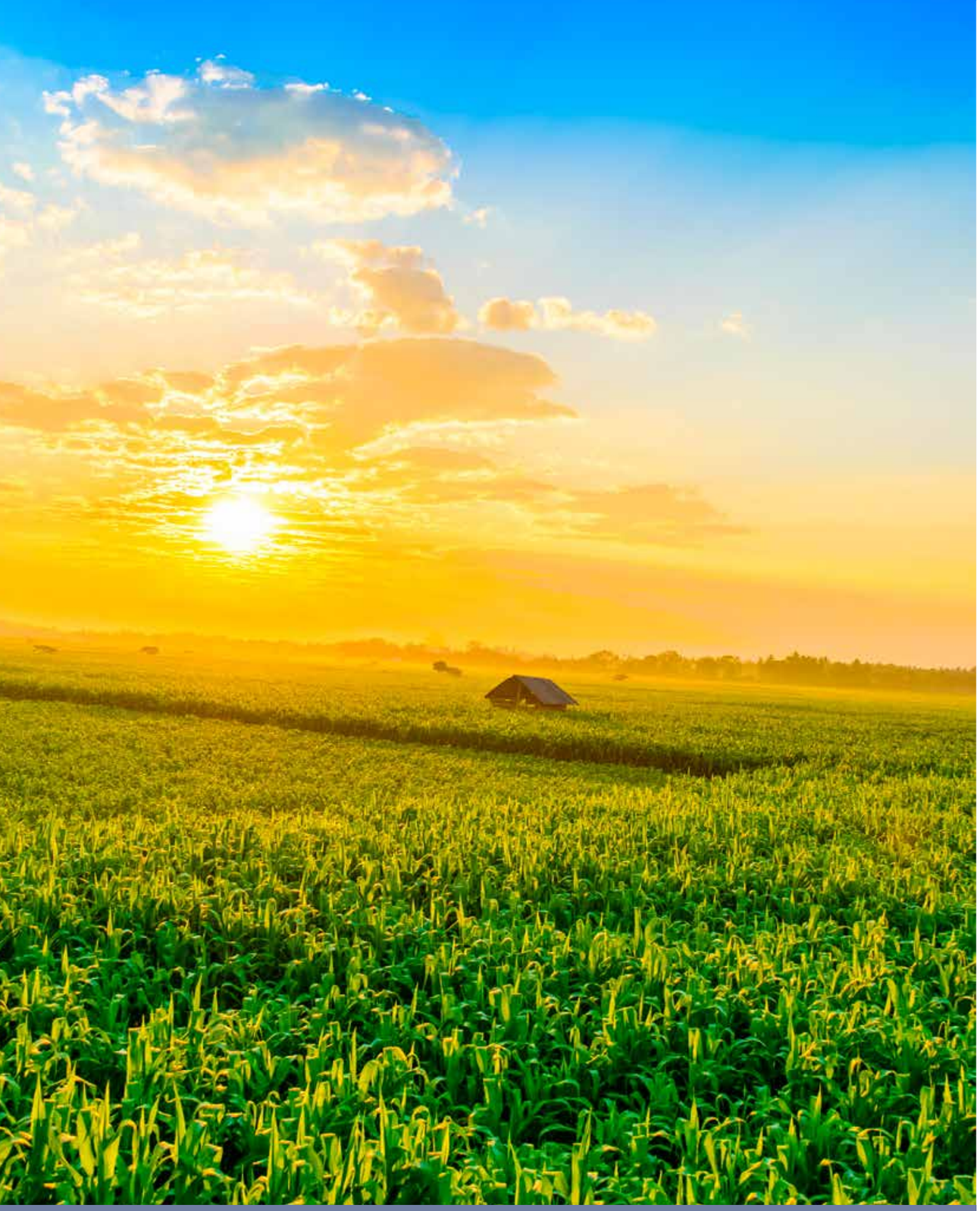
Meat and meat products

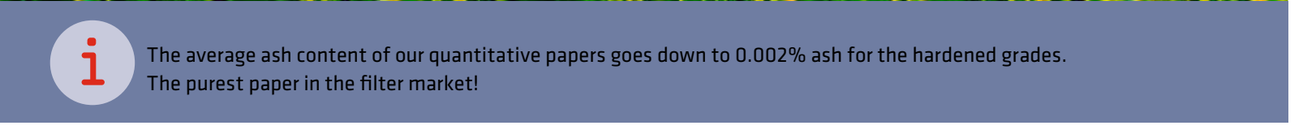
Target application:

- Analysis of ingredients, contaminants and microbiological purity according to § 64 LFBG German law for food, feed and utensils
- Gravimetric analyses
- Measurement of fats

Process	Technique	Type of Filter	Filter grade
Measurement of fats	Extraction with: Soxhlet/Tecator	Cellulose extraction thimbles	900, 901
Gravimetry	Filtration (funnel/Büchner)	Filter paper for quantitative analysis	589 /1, 589 /2 589 /3, 589 /5
Surface protection	Absorption	Absorbent paper with polyethylene layer	295 PE
Measurement of nitrogen	Kjeldahl weighing	Weighing paper	360

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.





The average ash content of our quantitative papers goes down to 0.002% ash for the hardened grades.
The purest paper in the filter market!

Hahnemühle Life Science

Agriculture

Soil and fertiliser

The determination of trace elements and nutrients in soil is important to optimise agricultural crops

Target application:
- Analysis of nutrients, mineral nutrients, contaminants and microbiological purity
- Measurement of nitrogen, potassium and phosphate
- Ideal for detecting minerals and heavy metals

Process	Technique	Type of Filter	Filter grade
Particle separation	Filtration (funnel, Büchner)	Filter paper for clarification	0858
Measurement of nitrogen insoluble in water		Filter paper for qualitative analyses, low ash content	2095
Measurement of nitrogen		Filter paper for quantitative analyses, ash-free	589/5
Measurement of trace elements		Filter paper for quantitative analyses, ash-free	589/1, 589/2 589/3, 589/4 589/5, 589/6
Free amino acids and total amino acids		Filter paper for quantitative analyses, ash-free	589/2 589/5
Measurement of soluble sulphates	Water extraction	Filter paper for quantitative analyses, ash-free	589/3
Determination of K and P	Egnér, Riehm and Lederle	Filter paper, low phosphates	589/1, 589/2 589/3, 589/4 589/5, 589/6
Measurement of solids in suspension	Filtration difference in weight	Glass microfibre filter	GF 52
Measurement of nitrates and phosphates by HPLC	Sample preparation	Nylon, 0.45 µm, syringe filter	SNY 045
Measurement of nitrogen	Weighing	Weighing paper, low in nitrogen	360

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

The high consistency of filtration quality ensures reliable results of the analysis from one lot to the other.

Agriculture

Animal feed

Target application:

- Analysis of nutrients, mineral nutrients, contaminants and microbiological purity
- Ideal for the detection of trace elements like Mg, Mn, Zn, Co, Cu, Mo, and B
- Measurement of fats

Process	Technique	Type of Filter	Filter grade
Measurement of fats	Extraction with Soxhlet or Tecator	Cellulose extraction thimbles	900, 901
Particle separation	Filtration (funnel/Büchner)	Filter paper for clarification	0858
Gravimetry		Filter paper for quantitative analysis	589/1, 589/2 589/3, 589/4 589/5, 589/6
Measurement of Calcium		Filter paper for quantitative analysis	589/2
HPLC	Clarification of organic samples	Syringe filter with nylon membranes or regenerated cellulose, 0.45 µm Syringe filter PES 0.2 µm PES membrane 0.2 µm	SNY 045 SCR 045 SPES 020 PES 020
	Filtration of mobile phase	Nylon membrane, 0.45 µm	NY 045
Microbiological analysis	Detection of microorganisms	White cellulose nitrate membranes, 0.45 µm, gridded	NCS 045
Separation of solids from suspensions	Filtration, weight determination	Glass microfibre filter	GF 52
Surface protection	Absorption	Absorbent paper with polyethylene layer	295 PE

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

Hahnemühle is the preferred and trusted Seed Testing Paper manufacturer for many Seed Testing Companies around the world. The stringent ISTA (International Seed Testing Association) provisions are adhered to as early as the production stage.

Hahnemühle Life Science

Agriculture

Germination testing

- All papers are made of pure cellulose and are free from mould, bacteria and any toxic substances which might interfere with the growth of seeds
- The highly absorbent papers store sufficient moisture for the whole duration of the test
- Their low density means the papers have a high degree of absorbency, but the roots are not able to grow into the paper
- The conductivity of the papers is lower than 40 mS/m, and the pH is between 6.0 and 7.5
- We offer a broad range of papers for the various germination methods TP, BP and PP

Target application:
The high purity of Hahnemühle germination test papers means they are very well suited for testing the germination of medium large and coated seeds (sugar beet, fodder beet, grain, sunflower, rapeseed, mustard), seeds with small, white rootlets, grain, very sensitive seeds, small seeds (flowers, grasses).

Process	Technique	Type of Filter		Filter grade
Seed germination	PP method (pleated paper)	Germination test paper,	pleated strips, white grey	3014 3236
			Wrapping strips	0858
	TP method (top of paper)	Germination test paper as wrapping strips, for Jacobsen tank, for petri dishes	Thin, 81g	597
			140g	598
			Creped, 135g	520bII
			Filter card, 700 g	3621 light blue
			Filter card, 300 g	3633 light blue
			Filter card, 720 g	3644 blue
			165g	3645 yellow
			150g	3024
	BP method (between paper)	Germination test paper		520b 5703
Dust control	Particle collection by dust meter	Glass microfibre filter with binder		GF 9
Prevention of penetration by roots, protection of surfaces	Absorption	Absorbent paper with polyethylene layer on one side		295 PE

You can find parts numbers for pleated strips and cuts on page 142. Other formats such as rolls, sheets and cuts are available on request.

Further information on germination test papers can be found on page 101 “germ test papers”.

Glass microfibre and quartz microfibre filter are recommended for the analysis of atmospheric pollution and for particle determination at high temperatures.

Hahnemühle Life Science

Environmental analysis

Air pollution

Target application:

- Ambient air monitoring
- Determination of suspended particles (SPM: suspended particular matter) and total suspended particles (TSP: total suspended particular matter)
- Detection of PM10 and lead (Pb)
- Monitoring the presence of pollutants in the air at different measuring points

Process	Apparatus	Technique	Type of Filter	Filter grade
Sampling of total suspended particulate matter TSP (Ø >30µm) [1]	High volume capturer	Gravimetry	Glass microfibre filter, in line with US EPA	GF 50
	Low volume capturer			GF 50
	Cascade impactor			GF 50
Sampling and analysis of PM10 (Ø > 10µm) [1][2][3]	High volume capturer		Quartz microfibre filter, in line with US EPA and DIN EN ISO 23210	QFH
	Low volume capturer			QFH
	Cascade impactor			QFH
Sampling and analysis of PM2.5 (Ø >2.5µm) [1]	High volume capturer		Quartz microfibre filter, in line with US EPA and DIN EN ISO 23210	QFH
	Low volume capturer			QFH
	Cascade impactor			QFH
Sampling and analysis of lead [4]	High volume capturer	Atomic absorption spectroscopy	Quartz microfibre filter, in line with US EPA and DIN EN ISO 23210	QFH
	Low volume capturer			QFH
	Cascade impactor			QFH

You can find parts numbers for round filter and sheets on page 142. Other formats such as rolls and special cuts are available on request.

1) Reference methods in '40CFR50 Appx B, J, L, and G' in the 'Federal Register of the US EPA'
2) Air quality in accordance with EN12341
3) Directive 2008/50/EC, in European standard EN12341.
4) Ambient air quality in accordance with EN 14902:2005

Glass and quartz fibre filter are resistant to high temperatures and aggressive chemicals, with the exception of hydrofluoric acid. Due to their purity, chemical stability and high filtration performance, these materials are highly suitable for air and emissions monitoring.

Hahnemühle Life Science

Environmental analysis

Emission control

Target application:

- Monitoring of anthropogenic atmospheric emissions (oil refineries, power stations, burning of liquid and solid fuels, cement factories, mining industries, incinerators, iron foundries, grinderies, asphalt plants, glassmakers, ceramic factories) and at stationary sources
- Measurement of dust release in workplace and production processes, exhaust fumes from private houses, and newly developed engines (for cars and other vehicles)

Process	Apparatus	Technique	Type of Filter	Filter grade
Measurement of nitrogen (gravimetry) [1) 2) 3) 4)]	Isokinetic probe with rear filter-holder (up to 500°C)	Filtration, weighing	Glass microfibre filter Glass fibre thimbles	GF 50 CFV
	Isokinetic probe with front filter-holder (up to 900°C)		Quartz microfibre filter Glass fibre thimbles	QFH CFV
Measurement of inorganic lead [5)]	Isokinetic probe with rear filter-holder (up to 500°C)	Atom absorption spectroscopy	Glass microfibre filter Glass fibre thimbles	GF 50 CFV
Measurement of metals [6)]	Isokinetic probe with rear filter-holder (up to 500°C)		Glass microfibre filter Glass fibre thimbles	GF 50 CFV
	Isokinetic probe with front filter-holder (up to 900°C)		Quartz microfibre filter Glass fibre thimbles	QFH CFV
Deposition of radioactive aerosols	Filtering instrument	Filtration, Scintillation	Glass microfibre filter, retention capability < 1µm	GF6
Monitoring the combustion air	Filtering instrument	Filtration, weighing	Glass microfibre filter	GF8, GF9
Monitoring particles in air and gases	Automatic air filter units, air analysers with filter rolls	Filtration, weighing	Glass microfibre filter with high mechanical strength	GF10
Smoke test/house coal	Portable measurement instrument	Filtration + optical evaluation	Fast, white filter paper, high air permeability	604L
Emission test/engine development [7)]	Automatic air filter units, air analysers with filter rolls	Filtration + optical evaluation	Medium-fast filter paper, small particle retention, white	597L

You can find parts numbers for round filter and sheets on page 142. Other formats such as rolls and cuts are available on request.

1) EPA 5
2) EPA 17
3) UNE ISO 9096
4) EN 13284
5) EPA 12
6) EPA 29
7) Stationary emissions sources. Optical on-site analysis

Glass fibre grade GF 6 is ideal for gravimetric analyses of organic and inorganic impurities in water and wastewater according to DIN 38409 and EN 872 (suspended particles). The inorganic binder increases solidity and does not distort the gravimetric output in annealing with 500 °C as stipulated.

Hahnemühle Life Science

Environmental analysis

Water

Target application:

- Gravimetric analyses of organic and inorganic contaminants in water and waste water
- Monitoring microbiological quality of drinking water
- Determination of total dry residue
- Determination of dissolved organic carbon (DOC) and total organic carbon (TOC)

Process	Technique	Type of Filter	Filter grade
Sample preparation	Clarification	Qualitative filter paper	595
Total dry residue, ash residue [2) 3)]	Filtration, weighing	Glass microfibre	GF 6
		Quantitative filter paper	589/1
Measurement of solids in suspensions after drying at 105°C [1) 2) 17)]	Filtration, weighing	Glass microfibre	GF 52 GF 6
Measurement of the total remainder after drying at 180°C [5) 6)]			GF 52 GF 6
Solids and volatiles after incineration at 550°C [7)]			GF 50
Suspended particles [8)]			GF 52, GF 6
Colouration [2)]	Filtration		GF 6, GF 50
Radioactivity			
Measurement of metals			
Measurement of total and dissolved organic carbon [9) 10) 11)]	Filtration, combustion-infrared	0.45 µm cellulose acetate/mixed cellulose ester	AC 045 MCE 045
	Filtration, oxidation	Glass microfibre	GF 6, GF 52
Measurement of dissolved iron [2)]	Filtration	0.45 µm cellulose acetate	AC 045
Measurement of metals (pre-filtration) [12)]	Filtration, ASS	0.45 µm cellulose acetate	AC 045
Measurement of oils and fats [13)]	Buchner funnel	Quantitative filter paper	589/4
Measurement of metals			589/1, 589/3
Measurement of radioactivity [15)]	Precipitation (Ra)	0.45 µm cellulose acetate	AC 045
Measurement of non-metallic inorganic compounds [16)]	Filtration	Quantitative filter paper	589/1, 589/3 589/5
Measurement of oils and fats [13)]	Extraction with Soxhlet or Tecator	Cellulose extraction thimbles	900 901
Microbiological analyses of drinking water	Filtration	Sterile cellulose mixed ester membranes 0.2 / 0.45 µm, white, gridded	MCE 020, MCE 045
		Sterile cellulose nitrate membranes, 0.2 µm or 0.45 µm, gridded	NCS 020, NCS 020 NCS 045, NCS 045
Microbiological analyses of drinking water, legionella		Sterile cellulose nitrate 0.2/0.45 µm, black, gridded	NCS 045

1) DIN EN 872
2) DIN 38409-1
3) DIN 38409-2 D
4) UNE 77031:
5) 2540 C Standard Methods
6) 2540 E Standard Methods
7) 2530 B Standard Methods
8) UNE EN 1484
9) 5310 B Standard Methods
10) 5310 D Standard Methods
11) 3030 B Standard Methods
12) UNE 77037
13) DIN 38409 D
14) 7500-Ra B Standard Methods
15) Part 4000 Standard Methods
16) DIN 38409 H2-2
17) 2540 C Standard Methods

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

Folded filter or creped filter papers are particularly suitable for quickly clarifying samples owing to the larger surface in comparison with round filter.

Environmental analysis

Waste products

Target application:

- Analysis of waste products in the disposal of industrial waste and laboratory waste
- Particle separation and clarification before further measurements
- Sample preparation and washing out of samples for characterisation of toxic substances

Process	Technique	Type of Filter	Filter grade
Characterisation of dangerous substances	Filtration	PES/cellulose acetate/ cellulose nitrate membranes 0.2 µm	PES 020 AC 020 NC 020
	Filtration (funnel/Büchner)	Filter papers for clarification	0905
Characterisation of toxic substances [1]	Pressure filtration	Glass microfibre filter	GF 52
Analysis of contaminated soil [2]	Extraction by water	PES/cellulose acetate/ cellulose nitrate membranes 0.45 µm	PES 045 NC 045 AC 045
Filtration of biosolids/sludge from wastewater	Continuous filtration by filterbelt	Fast, very high wet strength	1573
Protection of apparatus and surfaces	Absorption	Absorbent paper with polyethylene layer	295 PE

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

1) EPA 1311 TCLP
2) DIN 38414-4

The high consistency of the quality level ensures reliable analysis findings from one lot to the other over many years without the need to adjust analysis procedures.

Hahnemühle Life Science

Chemicals

Quality control

Target application:
- Clarification before quantitative analysis
- Sample preparation before HPLC
- Microbiological investigations
- Extraction before an analysis

Process	Technique	Type of Filter		Filter grade
Separation of solids from suspensions	Filtration (funnel, Büchner)	Filter paper for clarifying fluids	Smooth Grained Creped	0860 0858 0905
Gravimetry	Filtration (funnel, Büchner)	Filter paper for quantitative analyses		589/1 589/2 589/3 589/4 589/5 589/6
		Hardened filter paper for quantitative analyses		1505, 1506, 1507
Analysis of chemicals	Paper chromatography	Chromatography papers		3469 2043 a
Clarification of samples	Pre-filter for membranes	Glass microfibre filter		GF 9
Analysis of extractables	Extraction	Cellulose extraction cartridges		900, 901
Microbiological analysis	Detection of microorganisms	Cellulose nitrate membranes with grid, 0.45 and 0.2 µm, sterile Mixed cellulose ester membranes with grid, 0.45 µm and 0.2 µm, sterile		NCS 045 NCS 020 MCES 045 MCES 020
	Clarification of biological fluids	Sterile syringe filter with cellulose acetate 0.45 µm and 0.2 µm Sterile syringe filter with PES 0.45 µm and 0.2 µm		SACS 045 SACS 020 SPESS 020 SPESS 045
HPLC	Preparation of organic samples	Nylon syringe filter, 0.2 µm		SNY 020
	Filtration of mobile phase	Nylon membrane, 0.2 µm		NY 020
Surface protection	Absorption	Absorbent paper with polyethylene layer		295 PE

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

The average ash content of our quantitative papers is 0.004%, or 0.002% ash for the hardened quantitative papers. The purest paper in the filter market!

Hahnemühle Life Science

Chemicals

Cleaning materials

Target application:
- Clarification before quantitative analysis
- Gravimetric measurements
- Sample preparations before HPLC

Process	Technique	Type of Filter		Filter grade
Gravimetry	Filtration (funnel, Büchner)	Filter paper for quantitative analysis		589/1 589/2 589/3 589/4 589/5 589/6
Particle separation	Filtration (funnel, Büchner)	Folded filter for clarification	Smooth Grained Creped	0860 0858 0905
Determination of tenside content	Filtration (Funnel/Büchner)	Glass microfibre filter		GF 50
HPLC	Clarification of samples	Syringe filter with Nylon, 0.45 µm		SNY 020
Separation of solids in suspensions	Clarification of samples	Syringe filter, with PES, 0.2 µm Syringe filter, with Nylon, 0.2 µm		SPES 020 SNY 020
	Filtration of mobile phase	Nylon membranes, 0.2 µm		NY 020
	Filtration (Funnel/Büchner)	Glass microfibre filter		GF 52
Surface protection	Absorption	Absorbent paper with polyethylene layer		295 PE

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

Owing to the larger surface in comparison with round filter, folded filter or creped filter papers are particularly suitable for quickly clarifying samples – particularly in cases of viscous fluids such as oils.

Hahnemühle Life Science

Chemicals

Oil refinery

Target application:
- Clarification before quantitative analysis
- Gravimetric measurements
- Analysis of soot particles

Process filtration:
Removal of particles from used oil

Process	Technique	Type of Filter		Filter grade
Gravimetry	Filtration (funnel/Büchner)	Filter paper for quantitative analysis		589/1 589/2 589/3 589/4 589/5 589/6
		Hardened filter papers for quantitative analysis		1505, 1506, 1507
Solid-liquid separation		Folded filter for clarification	Smooth Grained Creped	0860 0858 0905
		Filter paper qualitative analysis, low ash		591
Extraction of organic compounds	Extraction with Soxhlet	Cellulose extraction thimbles		900
Determination of solids in suspensions	Filtration, weighing	Glass microfibre filter		GF 52
Surface protection	Absorption of liquids	Absorbent paper with Polyethylene coating		295 PE
Determination of particles with diameter ≥ 0.8 µm	Filtration, weighing	White, smooth cellulose nitrate membranes 0.8 µm		NC 080
Determination of particles with diameter ≥ 0.45 µm		White, smooth cellulose nitrate membranes 0.45 µm		NC 045
Monitoring of soot in oil (OCM)	Dispersancy of the oil on absorptive paper	Absorptive, dense filter paper		602h

Production	Type of Filter	Filter grade
Clarification and purification	Fast, creped, for large particles	3144L, 2410
	Fast, for coarse particles	1450nf
	Medium-fast, for small particles	22, 2589c, 3605
	Slow, for small particles	2589d
Removal of particles from used oils	Very fast, wet strength	3144L 1450nf

You can find parts numbers for round and folded filter and membrane filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

Chemicals

Cement analysis

Target application:
- Ensuring product quality
- Determination of water retention capacity
- Determination of grind level

Process (Technique)	Filter Type		Size Ø [mm]	Grade	Weight [g/m²]	Thickness [mm]
Water retention capacity (DIN EN 413-2)	Filter paper		100	3469	192	0.36
				2589A	200	0.45
Building lime (DIN EN 459-2)	Filter card		190 x 190 sheets	2727	730	1.3
Mortar with binders containing minerals	Filter card		190 x 190 sheets	2727	730	1.3
Blaine test (grinding fineness of cement (DIN EN 196-6))	Filter paper	fast	12.5	589/1	79	0.19
			12.7			
			40.5			
		medium-fast	12.7	589/2	86	0.18
			40.5			
		fast	41.5	589/1	79	0.19

You can find parts numbers for round and folded filter on page 142. Other formats such as rolls, sheets and cuts are available on request.

The quality of mortar and cement is regulated by German and European norms. Hahnemühle offers filter papers which enable manufacturers to comply with these norms and which are well established in this application area.

Technical special papers

In addition to filtration, our high-purity filter papers are also valued on account of their absorptive properties. They are suitable for use as a carrier material for chemicals, as a base material or as a component of final products – and they can also be used as a material in the manufacture of other products. Typical sectors that rely on the properties of these papers include the electronics industry, solar cell manufacturing, adhesive tape manufacturing and the production of impregnated papers. Our references include global market leaders from various traditional and innovative branches of the manufacturing and processing industries.

Technical data

	Grade	Properties	Thickness [mm]	Weight [g/m²]	Gurley [s]	Breaking load [min. N/15 mm]	Wet strength [min. cm WS]	Capillary rise [mm/10 min]
Surface protection	7192-90	Smooth, sized	0.135	90	-	70	-	-
	7194	Smooth, sized	0.5	350	-	120	-	-
Adhesive tape	7204	Wet strength	0.25	109	25	80	150	100
	7206	Wet strength	0.6	270	35	125	150	110
	0905	Wet strength, creped	0.27	74	40	16	130	-
	0859	Wet strength, divisible	0.14	61	26	19	130	-
	0860	Wet strength, divisible	0.17	78	20	22	130	-
Fragrance card	23	Rapid absorption, printable	0.45	240	135	110	130	85
	915/300	Rapid absorption, printable	0.45	300	-	160	130	-
	7217	Rapid absorption	0.25	220	1350	190	130	-
	2589C	Rapid absorption, printable	0.75	400	60	80	130	-
	2589D	Rapid absorption, printable	1.0	500	70	100	130	-

Ordering information
All grades are available as rolls, sheets and custom cuts. Please don't hesitate to contact us for further details and advice.

Do you need customised product solutions?

We'll be happy to develop a product that is tailored to your requirements.
Contact us now: +49 (0)5561 791 687 or filtration@hahnemuehle.com

Hahnemühle Life Science

Flexibility is a top priority for us!

We will develop a special formulation for you based on how you plan to use the paper. Through targeted pretreatment of the cellulose fibres and using a customised paper machine configuration, we can produce papers with your chosen properties. On request, we can also develop these customer-specific papers with a confidentiality agreement or provide you with exclusivity agreements. Our expertise enables us to produce papers with a wide range of different properties.

Examples include:

CUSTOM MADE

- Highly voluminous and thus highly absorbent papers
- Soft and smooth papers for surface protection
- High breaking load in the cross and machine direction
- High density and an even, compact structure
- Papers with high ageing resistance and light fastness for archiving
- Papers from 60 g/m² to 700 g/m² and with a thickness of 0.09 mm to 1.5 mm
- Made of high-purity cellulose, cotton linters and glass microfibres or mixtures thereof.
- Free of mineral compounds and heavy metals
- Acid-free, pH-neutral
- Photochemically inactive
- A variety of white tints or colours according to client specification
- Complies with the requirements of the BgVV in Recommendation XXXVI for food contact and with the stipulations of the FDA in 21 CFR Ch. 1 (1 April 2004 edition), § 176.170

Are you looking for a new paper for your application or an alternative supplier?
We'll be happy to cater to your individual needs!

We are committed to providing our customers with papers that deliver maximum quality and continuity. We can also prepare a certificate of analysis (CoA) on request.

OEM / private label

A number of manufacturers and suppliers from different markets opt for the high-quality papers from Hahnemühle when selecting their filter papers. Our many years of experience as a filter paper manufacturer and the quality of our products make us a qualified partner.

Supplement your high-quality product range with our reliable products. As an original equipment manufacturer, we're happy to cut papers according to customer requirements – in the spirit of an 'extended workbench'. Our machinery allows us to respond flexibly to finishing requirements, and we produce a variety of widths, lengths and formats in accordance with your specifications.

Continuous monitoring of our production systems, tight tolerances and unique quality are a matter of course for us, as are flexibility, customer service and delivery reliability. Our company structure allows us to respond rapidly to customer requirements. It is by virtue of all these factors that we are an important partner for industry.

Thanks to our loyalty to the production site in Dassel, we have access to reliable and highly trained staff. Our customers, as well as our younger generation of employees, benefit from their experience. With our employees' knowledge and impetus from our customers, we are constantly optimising existing products and developing new ones.

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For clarifying aqueous solutions and for microbiological analyses page 109

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Ideal for clarification and sterilisation, hydrophilic page 111

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Chemically stable membrane for preparing samples page 113

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Wide pH range, mechanically stable
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PES syringe filter
Wide pH range, <0.1% extractable substances page 125

PTFE syringe filter
High chemical resistance, hydrophobic page 127

Product selection

Quality and test methods

Chemical resistance

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The α cellulose content reaches 98%, therefore filter paper has a high stability and durability.

Hahnemühle Life Science

Ashless filter papers for quantitative analysis

Ashless filter (approx. 0.004 %), recommended for quantitative analyses, routine gravimetric tests and sample preparation for instrumental analyses

- Acid-washed and rinsed with water to neutralise
- Free of minerals and metallic ions, ideal for the detection of metallic ions
- Perfectly qualified for food control, beverage analysis and environmental monitoring

Technical data

Type	Properties	Filtration Herzberg [s]	Retention of particles * [µm]	Weight [g/m²]	Thickness [mm]
● 589/1 – black	fast	50	12 – 25	79	0.19
○ 589/2 – white	medium-fast	140	4 – 12	85	0.18
● 589/4 – yellow	medium-fast, low-fat	170	4 – 7	81	0.17
● 589/5 – red	medium-fast	450	2 – 4	84	0.17
● 589/6 – green	slow, thin	900	2	74	0.15
● 589/3 – blue	slow	750 **	< 2	84	0.16

** Approximate values, ** Measured with 100 mm water column instead of 50 mm*

Applications

Grade 589/1 – black
- Fast filtration for coarse and gelatinous precipitates
- Total dry/ash residue as per DIN 38409 H1 and 2
- For food analyses as per §64 LFBG
- Blaine test (cement, directives UNE 80-112-91 and EN-196-6)
- Analyses of beverages as per MEBAK specifications

Grade 589/2 – white
- Medium-fast filtration for coarse precipitates
- For food analyses as per §64 LFBG
- Analysis of alkaline earth carbonates and galvanic baths
- Blaine test (cement, directives UNE 80-112-91 and EN-196-6)
- Analysis of beverages as per MEBAK specifications

Grade 589/3 – blue
- For very fine crystalline precipitates
- Analyses of oil/fats: proportion of soluble contaminants
- Ground analyses: Measurement of soluble sulphates
- Collection of samples in medical diagnostics: Allergy testing

Grade 589/4 – yellow
- For very fine crystalline precipitates
- Analysis of oil/fats: proportion of soluble contaminants
- Ground analyses: Measurement of soluble sulphates
- Collection of samples in medical diagnostics: Allergy testing

Grade 589/5 – red
- For fine crystalline precipitates
- Determination of sulfates, carbonates and organic materials

Grade 589/6 – green
- For fine crystalline precipitates.
- CaC_2O_4, $PbSO_4$, $BaSO_4$ (hot-felled precipitates)

The types 589/1 to 589/6 are available as filter circles with the following sizes. Order numbers on page 142. Other sizes, folded filter, sheets and special cuts are available on request.

Hahnemühle
Life Science

Hardened, ashless filter papers

Hardened, ashless filter papers (approx. 0.002%) are especially recommended for vacuum and pressure filtration, and for the use of acidic and alkaline solutions.

- Extremely robust owing to the addition of a chemically stable resin (low nitrogen content) that does not significantly contaminate the filtrate
- High resistance to aggressive chemical components, like sulphuric and nitric acids (up to 40% at 50° Celsius) and alkalis (up to 10% at 20° Celsius)
- Acid-washed and rinsed with water to neutralise
- Free of minerals, ideal for the detection of metallic ions

Technical data

Type	Properties	Filtration Herzberg [s]	Retention of particles * [µm]	Weight [g/m²]	Thickness [mm]
1505	fast	50	12 – 25	88	0.17
1506	medium-fast	170	4 – 12	90	0.16
1507	slow	600 **	≤ 2	90	0.14

** Approximate values, ** Measured with 150 mm water column instead 50 mm*

Applications

Grade 1505
- For coarse crystalline precipitates
- Total dry/ash residue as per DIN 38409 H1 and 2
- For food analyses as per §64 LFBG
- Analysis in electroplating: baths of aluminium, chrome and copper

Grade 1506
- For fine crystalline precipitates
- Gravimetric determination of metals in acidic/alkaline solutions

Grade 1507
- For very fine crystalline precipitates
- Gravimetric analyses of fine metals: barium and lead sulphate, nickel and tin sulphide, oxalate and calcium fluoride

Ordering information
The types 1505 to 1507 are available as filter circles in various sizes. Order numbers on page 142. Other sizes, folded filter, sheets and special cuts are available on request.

Made from the same raw materials as the quantitative filter papers: Refined cotton linters and cellulose with an α cellulose content of up to 98%. This gives the filter papers a high degree of stability and durability.

Hahnemühle
Life Science

Highly pure filter papers for qualitative analysis

Highly pure filter papers (approx. 0.08% ash) are ideal for precise identification of materials and for sample preparation prior to sensitive detection methods

- These papers are perfectly qualified to yield reliable results for food controls as per §64 LFBG, beverage analyses and environmental monitoring
- A large selection of filter circles, folded filter, sheets and rolls is available
- For critical filtering processes, we recommend hardened, ashless filter, which have a greater resistance to both pressure and aggressive chemicals (types: 1573, 1574, 1575, 1577)

Technical data

Type	Properties	Filtration Herzberg [s]	Retention of particles * [µm]	Weight [g/m²]	Thickness [mm]
604	fast	50	12 – 25	79	0.19
591	medium-fast, thick	90	7 – 12	161	0.35
598	medium-fast, thick	100	8 – 10	139	0.32
597	medium-fast	155	4 – 7	85	0.18
597L	medium-fast	170	4 – 7	81	0.17
595	medium-fast, thin	160	4 – 7	68	0.15
593	medium to slow	450	2 – 5	84	0.17
602h	slow/dense	750 **	2	84	0.16
602eh	very slow/very dense	1500 **	< 2	84	0.15

** Approximate values*
*** Measured with 150 mm water column instead 50 mm*

Ordering information
Types 591, 593, 595, 597, 597L, 598, 602h, 602eh and 604 are available as filter circles and folded filter in various sizes. Order numbers on page 142. Other sizes, sheet formats, rolls and special cuts are available on request.

Hahnemühle Life Science

Highly pure filter papers for qualitative analysis

Applications

Grade 604
- For coarse crystalline precipitates
- Sodium chloride in foodstuffs, ferrous hydroxide, aluminium hydroxide and metal sulphide analysis
- Routine clarification of organic extracts and biological fluids
- For food analyses as per §64 LFBG
- High flow rates in air pollution monitoring and exhaust fumes detection

Grade 591
- For medium-fine, crystalline precipitates
- Its thickness enables greater load quantities of solutes
- Determination of water retention in mortar (EN 413-2:1994)

Grade 598
- For fast filtration of medium fine particles
- Its thickness enables a greater particle load

Grade 597
- For medium-fine, crystalline precipitates
- Calcium oxalate, metal sulphide
- Determination of the fat content of foods as per §64 LFBG (folded) and in milk and dairy products as per DIN 10342
- Preparation of samples and removal of CO_2 in the beverage industry, recommendation by the European Brewery Convention/MEBAK

Grade 597L
- Made of 100% ultrapure cotton linters
- For fine particles
- For determining the nitrate content of food products as per §64 LFBG
- Detection of soot in exhaust fumes

Grade 595
- For medium-fine, crystalline precipitates
- For determining the overall fat content of food products as per §64 LFBG (folded)
- Determination of the unsaponifiable fraction in fats and oils
- Digestion of solids with aqua regia e.g. for ICP/AAS analysis (folded)

Grade 593
- For fine crystalline precipitates
- Barium sulphate (hot), tin sulphide
- Soil analyses

Grade 602h
- For very fine crystalline precipitates
- Determination of the soot content of lubricants (oil condition monitoring, OCM)
- Preparation of samples and removal of CO_2 in the beverage industry, recommendation by the European Brewery Convention/MEBAK

Grade 602eh
- For ultrafine filtration, particle size of <1 µm
- For environmental analysis

i These filter papers are ideally qualified for: Food control, beverage analysis and environmental monitoring.

Hahnemühle Life Science

Hardened, highly pure filter papers for qualitative analysis

Hardened highly pure filter papers (approx. 0.05%) with extremely high chemical and mechanical resistance, especially recommended for vacuum and pressure filtration, and for the use of acidic and alkaline solutions

- Extremely robust owing to the addition of a chemically stable resin (low nitrogen content) that does not significantly contaminate the filtrate
- High resistance to aggressive chemical components, like sulphuric and nitric acids (up to 40% at 50° Celsius) and alkalis (up to 10% at 20° Celsius)
- Made of super-refined cotton linters and cellulose with an α cellulose content up to 98%, therefore high stability and durability

Technical data

Type	Properties	Filtration Herzberg [s]	Retention of particles * [µm]	Weight [g/m²]	Thickness [mm]
1573	fast	50	12 – 25	88	0.17
1574	medium-fast	170	7 – 12	90	0.16
1575	slow	600**	2	92	0.14
1577	slow	650**	< 2	81	0.12

** Approximate values*
*** Measured with 150 mm water column instead 50 mm*

Applications

Grade 1573
- For coarse crystalline precipitates
- Iron hydroxide, aluminium, chrome, copper sulphate, bismuth, cobalt and iron
- Used as rolls for filtration of biosolids

Grade 1574
- For fine crystalline precipitates
- Calcium oxalate, metal sulphide, barium sulphate and lead molybdate
- Emission controls on atmospheric pollution (sulphur oxide, ammoniac gases, etc.)

Grade 1575
- Retention of very fine precipitates, such as barium sulphate, zinc sulphide

Grade 1577
- For very fine precipitates
- Use in filter presses as protective paper

Ordering information
The types 1573, 1574, 1575 and 1577 are available as filter circles in various sizes. Order numbers on page 142. Other formats, folded filter, sheet material, rolls and special cuts are available on request.

Hahnemühle Life Science

Glass fibre filter

Recommended for controlling both air and water pollution

- Made of 100% micro-borosilicate glass fibres
- Chemically stable in acidic solutions (except hydrofluoric acid) and alkaline solutions in moderate concentrations
- Extremely low metal content
- Maintains its properties up to 500°C
- High flow speed and high permeability to air

Note on use and weight constancy: No relevant changes in weight due to variations in the ambient humidity. Limited bending resistance. Brushing against other surfaces may cause the loss of fibres (keep the filter in their original box until ready to use).

Technical data – including binder

Type	Binder	Retention rate % NaCl-particle size <1 µm*	Filter grade DIN EN 1822-3	Filtration Gurley [s]	Weight [g/m²]	Thickness [mm]	Max T [°C]
GF 6	inorg.	99.97	H14	40	80	0.35	500
GF 8	inorg.	99		12	75	0.35	500
GF 9	inorg.	99.97	U15	27	70	0.35	500
GF 10	org. hydrophobil	99.97	H13	12	70	0.35	180
GF 20	org. hydrophilic	99.99	-	15	86	0.50	180

** Tested with NaCl particles size <1 µm, main fraction at 0.3 to 0.5 µm*

Technical data – excluding binder

Type	Air permeability* (Resistance** mbar) [L/m²s]	Retention rate % NaCl-particle size <1 µm**	Filter grade EN 779	Filtration Gurley [s]	Weight [g/m²]	Thickness [mm]	Max T [°C]
GF 50	25	99.97	H14	19	56	0.29	500
GF 51	11	99.993	H13	44	140	1.00	500
GF 52	11	99.995	U15	25	54	0.28	500
GF 55	<10	99.999	U15	67	75	0.40	500

** as per ISO 53887*
*** Tested with NaCl particles size <1 µm, main fraction at 0.3 to 0.5 µm*

Ordering information:
Types GF 6 to GF 55 are available as filter circles in various sizes. Order numbers on page 142. Other sizes, sheet formats, rolls and special cuts are available on request.

Hahnemühle Life Science

Glass fibre filter

Applications

Grade GF 6
- Deposition of (radioactive) aerosols and monitoring of nuclear power plants
- Gravimetric analyses of organic and inorganic impurities in water and waste water according to DIN 38409 and EN 872 (suspended particles). The integrated anorganic binder increases the stability without distorting the gravimetric result during annealing at 500°C in accordance with regulations
- Removal of proteins in beer samples prior to analysis
- Clearing of protein solutions prior to freeze-drying

Grade GF 8 and GF 9
- Measurement of emission, monitoring of the efficiency of filtration and dedusting, monitoring the combustion air of power plants and of the steel and iron industry
- Gravimetric measurement of dust release in workplace and production processes
- Measurement of the proportion of dust particles in technical gases
- Pre-filtration before use of membranes

Grade GF 10
- High mechanical stability
- Because of the weak hydrophobic bond, no humidity will be absorbed and there are no weighing errors
- Suitable as a roll filter in automatic air filter units and air analysers
- Deposition and measurement of soot, oil fume and suspended particles

Grade GF 20
- The hydrophilic character enables rapid filtration of aqueous solutions
- Ideal for rapid clarification and degassing of carbonated drinks

Grade GF 50
- Water pollution analysis: Determination of suspended particles as per DIN 38409 and EN 872
- Biochemical issues like DNA, RNA, proteins and polysaccharides
- Determination of suspended particles (SPM and TSP) as per the directive of the US EPA
- Cleaning and buffering solutions and reagents for spectrophotometric measurements

Grade GF 51
- Biochemical issues like DNA, RNA, proteins and polysaccharides
- Membrane pre-filter to prevent silting
- Elimination of fine particles in solutions for analytical devices
- Conjugate release

Grade GF 52
- Determination of suspended particles as per European regulations EN 872 and/or standard method 2540 D
- Analysis of carbohydrates, cell cultures
- Scintillation count of DNA, RNA, proteins and polysaccharides
- Clearing of protein solutions prior to freeze-drying

Grade GF 55
- Sample and solvent filtration for HPLC
- Clarification and filtration of proteins, cell cultures, etc.
- Elimination of fine suspended carbon material in liquids to be filtered
- Conjugate release

Hahnemühle
Life Science

Quartz fibre filter

Recommended filter for atmospheric pollution control and for particles determination at high temperatures.

- Filter made of pure quartz microfibre (SiO_2), free of binding elements or additives
- Ideally suited for trace analysis owing to extremely low metals content
- Excellent stability against chemical solvents, alkalis and acids, even in extreme conditions involving acidic gases (HCl, SO_2, SO_3, H_2SO_4, NO and NO_3); except hydrofluoric acid (HF)
- Usable in temperatures of up to 1000 °C

Technical data

Type	Weight [g/m²]	Thickness [mm]	TSI efficiency % [particles 0.3 µm]	Air peamibility [l/m²sec]	Max T [°C]	Binder
QFH	90	0.5	99.97	16	950	no

Applications

- Determination of suspended particles (SPM and TSP) in ambient air acc. to the directive of the US EPA (Environmental Protection Agency) and the EN 23210
- Applications that require a maximum filter purity with a low metal content and no carbon traces
- Filtration and analysis of both acid and alkaline gases and of solvents
- Emission: pollution controls performed on air within industrial stacks, smoke ducts and aerosols

Ordering information
The type QFH is available as a filter circle in various sizes. Order numbers on page 142. Other sizes, sheet formats, rolls and special cuts are available on request.

Creped filter papers have a particularly large surface area and correspondingly shorter filtration times.

Hahnemühle Life Science

Filter papers for clarification

Recommended for identification of substances, clarification of liquids and for the preparation of samples in a broad range of chemical analyses

- Made of super-refined cellulose
- Three surfaces: smooth, grained, creped
- For quick separation of large to medium-sized particles
- Available as: plain and folded discs, sheets, cuts and rolls

Technical data

Type	Surface	Properties	Filtration Herzberg [s]	Retention of particles * [µm]	Weight [g/m²]	Thickness [mm]
1450nf	smooth	fast	50	15 – 25	118	0.30
0860	smooth	medium-fast	120	7 – 12	74	0.17
0859	smooth	medium-fast	150	7 – 12	61	0.14
400	smooth	medium-fast	200	7 – 12	65	0.17
0903	smooth	medium-fast	350	4 – 7	65	0.15
0858	grained	medium-fast	110	7 – 12	75	0.17
0905	crêped	fast	40	12 – 25	74	0.27

** Approximate values*

Applications

- Preparation of ordinary samples
- Clarification of:
  - Alcohols, essences, vinegar, essential oils, extracts
  - Salt solutions
  - Electroplating baths, flotation sludge
- Used as protection sheet of filter presses
- Gelatin, glycerol, hair tonics, perfumes, tinctures
- Paints, lacquers
- Beer wort, spirits, syrups

Ordering information
The types listed above are available as filter circles and folded filter in various sizes. Order numbers on page 142. Other sizes, sheet formats, rolls and special cuts are available on request.

Filter papers for technical and industrial use

We offer our customers in the manufacturing industries an ever-growing range of products. At present, our catalogue contains more than 150 types of technical paper for a wide variety of applications. Our industrial customers rely on our innovative energy and experience in the development process to produce the papers that are required for their production and as finished products for the customers' on going requirements. As a result, the Hahnemühle FineArt GmbH became contract manufacturer and important strategic partner for users of highly pure papers for filtration, as well as chemical and biological analyses.

The market sectors we supply with our technical speciality papers are equally as diverse and efficient as the properties of our papers. The purification and clarification of valuable liquids by using filter papers of consistent high quality are of high priority for several sectors. Customers working in medical engineering and diagnostics, molecular biology, pharmaceuticals, food and beverage industry, chemical industry, recycling of oils and industrial liquids and electroplating, benefit from the consistent quality of our papers, which remains unchanged from batch to batch.

Technical data

	Type	Properties	Filtration Herzberg [s]	Retention of particles * [µm]	Weight [g/m²]	Thickness [mm]
Smooth	1450nf	very fast, wet strength	50	12 – 15	118	0.30
	604L	fast	12 **	12 – 15	80	0.18
	598	medium-fast, thick	100	8 – 10	140	0.32
	3205	medium-fast	150	5 – 7	95	0.20
	3427	medium-fast, wet strength	26 **	5 – 7	100	0.20
	572	medium-fast, wet strength	160	5 – 7	125	0.28
	597L	medium-fast	170	4 – 7	81	0.17
	508	medium-fast, activated carbon	360	n/a	196	0.52
	BF	medium to slow, wet strength	300	4 – 6	135	0.26
	1577	very slow, very high wet strength, hardened filter	2000	≤2	82	0.12
Creped	520bII	very fast, wet strength, thick	30	15 – 19	135	0.50
	520b	very fast, wet strength, extra thick	30	16 – 20	155	0.65
	3144L	very fast, wet strength, extra thick	30 (4.2 **)	16 – 20	190	0.65
	520a	very fast, wet strength	35	15 – 18	90	0.32
	2772	very fast, wet strength	40	12 – 14	65	0.24
	2410	fast, wet strength	70	9 – 11	107	0.40
	2048	medium-fast, wet strength	135	5 – 8	149	0.65
Card	0048	Cellulose/synthetic, low density high break load	500 ***	n/a	130	0.68
	2282	fast, wet strength, thick	35	15 – 18	440	1.45
	2294	fast, wet strength, thick	55	8 – 15	570	1.50
	2208	fast, wet strength, thick	75 (12 **)	7 – 13	350	0.90
	2589a	medium-fast, wet strength	120	6 – 12	200	0.45
	5703	medium-fast, wet strength	120	6 – 12	240	0.55
	3605	medium-fast, wet strength	120	6 – 12	310	0.80
	2589b	medium-fast, wet strength	220	5 – 10	300	0.60
	2589c	medium to slow, wet strength	320	4 – 8	400	0.75
	22	medium to slow, wet strength, thin	350	3 – 8	180	0.35
	2589d	medium to slow, wet strength, thick	470	2 – 6	500	1.00
	2589e	slow, wet strength, thick	470	2 – 6	610	1.30
	8272	slow, wet strength, thick	600	2 – 4	707	1.50
	23	slow, wet strength	750	2 – 4	240	0.45

** Approximate value*
*** Gurley*
**** Air permeability according to ISO 53887*

Hahnemühle Life Science

Recommendation on filter papers for special applications

The selection of the right filter paper for the intended technical and industrial separation depends on many different factors. The individual demands on the filter paper can vary immensely. The chemical and physical nature of the sample has to be considered, as well as the further processing and analysis of the isolated precipitate or clarified filtrate.

Therefore, a closer look at the aims and objectives of the filtration process should be completed before a filtration medium is selected. The following questions will help you find the best filter paper:

- What is filtered?
- What kind of particles are in the liquid/air?
- What is the size of these particles?
- What shall be the maximum particle size in the resulting filtrate?
- What is the pH of the solution/gas?
- What is the temperature during the filtration process?
- Can the temperature be increased?
- What is the viscosity of the solution?
- What is the pressure during the filtration?
- Are the paper sheets mechanically supported in the filter press?
- What is the material of this support?
- How long does the filtration process take?
- How many grams of particle load per square metre of filter paper are expected?
- What additional demands are placed on the filter material?

The use of a special filter paper in certain filtration equipment usually requires a specific paper shape. Paper rolls with various width and lengths, filter circles with centre hole, large sheets with exactly positioned holes for the right fitting into a filter press and specific shapes with a flute or with pleats. All these conversions can be done with our own specific equipment. Please contact us!

Application	Smooth	Creped	Card
Separation of soot particles from air	604L, 597L		
Filtration of unsweetened juice, wine and spirits	572	2048	3605
Filtration of viscous liquids and emulsions (e.g. sweetened viscous juices, spirits and syrups, resin solutions, lacquers, essential oils, essences and plant extracts)	1450nf, 3205	520bII, 520b, 520a, 3144L	
Purification of electroplating baths		520b	2589a
Fine impurities in industrial liquids	1577, 3205	2772	5703, 2208, 2589a-d, 2294, 2282
Filtration of liquids, edible oils, transformer and turbine oils that are difficult to clarify	BF		22
Use in filter presses (protective paper)	1577	2410	
Filtration of tanning solutions and paints, vacuum and pressure filtration and lining larger suction filter	1577		2208
Boiler water filtration and filtration of active carbon particles			2589a-b
Determination of water uptake according to Cobb			5703
Monitoring dye stuffs in the textile industry	1450nf		
Centrifugation in cytological diagnosis			2589c, 2589d
Determination of the whiteness of milk, textile fibres	0048		

Ordering information

The types listed in the table are available in different varieties upon request: sheet material, rolls and special cuts.

Hahnemühle Life Science

Low nitrogen filter paper

Recommended for filtration of fine precipitates used for further analysis according to Kjeldahl

- Filter paper made from carefully selected raw materials
- Extremely low content of nitrogen, approx. 0.24 mg/240 mm disc

Applications

- Filtration of fine precipitates used to determine nitrogen content
- Determination of fine crystalline precipitates of sulphides of iron and steel alloys

Technical data

Type	Filtration Herzberg [s]	Weight [g/m²]	Thickness [mm]
2095	650	85	0.17

Ordering information
Type 2095 is available folded filter with 240 mm. Order numbers on page 142. Other sizes, sheet formats, rolls and special cuts are available on request.

Kieselguhr filter paper

Recommended for filtration of the finest semi-colloidal turbidities

- Medium to slow flow rate
- High absorption rate

Applications

- Clarification of extracts of soil suspensions, of milk serum, of starch solutions and sugar-containing solutions prior to polarimetry and refractometry
- For retention of protein precipitates and slime particles from solutions
- Clarification of urine samples

Technical data

Type	Filtration Herzberg [s]	Weight [g/m²]	Thickness [mm]
287	660	154	0.36

Ordering information
Type 287 is available as filter circles with the following sizes (in mm): 125 – 150 – 185 – 240. Order numbers on page 142. Other formats, filter circles, sheet material, rolls and special cuts are available on request.

Hahnemühle Life Science

Activated carbon filter paper

Recommended for the adsorption of certain molecules in liquids and gases and for the removal of the finest, semi-colloidal turbidities

- Medium flow rate
- High absorption rate
- Minimum of 35% content of activated carbon

Applications

- Clarification of extracts of soil suspensions, of milk serum, of starch solutions and sugar-containing solutions prior to polarimetry and refractometry
- Absorption of iodine 131 from air
- For filtration of electroplating baths

Technical data

Type	Filtration Herzberg [s]	Weight [g/m²]	Thickness [mm]
508	360	196	0.52

Ordering information
Type 508 is available as filter circles with 110 mm. Order numbers on page 142. Other sizes, sheet formats, rolls and special cuts are available on request.

Black filter paper

Recommended for the detection of very fine traces of light particles and precipitates. The filter paper grade 551 is a technical filter paper made with the addition of black dye. White and light particles can be detected easily after filtration owing to the strong contrast to the black filter paper.

Applications

- Detection of very fine traces of white precipitates and particles
- Detection of traces of silicone/fluorine traces (water drop test)
- Determination of the antiseptic effect of wood preservatives against fungal attack
- Visualisation of mycelial threads from fungi

Technical data

Type	Properties	Filtration Herzberg [s]	Weight [g/m²]	Thickness [mm]
551	slow, black	850	95	0.20

Ordering information
Type 551 is available as filter circles with the following sizes (in mm): 55 – 70 – 90 – 240. Order numbers on page 142. Other formats, folded filter, sheet material, rolls and special cuts are available on request.

For quantitative analysis in breweries, the types 589/1 and 589/2 are recommended

Filter papers for malt and beer analysis

Suitable for analytical methods in breweries to filter and analyse, based upon recommended procedures of the EBC (European Brewery Convention)

- Medium fast filtering
- Ideal for clarification and sample preparation
- Suitable for removing CO_2 and turbidities
- For quantitative analyses in breweries, the types 589/1 and 589/2 are recommended. Technical features of both types are listed in the chapter “Ashless filter papers for quantitative analyses”

Applications

2555: Sample preparation for extract determination of malt
597: Removal of carbon dioxide and turbidity from cold trub; determination of coagulated proteins (nitrogen) and the grade of fermentation
595: Samples preparation and clarification
602h: Removal of carbon dioxide and turbidity from beer
GF 20: Ideal for rapid clarification and degassing of carbonated drinks

Technical data

Type	Surface	Filtration Herzberg [s]	Weight [g/m²]	Thickness [mm]
2555	grained	110	75	0.17
595	smooth	140	68	0.18
597	smooth	160	85	0.15
602h	smooth	750	84	0.16
GF 20	org., hydrophilic	110	86	0.50

The types 2555, 597, 595 and 602h are available as folded filter in various sizes. The type GF 20 is available as filter circles with 150 mm in diameter. Order numbers on page 142. Other sizes, folded filter, sheets and special cuts are available on request.

Filter papers for the sugar industry

Recommended for the clarifying filtration of beet extracts and juices prior to analysis

- High filtration speed combined with high retention of particles
- Two surfaces are available: smooth or creped

Applications

- Clarification of dried beet pulp extracts
- Filtration of beet juice after addition of lead acetate for polarimetric sugar determination
- 3459 is recommended for Venema unit according to the sodium acetate method

Technical data

Type	Properties	Filtration Herzberg [s]	Weight [g/m²]	Thickness [mm]
3459	fast, creped	110	74	0.30
3002	medium, smooth	150	61	0.14

Ordering information
The types 3002 and 3459 are available as filter circles sized 200 or 230 mm. Order numbers on page 142. Other sizes, folded filter, sheets and special cuts are available on request.

High fitting accuracy for all available extraction systems, such as Soxhlet (type 900) and Tecator (type 901).

Hahnemühle Life Science

Cellulose extraction thimbles

For reliable and fast analysis in the areas of food control and environmental monitoring. Suitable for Soxhlet-type, Tecator-type or similar devices, to extract certain components out of solid material with an appropriate solvent

- Made of pure cellulose without added chemicals and a minimum amount of extractable components
- The consistent, high porosity of the thimbles ensures a rapid flow rate.
- The QC includes the testing for resins and fats according to ISO 624. In this way we ensure a minimum content of extractables.

Wall thickness:
1.3 mm in thimbles with ≤ 35 mm inner diameter
1.7 mm in thimbles with > 35 mm inner diameter

The extraction thimbles are available in 2 versions:
type 900 for Soxhlet and similar extractors
type 901 for Tecator

Suitable thimbles for standard Soxhlet appliances:

Extractor volume	I.D. x Height
ml	mm
30	22 x 80
100	33 x 94
250	33 x 205
500	48 x 230
1000	57 x 315

Applications

- Extraction of fatty/greasy materials in foodstuffs, paints, varnishes and bituminous materials
- Analyses of pesticide waste, poly-aromatic carbohydrates and dioxins in foodstuffs Determination of oil content in oil-bearing seeds
- Extraction of active agents from pharmaceuticals and plastic softening agents

Ordering information
The cellulose thimbles of type 900 and 901 are available in various sizes. Order numbers on page 142. Other sizes, rolls and special cuts are available on request.

The size of the thimbles should be carefully selected so that they fit optimally into the extractors. The inner diameter and the total length of the thimble in millimeters are usually indicated for the various sizes. When calculating the outer diameter, the wall thickness should therefore be taken into account.

It should be possible to pass the thimble through the top opening of the extractor, allowing a margin of 1 to 2 mm. In addition, the upper edge of the thimble should be 5 to 10 mm above the upper end of the siphon pipe. High accuracy of fit for all standard extractors such as Soxhlet (grade 900) and Tecator (grade 901)

High loading capacity and high air permeability at a high retention rate for small particles of >99% as per BS 4400.

Hahnemühle Life Science

Glass fibre extraction thimbles

Recommended for analysis of particles and aerosols in gases and air

- Made of 100% pure borosilicate microfibres, without binding elements
- Thickness is 1.5 mm (diameter < 33 mm), wall thickness 2.0 mm (≥ 33 mm diameter)
- Good stability at high temperatures of up to 500°C in hot, humid or acidic gases
- Minimum level of extractables

Applications

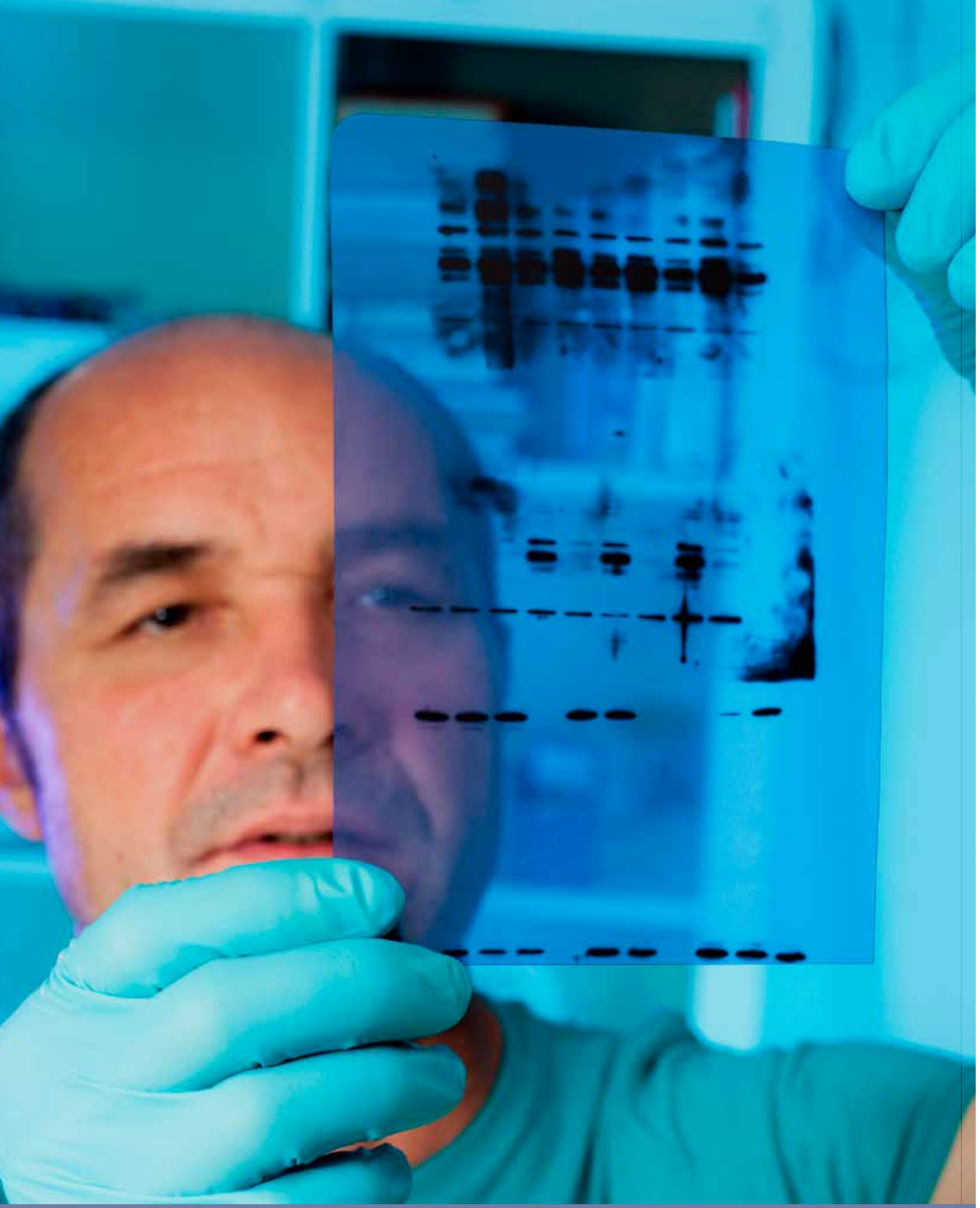
- Extraction of solvents which are incompatible with cellulose fibres
- Gravimetic collection of dust particles or aerosols from hot air and gas flows
- Extraction during special biochemical analyses

Technical data

Type	Retention rate* [%]	Max. temp. [°C]
CFV	>99	500

** Tested with NaCl particles size <1 µm, maximum of 0.3 to 0.5 µm*

Ordering information
The glass fibre thimbles are available in various sizes. Order numbers on page 142. Other sizes, rolls and special cuts are available on request.



High, uniform capillary strength and uniform molecule transfer
Ideal for reliable blotting in medical diagnostic laboratories

Hahnemühle Life Science

Blotting papers

Recommended for blotting techniques with gels

- Made from ultrapure raw materials without additives
- No risk of contamination during the transfer steps of the membranes and electrophoresis gels
- High wet strength for safe handling and lowest possible fiber release

Applications

- Southern, northern and western blots; dot and slot blots
- Lifting of sequencing gels
- Lysis/denaturation of colony or plaque lifts

Technical data

Type	Properties	Surface	Thickness [mm]	Weight [g/m²]	Water absorption [ml/m²]
BP002	medium absorbency	smooth	0.35	192	270
BP003	medium absorbency	smooth	0.90	320	740
BP005	high absorbency	smooth	1.50	570	1400

Ordering information
Types BP002, BP003 and BP005 are available as sheets. Order numbers on page 142. Other formats and special cuts are available on request.

Meets the directive for carriers of active agents acc. to DIN 58940-2.

Antibiotic test paper

Recommended for identifying pathogens of infectious diseases by determining the degree of resistance against antibiotics as per the Hemmhof method

- Made from ultrapure raw materials without additives
- No interference with the active substances during later incubation
- Consistent thickness ensures a constant absorption volume per disc

Applications

The test discs are impregnated with antibiotics or chemotherapeutic agents, placed on the inoculated nutrient agar and incubated. The size of the inhibition zone is a measurement of the potency of the substances.

Technical data

Type	Weight [g/m²]	Thickness [mm]	Absorption * [µl]
22	180	0.35	70
2668	320	0.90	215
3324	280	0.73	220

** Measured with water, with 10 assay discs (6 mm in diameter).*

Ordering information
The types 22, 2668 and 3324 are available as small, round discs. Order numbers on page 142. Other formats and special cuts are available on request.

The high purity of the filter paper allows for the recovery and reuse of spilled liquids.

Hahnemühle Life Science

Absorbent protective paper with polyethylene layer

This two-ply paper offers total protection of surfaces in the laboratory owing to its cellulose layer for liquid absorption and its waterproof polyethylene layer.

It has a cellulose layer of ultrapure filter paper that absorbs large volumes of liquid and a polyethylene layer that prevents liquids from reaching the protected surface

Applications

- Recommended as a base when working with valuable (precious metals) or dangerous substances (toxic, corrosive, radioactive, alkaline, acids, etc.)
- Hygienic coverage of surfaces in pathology, bacteriology and clinical and radiological laboratories
- Saturating the atmosphere in wet chambers (humidity controls)

Technical data

Type	Weight [g/m²]	Thickness [mm]	Water absorption [g/m²]
295PE	120	0.20	110

Ordering information
The type 295PE is produced in sheets and rolls by default. Order numbers on page 142. Other formats and special cuts are available on request.

Thicker papers allow higher sample volumes.
Lower capillary rises offer higher resolutions.

Hahnemühle Life Science

Chromatography papers

Recommended for chromatographic analysis and preparations

- Made from pure linters with an α-cellulose content of up to 98%
- High-performance resolution and wet strength
- The fibres run in predominantly one direction

Notes for handling
The absorption is always slightly greater along the linters fibres. The chromatography should be carried out along the direction of the fibres. This is indicated by the 570 or 600 mm long edge of the sheet. Grades “a” and “b” differ in thickness only! The performance in resolution is the same. For two-dimensional chromatography the “b” grades are recommended.

Applications

Analytical breakdown:
- For most chromatographic work: type 2043a, type 2043b
- For evaluation by elution out of the paper: 2043b

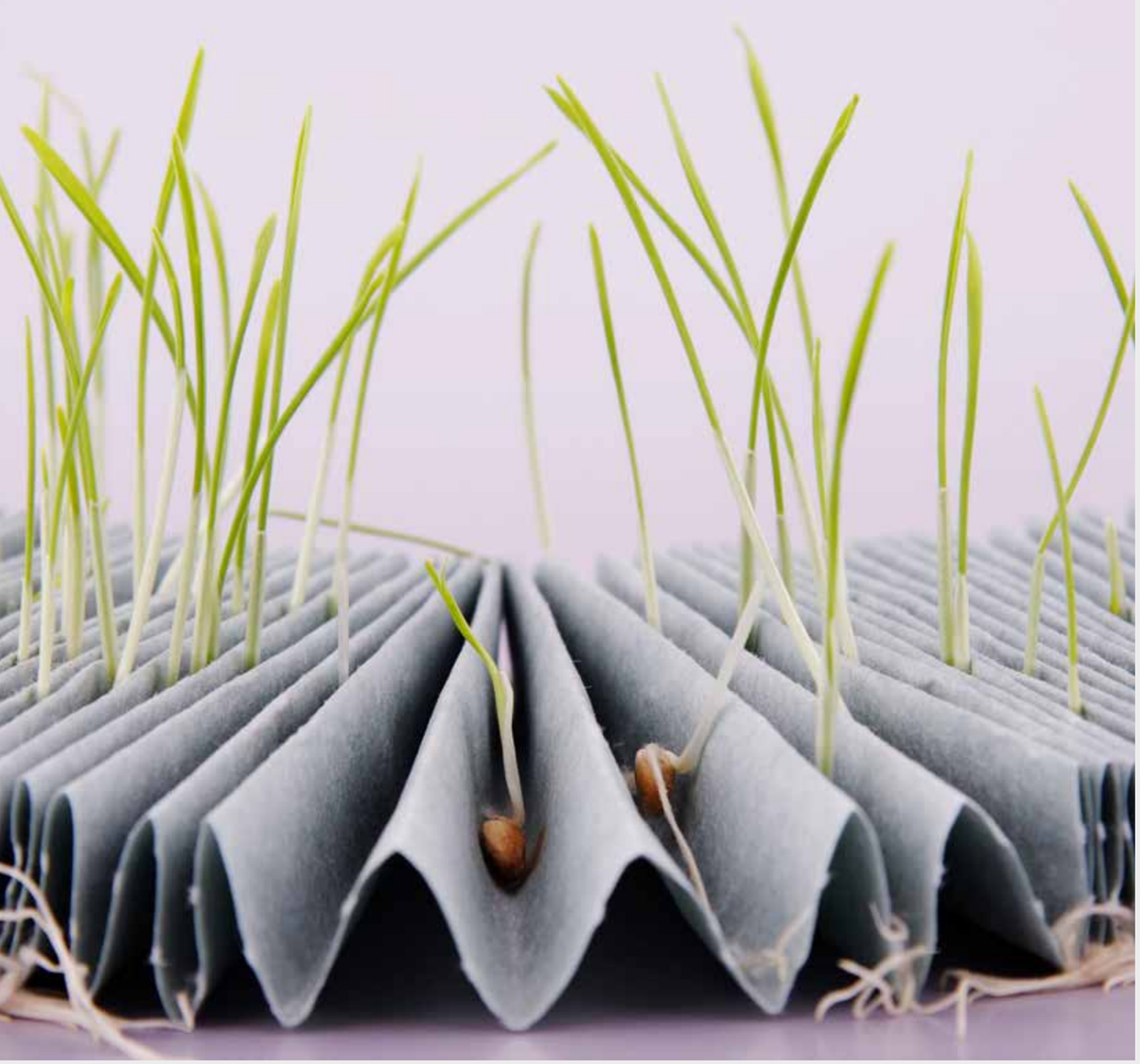
Preparative breakdown:
- Work with larger volumes of a substance: 2668

Technical data

Filter material	Type	Properties	Weight [g/m²]	Thickness [mm]	Capillary rise * [mm]
Analytical chromatography paper	2043a	medium-fast	90	0.17	105
	2043b	medium-fast	125	0.22	105
Preparatory Chromatography papers	2668	very fast	320	0.90	155**
Chamber saturation paper	5703	medium-fast	240	0.55	–

** Measures in 30 min.*
*** Measures in 10 min.*

Ordering information
Types 2043a, 2043b, 2668 and 5703 are available as sheets: 460 x 570 mm and 580 x 600 mm. Order numbers from page 142. Other formats and special cuts are available on request.



ISTA methods

- TP (top of paper): The seed is placed on one or more layers of paper and then allowed to germinate in a Copenhagen tank, petri dish or incubator.
- BP (between paper): The seeds are placed between two horizontal layers of paper or are rolled up in vertical standing rolls of paper.
- PP (pleated paper): The seeds are placed between the folds of a paper strip folded like a piano accordion. The pleated strips are placed in a plastic box and kept uniformly moist by a surrounding wrapping strip.

Hahnemühle Life Science

Germination test paper

Recommended for the reliable evaluation of seeds. All papers comply with the latest ISTA requirements.

- All papers are made of pure cellulose and are free from mould, bacteria and any toxic substances which might interfere with the growth of the seeds
- Sufficient moisture is stored for the whole duration of the test. The roots do not penetrate the paper
- The conductivity of the papers is lower than 40 mS/m and the pH is between 6.0 and 7.5
- All seed testing papers meet the ISTA and AOSA requirements. Broad range of papers available for the various germination methods TP, BP and PP
- Pleated strips with exactly 50 double folds ensure optimal water supply and allow a simple identification of the individual seeds
- Coloured papers make it easier to see the delicate, white roots due to higher contrast. The dyes used do not affect seedling growth

Applications

- Types 3014, 3236 and, optionally, 0858: Medium large and coated seeds (sugar beet, fodder beet, grain, sunflower, rapeseed, mustard)
- Grade 3024: Sunflowers
- Grade 3621, 3633, 3645: Seeds with small, white rootlets
- Grade 520b, 5703: Grain (BP method)
- Grade 3014: Very sensitive seeds
- Grade 597, 598: Small seeds (flowers, grasses)

Technical data

Filter material	Type	Properties	Weight [g/m²]	Thickness [mm]
TP method	597	for petri dishes, Jacobsen tank	81	0.18
	598	for petri dishes, Jacobsen tank	140	0.32
	520bII	for petri dishes, Jacobsen tank, creped	135	0.53
	3024	white	150	0.35
	3621	blotter, light blue	700	1.45
	3633	blotter, light blue	300	0.65
	3644	blotter, blue	720	1.42
	3645	yellow	165	0.34
BP method	520b	white	155	0.65
	5703	white	239	0.55
PP method	3014	pleated strips, white	110	0.22
	3236	pleated strips, grey	110	0.22
	0858	wrapping strips for pleated strips	75	0.17

Ordering information
Following standard formats are available:
Types 3014, 3236 as pleated strips 110 x 20 x 2000 mm with precisely 50 double folds

Type 0858 as wrapping strips 110 x 580 mm
Types 520b and 5703 as sheets 580 x 580 mm

Order numbers on page 142. Other formats and special cuts are available on request.

Lens cleaning paper

Soft paper free of fibres is recommended for cleaning sensitive, optical surfaces

- Fine, soft and white paper
- No release of fibres
- Silicone-free

Applications

- Cleaning optical lenses, trays, etc.
- As protective paper for microscopic and metallographic sections

Ordering information
The type 310 is available in a standard format of 10 x 15 cm. Order numbers on page 142.
Other formats and special cuts are available on request.

Weighing paper

The smooth surface guarantees the quantitative transfer of the material being weighed without any losses

- Smooth and polished surfaces on both sides
- Removes the need to clean the trays
- It can be used instead of weighing boats

Applications

Useful for weighing and handling of all kinds of solid samples.

Technical data

Type	Weight [g/m²]	Thickness [mm]	Nitrogen content [%]
360	25	0,02	0.04

Ordering information
Following standard formats are available: 5 x 5 cm, 10 x 10 cm and 15 x 15 cm
Order numbers on page 142. Other formats and special cuts are available on request.

Hahnemühle
Life Science

Cytocentrifuge papers

Highly absorbent papers made of pure cellulose

- Absorb a large volume of liquid
- No disruptive substances or fibres are released into the liquid medium

Applications

The papers are ideal for absorbing liquids during centrifuging of cell and tissue preparations.

Technical data

Type	Size [mm]	Weight [g/m²]	Thickness [mm]
2589C	25 x 75	400	0.75
2589D	25 x 75	500	1.00

Ordering information
Filter papers 2589C and 2589D are supplied as cut pieces in a standard format of 25 mm × 75 mm, with two 6 mm holes. All grades are also available as custom cuts. Please don't hesitate to contact us for further details and advice.

Order numbers on page 142.

Drying pad

Absorbent paper made of pure cellulose

- Absorbs a large volume of liquid
- No disruptive substances or fibres are released into the suspended sample

Applications

The papers are ideal for removing excess liquid on microscope slides. As a result, they dry stained microscopy specimens quickly, cleanly and easily.

1 pad = 50 strips, measuring 37 x 100 mm

Order numbers on page 142.

Hahnemühle Life Science

Cellulose acetate membrane filter

Recommended for aqueous samples, biological applications and protein filtration

- Made entirely from pure cellulose acetate, hydrophilic
- High flow rate
- High thermal stability
- Very low non-specific adsorption
- Suited for use in pressure filtration devices
- Suitable for aqueous solutions with pH 4-8, most alcohols, hydrocarbons and oils
- Filter diameters from 25 mm to 50 mm
- Pore sizes 0.2 µm and 0.45 µm

Technical data

Pore size [µm]	Thickness* [µm]	Flow rate** [ml/min]	Bubble pressure*** [bar]
0.2	125	21	3.6
0.45	125	39	2.7

** as per DIN 53105*
*** as per DIN 58355: Average value per cm² area at Δp = 0,9 bar*
**** as per DIN 58355*

- Adsorption: bovine serum albumin < 10 µg/cm²
- Extractables with water less than 1%
- Sterilisation: by autoclaving at 121 °C or 134 °C, with γ-radiation, dry heat or ethylene oxide
- Temperature-resistant up to 180 °C
- The resistance to various chemical solvents is summarised on page 138

Applications

- Filtration of aqueous solutions for biological and clinical analyses
- Sterilisation of biological solutions (CA-membranes with a pore size of 0.2 µm are specially recommended when the recovery of proteins is critical)
- Filtration of proteins and enzymes
- Biological and clinical analyses
- Sterilisation of culture media (0.2 µm)

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Sterility Test as per USP:
No growth was observed when sterilised samples were subjected to the Seven Day Sterility Test as described by USP
Microbial test:
- Retention of 10^7 organisms/cm² Serratia marcescens ATCC 14756.
- Recovery of Fecal Coliform > 90%

Hahnemühle Life Science

Cellulose nitrate membrane filter

Ideal for clarification and sterilisation of aqueous solutions, microbiological analyses and particle counts

- Made of cellulose nitrate, hydrophilic
- High flow rate and high non-specific adsorption
- Suitable for aqueous solutions (pH 4-8), hydrocarbons and some diluted solvents
- Very uniform pore structure, which ensures homogeneous distribution of the particles retained on the filter surface
- Extractables with water less than 1%
- Available in white or black, gridded (3.1 × 3.1 mm) or plain, sterile or non-sterile

Technical data

Pore size [µm]	Thickness* [µm]	Flow rate** [ml/min]	Bubble pressure*** [bar]
0.2	100	12	3.2
0.45	100	36	1.8
0.8	100	87	0.9

** as per DIN 53105*
*** as per DIN 58355: Average value per cm² area at Δp = 0,7 bar*
**** as per DIN 58355*

- Adsorption: 160 µg/cm² for γ-globulin and pore 0.2 µm (decreases with increasing pore size)
- Extractables with water less than 1% to ensure sample purity
- No enhancement or inhibition by the grid lines, due to chemical extractables
- Temperature-resistant up to 130 °C
- Sterilisation: by autoclaving at 121 °C, γ-radiation (25 kGy) or with ethylene oxide
- The resistance to various chemical solvents is summarised on page 138

Applications

- 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 analyses (bacterial counts) to detect E.coli, coliform bacteria and other germs in water, pharmaceuticals, beverages, cosmetics, etc.
- Sterilisation of solutions and culture media (0.2 µm) – Keep in mind binding of proteins!
- Pre-filtration, clarification, sterilisation prior to further analyses
- Removal of particles in suspensions to determine the degree of impurity
- Measurement of sewage sludge in clarification plants (0.8 µm)
- Immunological analyses, which allow only a very low level of extractable substances in water
- Analysis of cell solutions

We offer the cellulose nitrate membranes in a broad range of various formats:
- White membranes, used in general laboratory applications
- Black membranes for counts of fungi and yeasts (the higher contrast enables easier counting)
- Gridded membranes (3.1 x 3.1 mm raster, black grid on white membrane or white grid on black membrane) for counts of colonies as a standard method of quantification
- Sterilised membranes (packaged in individual blisters) to ensure that the filter is not contaminated

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Ideal for gravimetric measurements, constant weight
Extractables with water less than 1% to ensure sample purity

Mixed cellulose ester membrane filter

Recommended for clarification and sterilisation of aqueous solutions, microbiological analyses and particle counts

- Made of a blend of cellulose nitrate and cellulose acetate
- High flow rate and high non-specific adsorption
- High mechanical stability
- Suitable for aqueous solutions (pH 4-8), hydrocarbons and some diluted solvents

Technical data

non-sterile membrane filter

Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble pressure *** [bar]
0.2	120	15	3.5
0.45	120	40	2.0
3	170	200	0.5
5	170	250	0.4
8	180	300	0.2

sterile membrane filter

Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble pressure *** [bar]
0.2	120	15	3.3
0.45	120	40	1.8

** as per DIN 53105*
*** as per DIN 58355: Average value per cm² area at Δp = 0.9 bar*
**** as per DIN 58355*

- Adsorption: 160 µg/cm² for γ-globulin and pore size 0.2 µm (decreases with increasing pore size)
- Sterilisation: by autoclaving at 121 °C, γ-radiation (25 kGy) or with ethylene oxide
- Temperature-resistant up to 180 °C
- The resistance to various chemical solvents is summarised on page 138.

Applications

- The membranes with a pore size of 0.45 µm are used for micro-organism counts (microbiological analyses)
- Membranes with grid lines are ideal for microbiological analyses (bacterial counts) of water, pharmaceuticals, beverages, cosmetics, etc. for the measurement of coliform bacteria and other germs
- Sterilisation of solutions and culture media (0.2 µm) – Keep in mind binding of proteins!
- Pre-filtration, clarification, sterilisation prior to further analyses (0.45 µm)
- Gravimetric measurements, removal of particles in suspensions to determine the degree of impurity (sewage plants etc.)
- Membranes with larger pore sizes (8 µm, 5 µm and 3 µm) are used for chemotaxis and retention of large cells

We offer a broad range of various formats:

- White membranes, used in general laboratory applications
- Sterilised membranes (packaged in individual blisters) ensure that the filter is not contaminated.
- Gridded membranes (3.1 x 3.1 mm raster, black grid on white membrane or white grid on black membrane) for counts of colonies as a standard method of quantification

Sterility Test: No growth was observed when sterilised samples were subjected to the Seven Day Sterility Test as described by USP

Microbial Test:
- Retention of 10^7 organisms/cm² Serratia marcescens ATCC 14756.
- Recovery of Fecal Coliform > 90%.

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Nylon Membranes are hydrophilic and are perfect for the clarification of buffers and culture media with a low rate of extractables.

Nylon membrane filter

Recommended for filtration, sterilisation and clarifications of mobile phase in HPLC processes with aqueous, alkaline and organic samples

- Made entirely of polyamide (nylon), hydrophilic
- Suitable for many solvents and alkaline solutions, pH range 3-14
- High non-specific adsorption
- High mechanical stability

Technical data

Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble pressure *** [bar]
0.2	100	6	3.6
0.45	100	20	1.8

** as per DIN 53105*
*** as per DIN 58355: Average value per cm^2 area at Δp = 0,9 bar*
**** as per DIN 58355*

- Adsorption: bovine serum albumin 100 µg/cm^2 (for 0.2 µm pore size)
- Extractables with water less than 1%
- Sterilisation: by autoclaving (at 121 °C) or ethylene oxide
- Temperature-resistant up to 134 °C
- The resistance to various chemical solvents is summarised on page 138

Applications

- Particle removing filtration of water, and aqueous solutions and solvents for HPLC
- Isolating Legionella
- These filter are not recommended for applications such as the sterilisation of cell solutions as they can cause significant loss of tracers. For these applications, preference ought to be given to cellulose acetate (CA-)membranes, which have a low level of adsorption

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Our PES membranes impress with an extremely low rate of <0.1% extractable substances (water).

Hahnemühle Life Science

Polyethersulfone membrane filter

Recommended for the clarification, purification and sterilization of aqueous solutions and biological samples

- 100 % asymmetric polyethersulfone (PES) membrane without wetting agent, hydrophilic
- Asymmetric pore structure: higher flow rates and high physical resilience
- Very low non-specific adsorption
- Suitable for aqueous solutions in a pH range of 1 - 14 short-term, 1 - 13 long-term
- Extractable components of <0.1 %
- Fast filtration due to high flow rate 0.2 µm: >21 ml/min/sqm; 0.45 µm: >50 ml/min/sqm (at 10 psi)
- High non-specific adsorption
- Suitable for use in pressure filtration devices
- Tested for biocompatibility and cytotoxicity
- according to USP standard
- Membrane diameter from 25 mm to 142 mm
- Pore sizes 0.2 µm and 0.45 µm

Technical Data

Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble point *** [Bar]
0.2	100	> 21	3.6
0.45	100	> 50	2.7

** acc. to DIN 53105*
*** acc. to DIN 58355: Average value per sqm area at Δp = 1 bar with water*
**** acc. to DIN 58355, with water*

- <0.1% extractable substances (water)
- Sterilization by autoclaving at 121° C or ethylene oxide
- High mechanical strength and thermal stability up to up to 120° C/30 min
- The resistance to various solvents is shown on page page 138

Application

- Filtration in the pharmaceutical industry as well as the food and beverage industry
- Sterilization of biological solutions, e.g. drug preparations, pharmaceuticals or infusion solutions
- Filtration of proteins and enzymes
- Biological and clinical analyses
- All important liquid and gas filtration application
- Filtration of biological fluids, sera or tissue culture additives where extremely low protein binding to the membrane have to minimize sample loss.
- Sterile filtration (0.2 µm) and clarification (0.45 µm) of nutrient media, biological fluids, cell culture solutions, proteins, enzymes or serum additives
- Sterilization of biological solutions, e.g. drug preparations, pharmaceuticals or infusion solutions for which a test for biocompatibility and cytotoxicity according to the USP standard is required.
- Rapid ultra-cleaning, particle removal and clarification of liquids (0.45 µm)
- Environmental analysis (preparation of soil samples)

Ordering information
Article numbers of the membrane filter can be found on page 146. Other versions are available on request.

PTFE membranes filter

Recommended for filtration and sterilisation of aggressive organic and inorganic solvents and samples and for venting

- Made entirely of PTFE (polytetrafluorethylene), reinforced by Polypropylene net
- Permanently hydrophobic
- Allowing passage of air even at low differential pressure
- Resistant to almost all chemicals, very strong acids, cryoliquids, alkalis, aggressive organic solvents

Technical data

Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble pressure *** [bar]
0.2	220	12	1.2
0.45	220	25	0.6
5	220	300	-

** as per DIN 53105*
*** as per DIN 58355: Average value per cm² area at Δp = 0.7 bar*
**** as per DIN 58355 Isopropanol 60%*

- Adsorption 5 µg/cm² for γ-globulin (pore size 0.2 µm)
- Extractables with water not detected
- Sterilisation: by autoclaving (at 121 °C or 134 °C) or ethylene oxide
- Temperature-resistant up to 145 °C
- The resistance to various chemical solvents is summarised on page 138

Applications

- Filtering chemically aggressive samples
- Clarifying corrosive substances, strong acids and alkalis (0.45 µm)
- Clarification of samples and mobile phases of HPLC (0.45 µm)
- Sterilisation of air and gases (0.2 µm)
- Separation of aqueous aerosols from gases
- Sterile venting of fermentation vessels, tanks and containers (0.2 µm)
- Must be pre-wetted with an organic solvent, such as ethanol, methanol or isopropanol, before filtration of aqueous samples

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Hahnemühle syringe filter are HPLC tested

Cellulose acetate syringe filter

Recommended for clarification, purification and sterilisation of aqueous solutions and biological samples

- Cellulose acetate membrane, surfactant-free, hydrophilic
- Low non-specific adsorption (3.8 µg BSA/cm²)
- Suitable for aqueous solutions (pH 4-8) and most alcohols, carbohydrates and oils
- High flow rates: 0,2 µm: 16,1 ml/min/cm²; 0,45 µm: 54,7 ml/min/cm² (at 10 psi)
- Low dead volume
- Minimum of extractables
- Sterilisation by gamma irradiation or ethylene oxide, autoclaving is not recommended
- The resistance to various chemical solvents is summarised on page 140.

Technical data

Membrane diameter	Case material	Fitting inlet	Fitting outlet	Filter area (cm²)	Sample volume (ml)	Hold-up volume (µl)	Max. pressure (bar)	Max. Operating Temp. (°C)	Method of sterilisation
25 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	3	< 100	< 100	6	50	γ-radiation
30 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	4.5	< 200	< 200	6	50	γ-radiation

Applications

- Filtration of biological fluids, serum and nutrient media with a minimum loss of proteins owing to very low protein binding to the membrane
- Sterile filtration (0.2 µm) and clarification (0.45 µm) of nutrient media, biological fluids, cell solution, proteins, enzymes serum or additives
- Separation of virus/bacteria suspension (0.2 µm)
- Purification, particulate removal and clarification of liquids (0.45 µm)
- HPLC: Preparation of aqueous samples (0.45 µm)
- Clinical applications: Sterile filtration of injection solutions (0.2 µm)

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Hahnemühle Life Science

Regenerated cellulose syringe filter

High resistance during filtration and sterilisation of aqueous and organic samples in HPLC and GC applications

- Regenerated cellulose membrane, hydrophilic
- Low non-specific protein adsorption
- High flow rate, high throughput volume
- Resistant to almost all solvents and aqueous solutions in pH range 3-12
- Sterilisation by gamma irradiation or ethylene oxide, autoclaving is not recommended
- Low dead volume
- The resistance to various chemical solvents is summarised on page 140.
- Minimum of extractables

Technical data

Membrane diameter	Case material	Fitting inlet	Fitting outlet	Filter area (cm^2)	Sample volume (ml)	Hold-up volume (µl)	Max. pressure (bar)	Max. Operating Temp. (°C)	Method of sterilisation
13 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	1	< 10	< 25	6	50	γ-radiation
25 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	3	< 100	< 100	6	50	γ-radiation
30 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	4.5	< 200	< 200	6	50	γ-radiation

Applications

- Filtration and clarification of small volumes of aqueous, organic and mixed solutions (0.45 µm)
- Sterilisation and clarification of cell and protein solutions and biological fluids without loss of proteins (0.2 µm)
- HPLC: Filtering aqueous and organic solutions prior to sample injection (0.45 µm)
- GC: Preparation of samples (0.45 µm)

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Nylon syringe filter

Recommended for analytical applications, filtration of samples and solvents for HPLC under non-extreme conditions

- Nylon membrane, hydrophilic
- Suitable for dilute organic solvents (such as acetone, methylene chloride and acetonitrile) and alkaline solutions
- Do not contain wetting agents
- High flow rate and high throughput volume
- Low dead volume
- Sterilisation by gamma irradiation or ethylene oxide, autoclaving is not recommended
- The resistance to various chemical solvents is summarised on page 140.

Technical data

Membrane diameter	Case material	Fitting inlet	Fitting outlet	Filter area (cm^2)	Sample volume (ml)	Hold-up volume (µl)	Max. pressure (bar)	Max. Operating Temp. (°C)	Method of sterilisation
13 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	1	< 10	< 25	6	50	γ-radiation
25 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	3	< 100	< 100	6	50	γ-radiation
30 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	4.5	< 200	< 200	6	50	γ-radiation

Applications

- Filtration and clarification of small volumes prior to injection into HPLC system (0.45 µm)
- Sterilisation of aqueous and dilute organic solvents (0.2 µm)
- HPLC: Filtration of aqueous and organic solvents (0.45 µm)

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

Hahnemühle Life Science

Polyethersulfone syringe filter

Recommended for the clarification, purification and sterilization of aqueous solutions and biological samples.

- Asymmetric polyethersulfone (PES) membrane without wetting agent, hydrophilic
- Very low non-specific adsorption
- Suitable for aqueous solutions in a pH range from 1-14 short-term, 1-13 long-term
- The PES syringe filter are HPLC-tested and have a minimum extractable components of <0.1%
- High flow rate: 0.2 µm: >21 ml/min/sqm; 0.45 µm: >50 ml/min/sqm (at 10 psi)
- Low dead volume
- Sterilization with gamma irradiation or ethylene oxide (autoclaving is not recommended)
- The resistance to various solvents is shown on page page 140.

Technical Data

Membrane diameter	Hosing material	Input connection	Output connection	Filtration area (sqcm)	Recommended sample volume (ml)	Dead volume (µl)
25 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	4.08	10-100	< 100
30 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	5.39	100-200	< 200

Applications

- Filtration of biological fluids, serums or tissue culture additives, minimizing sample loss by a very low protein binding to the membrane
- Sterile filtration (0.2 µm) and clarification (0.45 µm) of nutrient media, biological fluids, cell culture solutions solutions, proteins, enzymes or serum additives
- Ultra-cleaning, particle removal and clarification of liquids (0.45 µm)
- HPLC: preparation of aqueous samples and a certain selection of organic solvents
- Clinical applications: Sterile filtration of injection solutions (0.2 µm)

Ordering information
Article numbers of the syringe filter can be found on page page 146. Other versions are available on request.

Owing to the colour code of Hahnemühle syringe filter, a mix-up can be excluded:

Orange = cellulose acetate
Light blue = regenerated cellulose
Blue = nylon
Pink = PTFE
Green = PES

Hahnemühle Life Science

PTFE syringe filter

Recommended for HPLC and GC samples, sterilisation and clarification of most solvents and filtration of gases and for sterile venting

- Polytetrafluorethylene (PTFE, Teflon) membrane, hydrophobic
- Very high flow rate
- High chemical resistance to most solvents and acids
- Low dead volume
- Sterilisation by autoclaving at 121°C or by ethylene oxide
- The resistance to various chemical solvents is summarised on page 140.
- Free from wetting agents
- They must be pre-wetted with a polar solvent such as ethanol or isopropanol before filtering aqueous samples

Technical data

Membrane diameter	Case material	Fitting inlet	Fitting outlet	Filter area (cm^2)	Sample volume (ml)	Hold-up volume (µl)	Max. pressure (bar)	Max. Operating Temp. (°C)	Method of sterilisation
13 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	1	< 10	< 25	6	50	γ-radiation
25 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	3	< 100	< 100	6	50	γ-radiation
30 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	4.5	< 200	< 200	6	50	γ-radiation

Applications

- Sterilisation (0.2 µm) and clarification (0.45 µm) of most acids and aggressive solvents
- Degassing solvents (0.45 µm)
- Venting of sterile containers (0.2 µm)
- Sterilisation of air, gas and aerosol (0.2 µm)
- Tool for protection within vacuum pump (0.2 µm)
- Clarification of small volume samples for HPLC and GC applications, which require greater chemical resistance than regenerated cellulose syringes (0,45 µm)
- Excellent for the sterilisation and clarification of most solvents (such as acetone, dimethyl formamide or DMSO), and of very aggressive or acidic solutions
- Filtration and degassing of solvents prior to analysis (0.45 µm)

Ordering information
The article numbers of the membrane filter are available on page 146. Other versions are available on request.

The optimal filter paper for every application

Residue analysis

Quantitative analysis

Aqueous solutions very acidic/alkaline

Pressure/vacuum high

Paper hardened quantitative

Coarse precipitates (12–25 µm)*, fast: **1505**

Medium-fine precipitates (4–12 µm)*, medium: **1506**

Very fine precipitates (≤ 2 µm)*, slow: **1507**

Pressure/vacuum normal

Glass microfibre

Colloidal precipitates (1–3 µm)*: **GF 50-51-52-55, GF 6-9**

Colloidal precipitates (1–3 µm), extreme pH*: **QFH**

Aqueous solutions acidic/alkaline

Pressure/vacuum normal

Paper quantitative

Coarse precipitates (12–25 µm)*, fast: **589/1**

Medium-fine precipitates (4–12 µm)*, medium: **589/2**

Medium-fine precipitates (4-7 µm)*, medium: **589/4**

Fine precipitates (4 µm)*, medium: **589/5**

Very fine precipitates (2 µm)*, slow: **589/6**

Colloidal precipitates (1–2 µm)*, very slow: **589/3**

Precipitates with nitrates, slow: **2095**

Glass microfibre

Colloidal precipitates (1–3 µm)*: **GF 50-51-52-55, GF 6-9, 20**

Air/gases

Pressure/vacuum normal

Glass/quartz-microfibre

Colloidal precipitates (1–3 µm)*: **QFH/CFV GF 6-10**

Please use quartz and glass microfibre filter at high pressure with mechanical support only.

*Retention range are approximate values.

Qualitative analysis

Aqueous solutions very acidic/alkaline

Pressure/vacuum high

Paper hardened qualitative

Coarse precipitates (12–25 µm)*, fast: **1573**

Medium-fine precipitates (7–12 µm)*, medium: **1574**

Very fine precipitates (≤ 2 µm)*, slow: **1575, 1577**

Aqueous solutions acidic/alkaline

Pressure/vacuum normal

Paper qualitative

Coarse precipitates (12–25 µm)*, fast: **604**

Medium-fine precipitates (7–12 µm)*, medium: **591, 598**

Medium-fine precipitates (4-7 µm)*, medium: **597, 595**

Fine precipitates (2–5 µm)*, medium: **593**

Very fine precipitates (2 µm)*, slow: **602h**

Colloidal precipitates (<2 µm)*, very slow: **602eh**

Please use quartz and glass microfibre filter at high pressure with mechanical support only.

*Retention range are approximate values.

The optimal filter paper for every application

Filtrate analysis

Removal of particles (sample preparation)

Aqueous solutions, very acidic/alkaline

Pressure/vacuum high

Paper hardened qualitative

Coarse precipitates (12–25 µm)*, fast: **1573**

Medium-fine precipitates (7–12 µm)*, medium: **1574**

Very fine precipitates (≤ 2 µm)*, slow: **1575, 1577**

Pressure/vacuum normal

Glass microfibre

Colloidal precipitates (1–3 µm)*, medium: **GF 51, GF 9**

Colloidal precipitates (1–3 µm)*: **QFH**

Aqueous solutions acidic/alkaline

Pressure/vacuum normal

Paper qualitative

Coarse precipitates (12–25 µm)*, fast: **604**

Medium-fine precipitates (7–12 µm)*, medium: **591, 598**

Medium-fine precipitates (4-7 µm)*, medium: **597, 595**

Fine precipitates (2–5 µm)*, medium: **593**

Very fine precipitates (2 µm)*, slow: **602h**

Colloidal precipitates (<2 µm)*, very slow: **602eh**

Glass microfibre

Colloidal precipitates (1–3 µm)*: **GF 51, GF 9 GF 20**

Paper general

Coarse precipitates (12–25 µm)*, fast: **1450nf, 0905**

Medium-fine precipitates (7–12 µm)*, medium: **0860, 0859, 400, 0858**

Fine precipitates (4-7 µm)*, medium: **0903**

Please use quartz and glass microfibre filter at high pressure with mechanical support only.

*Retention range are approximate values.

Overview of filtration speeds

	Technical grade	Analytical grade qualitative	Analytical grade quantitative	Quality of the precipitate	
slow	287	602eh		colloidal	1 µm
		1577	589/3		
	23	602h, 1575	1507	very fine crystalline	
			589/6		
	2589d				
medium	0903, 2589c	593	589/5		
	BF, 22			fine crystalline	
	2589b				
	572	595, 1574	589/4, 1506		
	3605, 3205	597	589/2		
	0860			medium-fine crystalline	
	2529a, 2048				
	0858, 0859	591, 598			
fast	2208, 2294				
	2410			coarse crystalline, flaky	
	1450nf, 2282	604	589/1		
	2772, 0905	1573	1505		
	520a				
	3144L			gelatinous	
	520b, 520bII				25 µm

Particle size

The relative position of the individual grades on the µm axis is to be understood as approximate rather than absolute.

Criteria for selecting the right filter material for filtration processes using membranes and syringe filter

When choosing the optimal membrane, the pore size is a very important variable. Depending on the aim, you should select the best compromise between filtration speed and retention rate:

- 0.2 µm pore size for sterilising liquids and air
- 0.45 µm pore size for clarification or microbiological retention
- 0.8 µm and larger pore size for particle removal and monitoring

The composition of the ingredients of the filtered media must not change by filtration:

- Choose types of membranes with known low unspecific adsorption: cellulose acetate (AC), regenerated cellulose (CR), Polyethersulfone (PES)
- For diluted protein solutions, keep the membrane diameter to a minimum to further avoid adsorption.

The syringe filter should not be decomposed by the used solvents:

Please see the overview of chemical compatibilities of the several membranes and syringe filter on pages 134-137. To meet this need, we offer membranes with a broad range of chemical compatibility. All our membranes are made from low extractable polymers to ensure that your filtered solutions do not retain impurities nor any particles. Most of the syringe filter are built with a polypropylene housing, which can stand the use of the usual solvents.

The syringe filter must have an optimal ratio between speed and hold-up volume:

- We offer syringe filter with various diameters, from 13 mm to 30 mm.

The high particle load of the sample may block the filter membrane or syringe filter:

-To avoid blocking the membrane, you should use a glass fibre filter as a pre-filter. The glass fibre filter GF9 is well accepted as a pre-filter for membranes to prevent the membranes from silting up. GF9 is available in different diameters: 50 mm and 90 mm. Order numbers: GF9050 and GF9090. Other sizes and special cuts are available on request.

The loss of expensive samples or media should be avoided:

- The design of our syringe filter features the lowest possible dead volume.

Minimising the risk of mix-ups between syringe filter:

membrane type and pore size are printed on the housing of the syringe filter. The colour of the edges of the syringe filter stands for a particular type of membrane.

Please contact us, we are happy to advise you:
Telephone: +49 55 61 791 687, Fax: +49 55 61 791 377, filtration@hahnemuehle.com

The optimal filter type for every application

Sample	Type of membrane		Benefits of the membrane type
Aqueous solution (hydrophile)	AC	Cellulose acetate	Very low protein binding
	NC	Cellulose nitrate	Broad range of various pore sizes, high protein binding
	MCE	Mixed Cellulose Ester	Constant weight, used for gravimetric analysis
	PES	Polyethersulfone	pH 1-13, <0.1 % extractable substances
Biological solution (hydrophilic)	AC	Cellulose acetate	Very low protein binding
	PES	Polyethersulfone	pH 1-13, <0.1 % extractable substances
Aqueous-organic solution (hydrophilic)	NY	Nylon (polyamide)	Fast wetting, very high mechanical strength (hydrophilic)
Organic solution (hydrophobic)	PTFE	Polytetrafluorethylene	Used for very strong acids and bases
Gases, even strongly oxidising	PTFE	Polytetrafluorethylene	Used for very strong acids and bases

Quality management

Hahnemühle strives to offer products and services that consistently meet our customers' requirements and expectations by applying a strict quality management system.

The DEKRA certification confirms that Hahnemühle meets all the requirements set out in DIN EN ISO 9001. The use of our quality management system guarantees a high standard of quality and a competitive position in international markets with increasingly stringent quality requirements.

Moreover, the certification documents our intense customer focus, which covers every stage of the value chain from product development to service provision. Ongoing further product development and continuous process improvements allow us to exceed the required quality standards.

Product manufacturers and quality assurance institutions must measure a product's performance and quality in a wide range of applications to verify its suitability. ISO/EN standards, guidelines issued by shareholder associations and state agencies stipulate the processes and tools for each application, not to mention the thresholds that must be observed. Filter papers from Hahnemühle provide a high degree of security.

Hahnemühle syringe filter and membranes are subject to stringent quality checks both during and after production. Finished products' storage life in the warehouse is constantly monitored. Each filter holder also undergoes the following five tests: bubble point, burst pressure, membrane adsorption, flow rate and extractable substances.

Hahnemühle has been a 'Brand of the Century' since 2016 and is part of the exclusive circle of Germany's strongest brands.

Sustainability

Clean water, natural fibres, first-rate expertise in paper production and absolute quality awareness have formed the foundation of our success for over 435 years. Using precious resources such as water, fibres and energy carefully and responsibly is a matter of course for us.

The water we use to produce our valuable FineArt papers comes straight from the source and is set apart by its particularly high level of purity, meaning it requires no chemical treatment whatsoever. Even at the end of the production cycle, the wastewater has not been contaminated with pollutants and is returned to the river as high-quality water.

FSC/PEFC-certified fibres

Linters – a by-product of the textile and oil industries

Reuse of production waste and use of recycled packaging materials

Electricity from 100% renewable energy sources

Ecovadis 2023

DEKRA ISO 9001 ISO 14001

Test methods

- Ash content as per DIN 54370
  Weighing the ash content of 10 g sample at 900 °C (only quantitative and qualitative filter papers).
- Separating performance as per BS 4400 (only for glass fibre filter)
  Sodium chloride aerosols with a particle size < 1µm (maximum for 0.3 – 0.5µm) are applied to a paper. Any aerosol passing through the paper is defined as photometric. Inflow velocity: 3 m/min.
- Burst pressure A paper sample is stretched over a rubber membrane. A constantly increasing force is applied and the pressure at the moment of bursting is measured.
- Breaking load (breaking resistance)
  Stability property of a paper under tensile stress. A 15 mm wide and 100 mm long test strip is subjected to an increasing vertical load. The maximum force at the moment of tearing is the tensile strength. It is determined for the cross and machine direction of the paper.
- Cobb-Test (water absorption capacity, g /m²)
  Test used to determine the amount of water absorbed after 10 minutes by the surface of a 100 cm² large test sample under pre-assigned conditions. EN ISO 535.
- Thickness (mm)
  Thickness is determined using a meter (test area = 2 cm²). As per EN ISO 534, the surface pressure averages 25 kPa
- Iron (mg /100 g)
  DIN 54374.
- Grammage (g /m²)
  A 100 cm² sample is weighed. EN ISO 536.
- Gurley (s)
  Time is recorded for 100 ml of air to pass through the sample at a certain pressure and 1.56 cm² sample area. ISO 5636-5.
- Resins and oils (mg/100 g)
  Determination of dichloromethane soluble matter. ISO 624.
- Herzberg flow rate test (s)
  Test to determine flow rate using 100 ml pre-filtered distilled water (20°C) applied to the test filter (effective area 10 cm²) at a constant hydrostatic head.
- Copper (mg /100 g)
  DIN 54375.
- Porosity (L/m² s)
  Determination of apparent porosity with a pressure differential of 2 mbar and a test area of 20 cm². ISO 53887
- Wet tensile (mm, water column)
  Determined by continuously increasing a water column over a test area of 14.5 cm2 until the paper bursts. Plant standard.
- pH value – hot extract
  A sample of 5 g is leached for 1 h with 250 ml of boiling distilled water and the pH value in the extract is measured using a glass electrode after cooling down to 20°C. DIN 53124.
- Suction lift as per Klemm (mm)
  Determination of capillary rise by measuring the wet part of a paper strip (15 x 250 mm) immersed in pre-filtered water (20°C) after 10 or 30 minutes. DIN ISO 8787.
- Water absorption (g /m²)
  Determination by differential weighing of a sample with a surface area of 100 cm². (Weight 2 - weight 1) x 100 = water absorption Weight 1 = dry weight Weight 2 = weight after immersing the test sample in distilled water for 1 minute and removing the excess surface water. Plant standard.
- Whiteness (%)
  Determination of CIE whiteness viewed under the CIE D65 daylight illuminant at an angle of 10°. λ = 460 nm.

Parameters and testing methods for membranes

Test Criteria	Description	Units
Pore size	One dry membrane filter and one wetted with a special liquid are subjected to continuously increasing pressure in a Coulter Porometer; in both cases, the air flow through the membrane is measured.	µm
Bubble point DIN 58355 part 2 ASTM F 316	The membrane filter is wetted completely with water or isopropanol (PTFE membranes) and a continuously increasing pressure is applied to the inlet side until air bubbles appear at the outlet side. The bubble point correlates directly with the pore size and can be used to check the integrity of the filter.	bar
Water flow as per DIN 58355 part 1	The time taken for a certain amount of pre-filtered, deionised water (or ethanol for PTFE filter) to pass through the membrane filter is determined at a vacuum of 0.9 bar.	ml/min/cm²
Air flow rate	The time taken for the filtration of a defined volume of air (e.g. 100 ml) at a pressure of 3 mbar through a filter area of 6.45 cm².	ml/min/cm²
Thickness	The determination is carried out using callipers with 2 cm² jaws and a contact pressure of 0.1 bar (100 g/cm²).	µm
Wetting	A membrane filter with a diameter of 50 mm is placed on water. The time taken for it to become completely wetted is measured.	s

Test Criteria	Description	Units
Burst pressure (bar)	A 10 cm² membrane sample is stretched over a rubber membrane. A constantly increasing force is applied and the pressure at the moment of bursting is measured.	bar
Extractable components (Weight loss) DIN 58 355 part 6	A membrane filter is weighed, placed in boiling water for 30 minutes, dried and then reweighed. The loss in weight is a measure of the extractable component fraction.	%
Bacterial challenge test DIN 58 355 part 3 ASTM D 3863 C	A medium containing test bacteria is filtered through the membrane filter (microorganism density 10^7 microorganisms/cm³). After an incubation period of 72 hours the filtrate must show no signs of bacterial growth. Test bacteria: 0.15 µm - *Burkholderia cepacia* 0.2 µm - *Brevundimonas diminuta* 0.45 µm - *Serratia marcescens*	Optical evaluation (Turbidity)
Checking the sterilisation method with bio-indicators as per DIN 58 948 Teil 8	During the sterilisation process test strips with living bacterial spores are applied to the individually packed membranes. These are then incubated in a nutrient solution. After 7 days, no turbidity (= bacterial growth) should be visible. Test spores: Ethylene oxide gas exposure: *Bacillus subtilis* γ-sterilisation: *Bacillus pumilus*	Optical evaluation (Turbidity)

Chemical resistance – membranes

Membrane	AC	NC	MCE	PES	NY	PTFE
STERILISATION						
Ethylene oxide	++	++	++	++	++	++
Gamma irradiation	++	++	++	++	–	–
Autoclaving 121 °C, 30 minutes	++	++	++	++	++	++
SOLVENTS						
Acetone	–	–	–	–	++	++
Acetonitrile	–	n/a	n/a	–	n/a	++
Gasoline	+	++	++	+	++	++
Benzene	+	++	++	–	++	++
Benzyl alcohol	–	+	+	+	++	++
N-Butyl acetate	–	–	–	–	++	++
n-Butanol	+	++	++	++	++	++
Cellosolve	–	–	–	+	++	++
Chloroform	–	++	++	–	++	++
Cyclohexane	+	+	+	–	++	++
Cyclohexanone	+	–	–	–	++	++
Diethylacetamide	–	–	–	–	++	++
Diethyl ether	+	–	–	–	++	++
Dimethyl formamide	–	–	–	–	+	++
Dimethylsulfoxide	–	–	–	–	++	++
Dioxane	–	–	–	–	++	++
Ethanol, 98%	+	–	–	++	++	++
Ethyl acetate	–	–	–	–	++	++
Ethylene glycol	+	+	+	++	++	++
Formamide	–	–	–	++	++	++
Glycerin	+	++	++	++	++	++
n-Heptane	+	++	++	+	++	++
n-Hexane	+	++	++	+	++	++
Isobutanol	+	+	+	++	++	++
Isopropanol	+	+	+	++	++	++
Isopropyl acetate	–	–	–	–	++	++
Methanol, 98%	–	–	–	+	++	++
Methyl acetate	–	–	–	–	++	++
Methylen chloride	–	+	n/a	–	++	++
Methyl ethyl ketone	–	–	n/a	–	++	++
Methyl isobutyl ketone	–	–	n/a	–	++	++
Monochlorobenzene	–	++	n/a	+	++	++
Nitrobenzene	–	+	n/a	–	+	++
n-Pentane	+	++	++	++	++	++
Perchloroethylene	–	++	++	–	++	++
Pyridine	–	–	–	–	++	++
Carbon tetrachloride	–	++	++	–	++	++

Membrane	AC	NC	MCE	PES	NY	PTFE
Tetrahydrofuran	–	–	–	–	++	++
Toluene	+	++	++	–	++	++
Trichlorethane	–	++	++	–	++	++
Trichlorethylene	+	++	++	–	++	++
Xylene	+	++	++	–	++	++
ACIDS						
Acetic acid, 25%	+	+	+	+	–	++
Acetic acid, 80%	–	–	–	–	–	++
Hydrofluoric acid, 25%	–	+	–	–	–	++
Hydrofluoric acid, 50%	–	+	–	+	–	++
Perchloric acid, 25%	–	+	+	–	–	++
Phosphoric acid, 25%	+	+	+	+	–	++
Phosphoric acid, 86%	+	+	+	–	–	++
Nitric acid, 30%	–	+	+	+	–	++
Nitric acid, 65%	–	–	–	–	–	++
Hydrochloric acid, 15%	+	+	+	++	–	++
Hydrochloric acid, 20%	–	–	–	+	–	++
Sulphuric acid, 25%	–	–	+	+	–	++
Sulphuric acid, 98 %	–	–	–	–	–	++
Trichloroacetic acid, 25%	–	+	+	–	–	++
BASES						
Ammonia, 1 N	–	++	++	++	++	++
Ammonium hydroxide, 25%	+	–	+	+	++	++
Potassium hydroxide, 25%	–	–	–	++	+	++
Sodium hydroxide, 32%	–	–	–	+	+	++
Sodium hydroxide, 1N	–	–	–	++	++	++
AQUEOUS SOLUTIONS						
Formalin, 30%	++	++	++	+	++	++
Sodium hypochlorite, 5%	–	+	–	++	–	++
Hydrogen peroxide, 35%	–	++	–	++	–	++
pH RANGE						
pH 1–14	–	–	–	+	–	++
pH 1-13	–	–	–	++	+	++
pH 3–14	–	–	–	+	+	++
pH 3–12	–	–	–	++	++	++
pH 4-8	++	++	++	++	++	++

Legend

compatible	++	not compatible	–
limited compatibility	+	not analysed	n/a

Contact time: 24 h at 20 °C
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you want to filter by performing a trial filtration run before you start your actual filtration.

Chemical resistance – syringe filter

Membrane		AC	CR	PES	NY	PTFE
Housing	**PP**					
STERILISATION						
Ethylene oxide	++	++	++	++	++	++
Gamma irradiation	–	++	–	–	–	–
Autoclaving 121°C, 30 minutes	++	+	+	++	+	++
SOLVENTS						
Acetone	++	–	++	–	++	++
Acetonitrile	++	–	++	–	++	++
Gasoline	++	++	++	+	++	++
Benzyl alcohol	+	+	+	+	++	++
n-Butanol	++	+	++	++	++	++
Chloroform	++	–	++	–	++	++
Cyclohexane	+	+	+	–	++	++
Cyclohexanone	+	–	+	–	++	++
Diethylacetamide	++	–	++	–	++	++
Diethyl ether	++	+	++	–	++	++
Dimethylformamide	+	–	+	–	+	++
Dimethylsulfoxide	++	–	++	–	++	++
Dioxane	++	–	++	–	++	++
Ethanol, 98%	+	+	+	++	++	++
Ethylene glycol	++	++	++	++	++	++
Glycerine	+	+	+	++	++	++
n-Hexane	+	+	+	+	++	++
Isopropanol	++	+	++	++	++	++
n-Propanol	++	+	++	++	++	++
Isopropyl acetone	++	+	++	–	++	++
Methanol, 98%	+	+	+	+	++	++
Methylene chloride	++	–	++	–	+	++
Methyl ethyl ketone	+	–	+	–	++	++
Methyl isobutyl ketone	+	–	+	–	-	++
Monochlorobenzene	+	+	+	+	++	++
Perchloroethylene	++	–	++	–	++	++
Propylene glycol	++	+	+	+	++	++
Pyridine	++	–	++	–	++	++
Carbon tetrachloride	–	-	–	–	++	++
Tetrahydrofuran	++	–	++	–	++	++
Toluene	++	–	++	–	++	++
Trichlorethylene	++	++	++	–	++	+
Xylene	+	++	+	–	++	++
ACIDS						
Formic acid	+	+	-	+	-	++
Acetic acid, 25%	+	-	+	+	++	++

Membrane		AC	CR	PES	NY	PTFE
Housing	**PP**					
Acetic acid, 80%	+	-	+	–	+	++
Phosphoric acid, 25%	+	-	–	+	–	++
Nitric acid, 25 %	+	–	–	+	–	++
Hydrochloric acid, 25 %	+	–	–	+	–	++
Sulphuric acid, 25%	++	-	+	+	–	++
Sulphuric acid, 98 %	+	–	–	–	–	++
Trichloroacetic acid, 25%	+	-	+	–	–	++
BASES						
Ammonium hydroxide, 25%	+	-	+	+	++	++
Sodium hydroxide, 32%	+	–	–	++	++	++
AQUEOUS SOLUTIONS						
Formalin, 30%	+	+	+	+	++	++
Sodium hypochlorite, 5%	+	–	–	++	–	++
Hydrogen peroxide, 35%	++	+	–	++	++	++
pH RANGE						
pH 1-14	++	–	–	+	–	++
pH 1-13	++	–	–	++	–	++
pH 3-14	++	–	+	+	++	++
pH 3–12	++	–	++	++	++	++
pH 4-8	++	++	++	++	++	++

Legend

compatible	++	not compatible	–
limited compatible	+	not analysed	n/a

Contact time: 24 h at 20 °C
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you want to filter by performing a trial filtration run before you start your actual filtration.

Order numbers:
Filter papers

Type	Format	Pack size	Order number
0048	Filter circles, 32 mm	1000 pc.	DP0048032
0858	Sheets 110 x 580 mm	500 pc.	08581158
0858	Sheets 300 x 300 mm	100 pc.	52858812
0858	Sheets 580 x 580 mm	500 pc.	RM08585858
0858	Folded filter, 150 mm	100 pc.	DF0858150
0858	Folded filter, 185 mm	100 pc.	DF0858185
0858	Folded filter, 240 mm	100 pc.	DF0858240
0858	Folded filter, 320 mm	100 pc.	DF0858320
0859	Sheets, 580 mm x 580 mm	500 pc.	RM08595858
0860	Sheets , 450 mm x 450 mm	500 pc.	RM08604545
0860	Folded filter, 150 mm	100 pc.	DF0860150
0860	Folded filter, 185 mm	100 pc.	DF0860185
0860	Faltenfilter, 240 mm	100 pc.	DF0860240
0860	Folded filter, 320 mm	100 pc.	DF0860320
0860	Folded filter, 600 mm	50 pc.	DF0860600
0903	Sheets , 580 mm x 580 mm	500 pc.	RM09035858
0905	Sheets , 580 mm x 580 mm	500 pc.	RM09055858
0905	Folded filter, 320 mm	100 pc.	DF0905320
1505	Filter circles, 110 mm	100 pc.	DP1505110
1505	Filter circles, 125 mm	100 pc.	DP1505125
1505	Filter circles, 150 mm	100 pc.	DP1505150
1506	Filter circles, 125 mm	100 pc.	DP1506125
1506	Filter circles, 150 mm	100 pc.	DP1506150
1506	Filter circles, 240 mm	100 pc.	DP1506240
1507	Filter circles, 125 mm	100 pc.	DP1507125
1507	Filter circles, 150 mm	100 pc.	DP1507150
1507	Filter circles, 185 mm	100 pc.	DP1507185
1573	Folded filter, 125 mm	100 pc.	DF1573125
1573	Folded filter, 185 mm	100 pc.	DF1573185
1573	Folded filter, 240 mm	100 pc.	DF1573240
1573	Filter circles, 90 mm	100 pc.	DP1573090
1573	Filter circles, 125 mm	100 pc.	DP1573125
1573	Filter circles, 150 mm	100 pc.	DP1573150
1573	Filter circles, 185 mm	100 pc.	DP1573185
1573	Filter circles, 240 mm	100 pc.	DP1573240
1574	Sheets 460 x 570 mm	100 pc.	15744657
1574	Filter circles, 47 mm	100 pc.	DP1574047
1574	Filter circles, 70 mm	100 pc.	DP1574070
1574	Filter circles, 90 mm	100 pc.	DP1574090
1574	Filter circles, 110 mm	100 pc.	DP1574110
1574	Filter circles, 150 mm	100 pc.	DP1574150
1574	Filter circles, 240 mm	100 pc.	DP1574240
1575	Filter circles, 55 mm	100 pc.	DP1575055
1575	Filter circles, 70 mm	100 pc.	DP1575070
1575	Filter circles, 110 mm	100 pc.	DP1575110
1575	Filter circles, 125 mm	100 pc.	DP1575125
1575	Filter circles, 150 mm	100 pc.	DP1575150
1575	Filter circles, 240 mm	100 pc.	DP1575240
2043A	Sheets 460 x 570 mm	100 pc.	2043A4657
2043A	Sheets 580 x 600 mm	100 pc.	2043A5860
2043B	Sheets 460 x 570 mm	100 pc.	2043B4657
2095	Folded filter, 240 mm	100 pc.	DF2095240
22	Round plates, 6 mm	1000 pc.	A22060
22	Round plates, 9 mm	1000 pc.	A22090
2282	Round plates 25 mm	100 pc.	DP2282025
2294	Filter circles, 110 mm	100 pc.	DP2294110
2555	Folded filter, 185 mm	100 pc.	DF2555185
2555	Folded filter, 240 mm	100 pc.	DF2555240
2555	Folded filter, 320 mm	100 pc.	DF2555320
2589C	25 x 75 mm, two holes (6 mm)	200 pc.	2589C2575
2589D	25 x 75 mm, two holes (6 mm)	200 pc.	2589D2575
2668	Round plates, 6 mm	1000 pc.	A2668060
2668	Round plates, 9 mm	1000 pc.	A2668090
2668	Sheets 580 x 600 mm	50 pc.	26685860
2727	Sheets 190 x 190 mm	100 pc.	52270800
2772	Folded filter, 500 mm	100 pc.	DF2772500
287	Folded filter, 125 mm	100 pc.	DF287125
287	Folded filter, 150 mm	100 pc.	DF287150
287	Folded filter, 185 mm	100 pc.	DF287185
287	Folded filter, 240 mm	100 pc.	DF287240
295PE	Roll 460 mm x 50 m	1 pc.	55335865
295PE	Roll 1200mm x 50 m	1 pc.	55335874
295PE	Sheets 460 x 570 mm	100 pc.	55335885
2992	Sheets 580x580mm	100 pc.	52292358
3002	Filter circles, 200 mm	1000 pc.	DP3002200
3014	110 mm x 2 m, 50 double folds, 20 mm height	1008 pc.	301411200
3014	110 mm x 2 m, 50 double folds, 20 mm height	306 pc.	301411200V300
310	10 x 15 cm	6 x 100 pc.	3101015
3236	110 mm x 2 m, 50 double folds, 20 mm height	1008 pc.	323611200
3324	Round plates, Ø 6 mm	1000 pc.	A3324060
3459	Filter circles, 230 mm	100 pc.	DP3459230
360	5 x 5 cm	500 pc.	3600505
360	10 x 10 cm	500 pc.	3601010
360	15 x 15 cm	500 pc.	3601515
400	Filter circles, 47 mm	100 pc.	DP400047
400	Filter circles, 55 mm	100 pc.	DP400055
400	Filter circles, 70 mm	100 pc.	DP400070
400	Filter circles, 90 mm	100 pc.	DP400090
400	Filter circles, 110 mm	100 pc.	DP400110
400	Filter circles, 125 mm	100 pc.	DP400125
400	Filter circles, 130 mm	100 pc.	DP400130
400	Filter circles, 150 mm	100 pc.	DP400150
400	Filter circles, 185 mm	100 pc.	DP400185
400	Filter circles, 200 mm	100 pc.	DP400200
400	Filter circles, 240 mm	100 pc.	DP400240
400	Filter circles, 250 mm	100 pc.	DP400250
400	Filter circles, 500 mm	100 pc.	DP400500
400	Sheets 460 x 570 mm	100 pc.	4004657
400	Folded filter, 70 mm	100 pc.	DF400070
400	Folded filter, 90 mm	100 pc.	DF400090
400	Folded filter, 100 mm	100 pc.	DF400100
400	Folded filter, 110 mm	100 pc.	DF400110
400	Folded filter, 125 mm	100 pc.	DF400125
400	Folded filter, 130 mm	100 pc.	DF400130
400	Folded filter, 150 mm	100 pc.	DF400150
400	Folded filter, 185 mm	100 pc.	DF400185
400	Folded filter, 200 mm	100 pc.	DF400200
400	Folded filter, 300 mm	100 pc.	DF400300
400	Folded filter, 320 mm	100 pc.	DF400320
400	Folded filter, 400 mm	100 pc.	DF400400
400	Folded filter, 500 mm	100 pc.	DF400500
400	Folded filter, 650 mm	100 pc.	DF400650
508	Filter circles, 110 mm	100 pc.	DP508110
520a	Folded filter, 185 mm	100 pc.	DF520a185
520a	Folded filter, 240 mm	100 pc.	DF520a240
520a	Folded filter, 500 mm	100 pc.	DF520a500
520b	Sheets 580 x 580 mm	100 pc.	520b5858
520b	Folded filter, 150 mm	100 pc.	DF520b150
520b	Folded filter, 185 mm	100 pc.	DF520b185
520b	Folded filter, 240 mm	100 pc.	DF520b240
520b	Folded filter, 500 mm	20 pc.	DF520b500
520b	Folded filter, 600 mm	20 pc.	DF520b600
551	Filter circles, 55mm	100 pc.	DP551055
551	Filter circles, 70mm	100 pc.	DP551070
551	Filter circles, 90mm	100 pc.	DP551090
551	Filter circles, 240mm	100 pc.	DP551240
5703	Sheets 580 x 580 mm	100 pc.	57035858
589/1	Filter circles, 41 mm	100 pc.	DP5891041
589/1	Filter circles, 47 mm	100 pc.	DP5891047
589/1	Filter circles, 55 mm	100 pc.	DP5891055
589/1	Filter circles, 70 mm	100 pc.	DP5891070
589/1	Filter circles, 90 mm	100 pc.	DP5891090
589/1	Filter circles, 110 mm	100 pc.	DP5891110
589/1	Filter circles, 125 mm	100 pc.	DP5891125
589/1	Filter circles, 150 mm	100 pc.	DP5891150
589/1	Filter circles, 185 mm	100 pc.	DP5891185
589/1	Filter circles, 240 mm	100 pc.	DP5891240
589/2	Filter circles, 12.5 mm	1000 pc.	DP58920125
589/2	Filter circles, 12.7 mm	1000 pc.	DP58920127
589/2	Filter circles, 40.5 mm	100 pc.	DP58920405
589/2	Filter circles, 55 mm	100 pc.	DP5892055
589/2	Filter circles, 70 mm	100 pc.	DP5892070
589/2	Filter circles, 90 mm	100 pc.	DP5892090
589/2	Filter circles, 110 mm	100 pc.	DP5892110
589/2	Filter circles, 125 mm	100 pc.	DP5892125
589/2	Filter circles, 150 mm	100 pc.	DP5892150
589/2	Filter circles, 185 mm	100 pc.	DP5892185
589/3	Filter circles, 47 mm	100 pc.	DP5893047
589/3	Filter circles, 55 mm	100 pc.	DP5893055
589/3	Filter circles, 70 mm	100 pc.	DP5893070
589/3	Filter circles, 90 mm	100 pc.	DP5893090
589/3	Filter circles, 110 mm	100 pc.	DP5893110
589/3	Filter circles, 125 mm	100 pc.	DP5893125
589/3	Filter circles, 150 mm	100 pc.	DP5893150
589/3	Filter circles, 185 mm	100 pc.	DP5893185
589/3	Filter circles, 240 mm	100 pc.	DP5893240
589/4	Filter circles, 90 mm	100 pc.	DP5894090
589/4	Filter circles, 110 mm	100 pc.	DP5894110
589/4	Filter circles, 125 mm	100 pc.	DP5894125
589/4	Filter circles, 150 mm	100 pc.	DP5894150
589/5	Filter circles, 55 mm	100 pc.	DP5895055
589/5	Filter circles, 90 mm	100 pc.	DP5895090
589/5	Filter circles, 110 mm	100 pc.	DP5895110
589/5	Filter circles, 125 mm	100 pc.	DP5895125
589/5	Filter circles, 150 mm	100 pc.	DP5895150
591	Sheets 580x580mm	100 pc.	5915858
593	Folded filter, 110 mm	100 pc.	DF593110
593	Folded filter, 125 mm	100 pc.	DF593125
593	Folded filter, 150 mm	100 pc.	DF593150
593	Folded filter, 185 mm	100 pc.	DF593185
593	Folded filter, 240 mm	100 pc.	DF593240
593	Filter circles, 90 mm	100 pc.	DP593090
593	Filter circles, 125 mm	100 pc.	DP593125
593	Filter circles, 150 mm	100 pc.	DP593150
593	Filter circles, 185 mm	100 pc.	DP593185
593	Filter circles, 320 mm	100 pc.	DP593320
595	Sheets 580 x 580 mm	100 pc.	5955858
595	Folded filter, 90 mm	100 pc.	DF595090
595	Folded filter, 110 mm	100 pc.	DF595110
595	Folded filter, 125 mm	100 pc.	DF595125
595	Folded filter, 150 mm	100 pc.	DF595150
595	Folded filter, 185 mm	100 pc.	DF595185
595	Folded filter, 240 mm	100 pc.	DF595240
595	Folded filter, 270 mm	100 pc.	DF595270
595	Folded filter, 320 mm	100 pc.	DF595320
595	Folded filter, 385 mm	100 pc.	DF595385
595	Folded filter, 500 mm	100 pc.	DF595500
595	Filter circles, 47 mm	100 pc.	DP595047
595	Filter circles, 55 mm	100 pc.	DP595055
595	Filter circles, 70 mm	100 pc.	DP595070
595	Filter circles, 90 mm	100 pc.	DP595090
595	Filter circles, 110 mm	100 pc.	DP595110
595	Filter circles, 125 mm	100 pc.	DP595125
595	Filter circles, 150 mm	100 pc.	DP595150
595	Filter circles, 185 mm	100 pc.	DP595185
595	Filter circles, 240 mm	100 pc.	DP595240
597	Sheets 580 x 580 mm	100 pc.	5975858
597	Folded filter, 90 mm	100 pc.	DF597090
597	Folded filter, 110 mm	100 pc.	DF597110
597	Folded filter, 125 mm	100 pc.	DF597125

Order numbers:
Filter papers

Type	Format	Pack size	Order number
597	Folded filter, 150 mm	100 pc.	DF597150
597	Folded filter, 185 mm	100 pc.	DF597185
597	Folded filter, 240 mm	100 pc.	DF597240
597	Folded filter, 270 mm	100 pc.	DF597270
597	Folded filter, 320 mm	100 pc.	DF597320
597	Folded filter, 385 mm	100 pc.	DF597385
597	Filter circles, 47 mm	100 pc.	DP597047
597	Filter circles, 55 mm	100 pc.	DP597055
597	Filter circles, 70 mm	100 pc.	DP597070
597	Filter circles, 90 mm	100 pc.	DP597090
597	Filter circles, 110 mm	100 pc.	DP597110
597	Filter circles, 125 mm	100 pc.	DP597125
597	Filter circles, 150 mm	100 pc.	DP597150
597	Filter circles, 185 mm	100 pc.	DP597185
597	Filter circles, 240 mm	100 pc.	DP597240
597	Filter circles, 320 mm	100 pc.	DP597320
598	Sheets 460 x 570 mm	100 pc.	5984657
598	Folded filter, 90 mm	100 pc.	DF598090
598	Folded filter, 110 mm	100 pc.	DF598110
598	Folded filter, 125 mm	100 pc.	DF598125
598	Folded filter, 150 mm	100 pc.	DF598150
598	Folded filter, 185 mm	100 pc.	DF598185
598	Folded filter, 240 mm	100 pc.	DF598240
598	Filter circles, 90 mm	100 pc.	DP598090
598	Filter circles, 110 mm	100 pc.	DP598110
602eh	Folded filter, 110 mm	100 pc.	DF602eh110
602eh	Folded filter, 125 mm	100 pc.	DF602eh125
602eh	Folded filter, 150 mm	100 pc.	DF602eh150
602eh	Folded filter, 185 mm	100 pc.	DF602eh185
602eh	Folded filter, 320 mm	100 pc.	DF602eh320
602eh	Filter circles, 125 mm	100 pc.	DP602eh125
602eh	Filter circles, 240 mm	100 pc.	DP602eh240
602h	Folded filter, 90 mm	100 pc.	DF602090
602h	Folded filter, 110 mm	100 pc.	DF602110
602h	Folded filter, 125 mm	100 pc.	DF602125
602h	Folded filter, 150 mm	100 pc.	DF602150
602h	Folded filter, 185 mm	100 pc.	DF602185
602h	Folded filter, 240 mm	100 pc.	DF602240
602h	Folded filter, 320 mm	100 pc.	DF602320
602h	Filter circles, 70 mm	100 pc.	DP602070
602h	Filter circles, 90 mm	100 pc.	DP602090
602h	Filter circles, 110 mm	100 pc.	DP602110
602h	Filter circles, 125 mm	100 pc.	DP602125
602h	Filter circles, 150 mm	100 pc.	DP602150
602h	Filter circles, 185 mm	100 pc.	DP602185
602h	Filter circles, 240 mm	100 pc.	DP602240
604	Folded filter, 90 mm	100 pc.	DF604090
604	Folded filter, 110 mm	100 pc.	DF604110
604	Folded filter, 125 mm	100 pc.	DF604125
604	Folded filter, 150 mm	100 pc.	DF604150
604	Folded filter, 185 mm	100 pc.	DF604185
604	Folded filter, 240 mm	100 pc.	DF604240
604	Folded filter, 320 mm	100 pc.	DF604320
604	Filter circles, 55 mm	100 pc.	DP604055
604	Filter circles, 90 mm	100 pc.	DP604090
604	Filter circles, 110 mm	100 pc.	DP604110
604	Filter circles, 125 mm	100 pc.	DP604125
604	Filter circles, 150 mm	100 pc.	DP604150
604	Filter circles, 185 mm	100 pc.	DP604185
900	Ø 19 x 90 mm	25 pc.	90019090
900	Ø 22 x 80 mm	25 pc.	90022080
900	Ø 22 x 100 mm	25 pc.	90022100
900	Ø 25 x 60 mm	25 pc.	90025060
900	Ø 25 x 70 mm	25 pc.	90025070
900	Ø 25 x 80 mm	25 pc.	90025080
900	Ø 25 x 100 mm	25 pc.	90025100
900	Ø 28 x 60 mm	25 pc.	90028060
900	Ø 28 x 80 mm	25 pc.	90028080
900	Ø 28 x 100 mm	25 pc.	90028100
900	Ø 30 x 80 mm	25 pc.	90030080
900	Ø 30 x 100 mm	25 pc.	90030100
900	Ø 33 x 60 mm	25 pc.	90033060
900	Ø 33 x 80 mm	25 pc.	90033080
900	Ø 33 x 90 mm	25 pc.	90033090
900	Ø 33 x 94 mm	25 pc.	90033094
900	Ø 33 x 100 mm	25 pc.	90033100
900	Ø 33 x 118 mm	25 pc.	90033118
900	Ø 33 x 130 mm	25 pc.	90033130
900	Ø 33 x 205 mm	25 pc.	90033205
900	Ø 35 x 150 mm	25 pc.	90035150
900	Ø 40 x 100 mm	25 pc.	90040100
900	Ø 40 x 123 mm	25 pc.	90040123
900	Ø 40 x 150 mm	25 pc.	90040150
900	Ø 43 x 123 mm	25 pc.	90043123
901	Ø 26 (OD) x 60 mm (length)	25 pc.	90126060
BP002	460 mm x 570 mm	100 pc.	BP0024657
BP002	580mm x 600mm	100 pc.	BP0025860
BP003	580mm x 600mm	50 pc.	BP0035860
BP005	580mm x 600mm	25 pc.	BP0055860
CFV	Ø 19 x 90 mm	25 pc.	CFV19090
CFV	Ø 22 x 80 mm	25 pc.	CFV22080
CFV	Ø 25 x 100 mm	25 pc.	CFV25100
CFV	Ø 26 x 60 mm	25 pc.	CFV26060
CFV	Ø 30 x 100 mm	25 pc.	CFV30100
CFV	Ø 33 x 94 mm	25 pc.	CFV33094
CFV	Ø 43 x 123 mm	25 pc.	CFV43123
GF6	Filter circles, 25 mm	100 pc.	GF6025
GF6	Filter circles, 47 mm	100 pc.	GF6047
GF6	Filter circles, 50 mm	100 pc.	GF6050
GF6	Filter circles, 55 mm	100 pc.	GF6055
GF6	Filter circles, 70 mm	100 pc.	GF6070
GF6	Filter circles, 90 mm	100 pc.	GF6090
GF6	Filter circles, 100 mm	100 pc.	GF6100
GF6	Filter circles, 125 mm	100 pc.	GF6125
GF6	Filter circles, 142 mm	100 pc.	GF6142
GF6	Filter circles, 185 mm	100 pc.	GF6185
GF6	Filter circles, 293 mm	100 pc.	GF6293
GF8	Filter circles, 90 mm	100 pc.	GF8090
GF8	Round filter, 60 x 90 mm	100 pc.	GF86090
GF9	Filter circles, 50 mm	100 pc.	GF9050
GF9	Filter circles, 90 mm	100 pc.	GF9090
GF10	Filter circles, 47 mm	100 pc.	GF10047
GF10	Filter circles, 100 mm	100 pc.	GF10100
GF10	Filter circles, 200 mm	100 pc.	GF10200
GF20	Filter circles, 150 mm	250 pc.	GF20150
GF50	Filter circles, 25 mm	100 pc.	GF50025
GF50	Filter circles, 37 mm	100 pc.	GF50037
GF50	Filter circles, 47 mm	100 pc.	GF50047
GF50	Filter circles, 50 mm	100 pc.	GF50050
GF50	Filter circles, 55 mm	100 pc.	GF50055
GF50	Filter circles, 70 mm	100 pc.	GF50070
GF50	Filter circles, 90 mm	100 pc.	GF50090
GF50	Filter circles, 125 mm	100 pc.	GF50125
GF50	Sheets , 203 mm x 254 mm	100 pc.	GF50203254
GF51	Filter circles, 47 mm	100 pc.	GF51047
GF52	Filter circles, 47 mm	100 pc.	GF52047
GF52	Filter circles, 50 mm	100 pc.	GF52050
GF52	Filter circles, 70 mm	100 pc.	GF52070
GF52	Filter circles, 90 mm	100 pc.	GF52090
GF52	Filter circles, 110 mm	100 pc.	GF52110
GF55	Filter circles, 47 mm	100 pc.	GF55047
GF55	Sheets, 60 x 90 mm	100 pc.	GF556090
QFH	Filter circles, 47 mm	50 pc.	QFH047
QFH	Filter circles, 150 mm	50 pc.	QFH150
QFH	Sheets , 203 mm x 254 mm	50 pc.	QFH203254
Drying pad	Strips 37 x 100 mm, 50 strips each	100 pc.	TB342750

Order numbers:

Membrane filter

Type	Format	Pack size	Order number
Cellulose acetate	0.2 µm, non-sterile, white, 25 mm	100 pc.	AC02025BL
Cellulose acetate	0.2 µm, non-sterile, white, 47 mm	100 pc.	AC02047BL
Cellulose acetate	0.45 µm, non-sterile, white, 25 mm	100 pc.	AC04525BL
Cellulose acetate	0.45 µm, non-sterile, white, 47 mm	100 pc.	AC04547BL
Cellulose acetate	0.45 µm, non-sterile, white, 50 mm	100 pc.	AC04550BL
Cellulose acetate	0.45 µm, non-sterile, 142 mm	25 pc.	AC045142BL
Mixed Cellulose Ester	0.2 µm, sterile, white, net, 47 mm	100 pc.	MCES02047BC
Mixed Cellulose Ester	0.2 µm, sterile, white, net, 50 mm	100 pc.	MCES02050BC
Mixed Cellulose Ester	0.45 µm, sterile, white, net, 47 mm	100 pc.	MCES04547BC
Mixed Cellulose Ester	0.45 µm, sterile, white, net, 50 mm	100 pc.	MCES04550BC
Mixed Cellulose Ester	0.2 µm, non-sterile, white, 50 mm	100 pc.	MCE02050BL
Mixed Cellulose Ester	0.45 µm, non-sterile, white, net, 50 mm	100 pc.	MCE04550NC
Mixed Cellulose Ester	0.45 µm, non-sterile, white, 25 mm	100 pc.	MCE04525BL
Mixed Cellulose Ester	0.45 µm, non-sterile, white, net, 47 mm	100 pc.	MCE04547BC
Mixed Cellulose Ester	0.45 µm, non-sterile, white, 47 mm	100 pc.	MCE04547BL
Mixed Cellulose Ester	0.45 µm, non-sterile, white, net, 50 mm	100 pc.	MCE04550BC
Mixed Cellulose Ester	3 µm, non-sterile, white, 47 mm	100 pc.	MCE30047BL
Mixed Cellulose Ester	5 µm, non-sterile, white, 47 mm	100 pc.	MCE50047BL
Mixed Cellulose Ester	8 µm, non-sterile, white, 47 mm	100 pc.	MCE80047BL
Cellulose nitrate	0.2 µm, non-sterile, white, 25 mm	100 pc.	NC02025BL
Cellulose nitrate	0.2 µm, non-sterile, white, 47 mm	100 pc.	NC02047BL
Cellulose nitrate	0.2 µm, non-sterile, white, 50 mm	100 pc.	NC02050BL
Cellulose nitrate	0.2 µm, sterile, white,net, 47 mm	100 pc.	NCS02047BC
Cellulose nitrate	0.45 µm, non-sterile, black, net, 47 mm	100 pc.	NCS04547NC
Cellulose nitrate	0.45 µm, non-sterile, black, net, 50 mm	100 pc.	NCS04550NC
Cellulose nitrate	0.45 µm, non-sterile, white, 25 mm	100 pc.	NC04525BL
Cellulose nitrate	0.45 µm, non-sterile, white, net, 47 mm	100 pc.	NC04547BC
Cellulose nitrate	0.45 µm, non-sterile, white, 47 mm	100 pc.	NC04547BL
Cellulose nitrate	0.45 µm, non-sterile, white, 50 mm	100 pc.	NC04550BL
Cellulose nitrate	0.45 µm, sterile, white, net, 47 mm	100 pc.	NCS04547BC
Cellulose nitrate	0.45 µm, sterile, white, 47 mm	100 pc.	NCS04547BL
Cellulose nitrate	0.8 µm, non-sterile, white, 47 mm	100 pc.	NC08047BL
Cellulose nitrate	0.8 µm, non-sterile, white, 50 mm	100 pc.	NC08050BL
Nylon	0.2 µm, non-sterile, white, 47 mm	100 pc.	NY02047BL
Nylon	0.45 µm, non-sterile, white, 47 mm	100 pc.	NY04547BL
PES	0.2 µm, non-sterile, 25 mm	100 pc.	PES02025BL
PES	0.2 µm, non-sterile, 47 mm	100 pc.	PES02047BL
PES	0.45 µm, non-sterile, 25 mm	100 pc.	PES04525BL
PES	0.45 µm, non-sterile, 47 mm	100 pc.	PES04547BL
PES	0.45 µm, non-sterile, 50 mm	100 pc.	PES04550BL
PES	0.45 µm, non-sterile, 142 mm	25 pc.	PES045142BL
PTFE	0.2 µm, non-sterile, white, 25 mm	100 pc.	PT02025BL
PTFE	0.2 µm, non-sterile, white, 47 mm	100 pc.	PT02047BL
PTFE	0.45 µm, non-sterile, white, 25 mm	100 pc.	PT04525BL
PTFE	0.45 µm, non-sterile, white, 47 mm	100 pc.	PT04547BL
PTFE	5 µm, non-sterile, white, 47 mm	100 pc.	PT50047BL
PTFE	5 µm, non-sterile, white, 90 mm	25 pc.	PT50090BL

Syringe filter

Type	Format	Pack size	Order number
Cellulose acetate	0.2 µm, sterile, 25 mm	100 pc.	SAC02025100
Cellulose acetate	0.2 µm, sterile, 25 mm	50 pc.	SACS0202550
Cellulose acetate	0.2 µm, sterile, 30 mm	50 pc.	SACS0203050
Cellulose acetate	0.45 µm, non-sterile, 25 mm	100 pc.	SAC04525100
Cellulose acetate	0.45 µm, non-sterile, 25 mm	500 pc.	SAC04525500
Cellulose acetate	0.45 µm, non-sterile, 30 mm	100 pc.	SAC04530100
Cellulose acetate	0.45 µm, non-sterile, 30 mm	500 pc.	SAC04530500
Cellulose acetate	0.45 µm, sterile, 25 mm	50 pc.	SACS0452550
Cellulose acetate	0.45 µm, sterile, 30 mm	50 pc.	SACS0453050
Nylon	0.2 µm, non-sterile, 13 mm	100 pc.	SNY02013100
Nylon	0.2 µm, non-sterile, 25 mm	100 pc.	SNY02025100
Nylon	0.2 µm, non-sterile, 25 mm	500 pc.	SNY02025500
Nylon	0.45 µm, non-sterile, 13 mm	100 pc.	SNY04513100
Nylon	0.45 µm, non-sterile, 25 mm	100 pc.	SNY04525100
Nylon	0.45 µm, non-sterile, 25 mm	500 pc.	SNY04525500
PES	0,2 µm, sterile, 25 mm	50 pc.	SPESS0202550
PES	0,2 µm, sterile, 30 mm	50 pc.	SPESS0203050
PES	0,45 µm, sterile, 25 mm	50 pc.	SPESS0452550
PES	0,45 µm, sterile, 30 mm	50 pc.	SPESS0453050
PES	0,2 µm, non-sterile, 25 mm	100 pc.	SPES02025100
PES	0,2 µm, non-sterile, 30 mm	100 pc.	SPES02030100
PES	0,45 µm, non-sterile, 25 mm	100 pc.	SPES04525100
PES	0,45 µm, non-sterile, 30 mm	100 pc.	SPES04530100
PTFE	0.2 µm, non-sterile, 13 mm	100 pc.	SPT02013100
PTFE	0.2 µm, non-sterile, 25 mm	100 pc.	SPT02025100
PTFE	0.45 µm, non-sterile, 13 mm	100 pc.	SPT04513100
PTFE	0.45 µm, non-sterile, 25 mm	100 pc.	SPT04525100
PTFE	0.45 µm, non-sterile, 25 mm	500 pc.	SPT04525500
PTFE	0.45 µm, non-sterile, 30 mm	100 pc.	SPT04530100
Regenerated Cellulose	0.2 µm, non-sterile, 13 mm	100 pc.	SCR02013100
Regenerated Cellulose	0.2 µm, non-sterile, 25 mm	100 pc.	SCR02025100
Regenerated Cellulose	0.45 µm, non-sterile, 13 mm	100 pc.	SCR04513100
Regenerated Cellulose	0.45 µm, non-sterile, 25 mm	100 pc.	SCR04525100
Regenerated Cellulose	0.45 µm, non-sterile, 30 mm	100 pc.	SCR04530100

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Type index

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