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Hahnemühle



CATALOGUE FILTRATION & SEPARATION

Microfiltration

Hahnemühle's Albet LabScience brand is a range of products designed for general filtration applications and complex filtration processes in life science and analytical applications in chemical and biological laboratories. The technical specifications of our membranes and syringe filters allow their use in areas where reproducibility and consistency are of major importance.

Quality

Our *syringe filters* undergo strict quality controls during and after production. The storage life of the finished products in the warehouse is constantly monitored. Each filter holder undergoes the following five tests: bubble point, burst pressure, membrane absorption, flow rate and extractable substances. The range includes filter holders for the reliable separation of microorganisms and particles in liquids, air and other gases. Clear and sterile filtration, sample production, sterile aeration and medical applications are just some of the areas where disposable filter holders are typically used. They are available in different pore sizes and with different hydrophilic or hydrophobic membrane materials.

Our microfiltration range also includes membrane units. The first step towards successful analysis is choosing the right membrane unit. We offer you different *membrane filters* with pore sizes from 0.2 µm – 8 µm for particle removal or for the collection of the microorganisms to be examined from solutions. Various cellulose-based membranes and polymer materials cover a wide range of application areas, from clarification and sample preparation to sterile and air filtration to aeration and microbiological control. See our quick and easy to use guidelines on page 8f, which will help you to decide which product is perfect for you.

Experience

Our range of papers for day-to-day laboratory applications is completed by our over *150 types of filter paper*, which we have been produced at our site in Dassel in Germany since 1883. See our separate catalogue for industrial and laboratory use filter papers for more detailed information about our range of filter papers.

Consistency

We care greatly about the quality of our products – because our success is due to customer satisfaction. We are aware of the importance of consistently high quality product properties. We do everything we can to maintain this quality in order to ensure that your analysis results are always reproducible.

We are a reliable partner that offers you the perfect product for your application as well as efficient order processing. We will of course deliver all orders promptly on the agreed date.
Leading businesses from sensitive industry sectors put their trust in us and in our products:

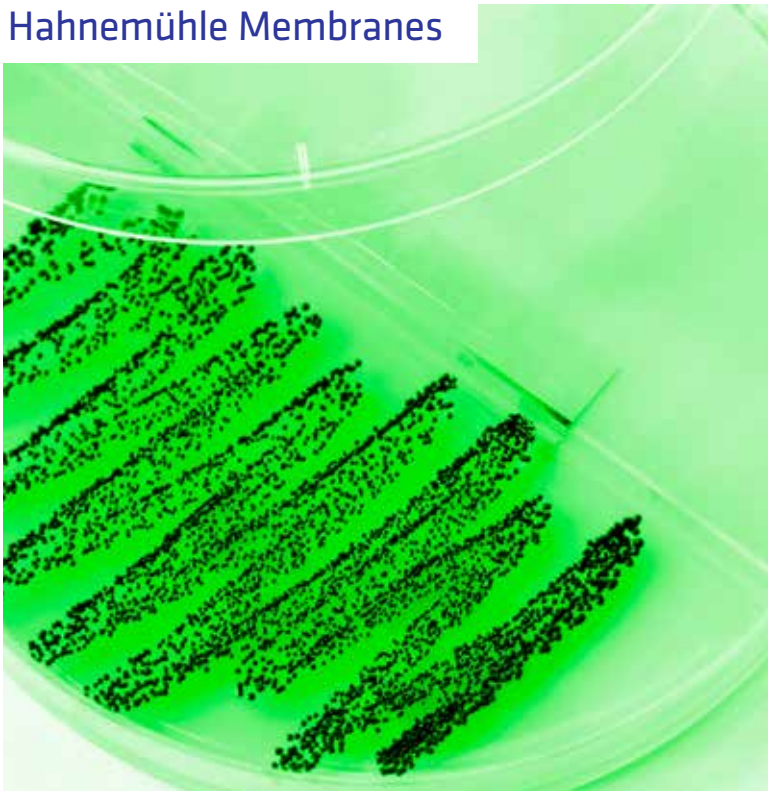
- Pharmaceuticals
- Life science
- Food & beverage
- Environmental monitoring
- Automotive

Hahnemühle Filtration

Hahnemühle



Hahnemühle Membranes



Our history
Profit from our more than 430 years of experience ... **6/7**

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Cellulose nitrate membrane filters
Recommended for clarification and sterilisation of aqueous solutions, microbiological analysis and particle counts ... **13-15**

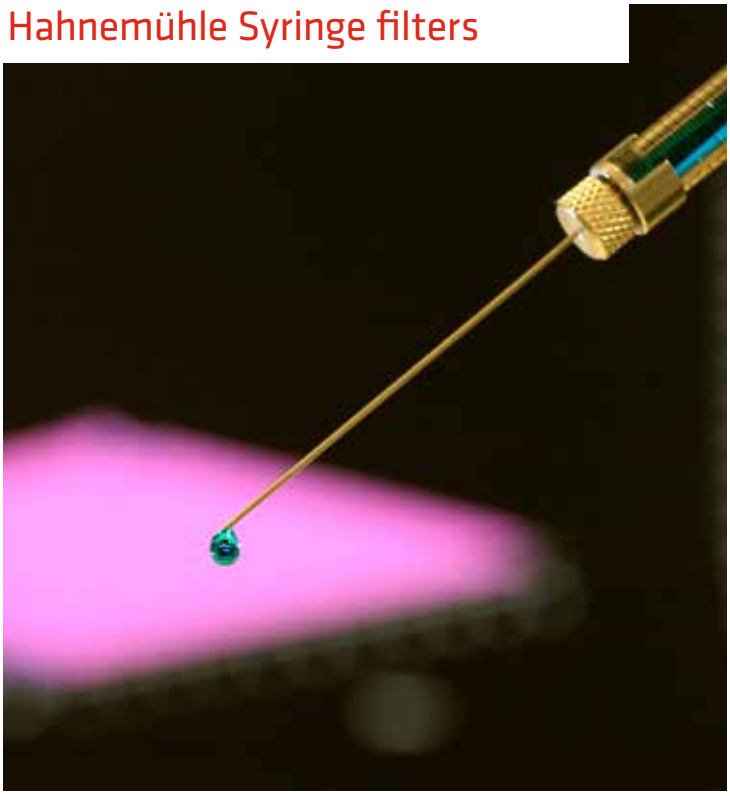
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Recommended for clarification and sterilisation, hydrophilic ... **17-19**

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Hahnemühle Syringe filters



Parameters and testing methods



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About us

Hahnemühle FineArt GmbH is an internationally active company that specialises in the development and production of high quality papers. Hahnemühle has been developing and manufacturing filter papers for both liquid and air filtration technologies in various areas of application since 1883. The premium quality pulp, cotton linters, glass and quartz fibre materials are suitable for all laboratory and industrial applications and are manufactured individually according to customer specifications. Our in-house team of developers ensures that the filter media we offer meet the modern, diverse and individual requirements of our customers.

Clientele

Leading businesses from the manufacturing sector and analytical laboratories rely on the consistent quality of our products. With over 150 filter papers, we offer our customers a wide spectrum of papers that cover almost all filter requirements.

Flexibility

Our company structure allows us to quickly respond to specific customer needs; we also offer low volume production. Our specialists will be happy to assist you in the development of an individual paper that fully meets your specific requirements. In cooperation with the client and the raw material supplier, we create new formulas which we then use to manufacture filter papers with the required properties at our factory.

Hahnemühles history

1584	Establishment of Hahnemühle FineArt
1883	Filter papers produced for the first time
1886	Carl Hahne buys the paper mill, which subsequently bears his name
1927 - 2004	Hahnemühle was part the „Schleicher & Schuell“ group of companies. Under this name, the papers produced here gained an international reputation
2004	Hahnemühle FineArt GmbH becomes an independent company again, with subsidiaries and distribution companies in the USA, the UK, China and France
Since 2008	Hahnemühle‘s pure filter papers are marketed directly under the company name



Quality Management

Our paper manufacturing process combines traditional craftsmanship with state-of-the-art production technology and conversion. The quality of our papers is not only a result of our many years of manufacturing and paper making expertise; we also use only high-class raw materials and pure spring water to produce them.

Our production process is strictly controlled, which guarantees consistently even, proven quality, charge by charge. We hold a DEKRA certificate, which confirms that the quality management system we have introduced complies with all DIN EN ISO 9001 standard requirements.

The implementation of these quality assurance systems guarantees our high quality standard and competitiveness in increasingly international markets with increasingly sophisticated requirements.

The fact that we hold this certificate also proves that we are thoroughly customer-focused, from product development to the services we provide. Ongoing further product development and process improvements allow us to exceed the required quality standards.





Requirement to filtration by membranes and syringe filters

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
- 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) and regenerated Cellulose (CR)
- For dilute 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 filters on pages 32 - 35. 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 filters 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 filters 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 as filter circles with various standard diameters (in mm): 25 - 47 - 90, the product references are GF9025, GF9047 and GF9090, respectively. Other sizes and special cuts are available on request.

The loss of expensive samples or media should be avoided:
The design of our syringe filters features the lowest possible hold-up volume.

The risk of mistaken identities shall be minimised:
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 serve you:
Telefon: +49 55 61 791 687, Fax: +49 55 61 791 377, filtration@hahnemuehle.com

Further broschures are available for download on the internet @ www.hahnemuehle.com





For every application the optimal filter type

Sample	Type of membrane		Benefits of the membrane type
Aqueous solution (hydrophilic)	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 gravimetrical analysis
Biological solution (hydrophilic)	AC	Cellulose Acetate	Very low protein binding
	CR	Regenerated Cellulose	High mechanical strength





Sample	Type of membrane		Benefits of the membrane type
Aque-ous-organic solution (hydrophilic)	CR	Regenerated Cellulose	High mechanical strength
	NY	Nylon (Polyamide)	Fast wetting, very high mechanical strength
Organic solution (hydrophobic)	CR	Regenerated Cellulose	High mechanical strength
	PTFE	Polytetrafluorethylene	Used for very strong acids and bases
Gases, even strongly oxdidasing	PTFE	Polytetrafluorethylene	Used for very strong acids and bases

Hahnemühle Filtration
Membranes



Cellulose acetate membrane filters

Recommended for aqueous samples, biological applications and protein filtration

- Made entirely from pure cellulose acetate, hydrophilic
- High flow rate
- High thermal stability
- Very low nonspecific adsorption
- Suited for use in pressure filtration devices
- Compatible to 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

ALBET LabScience

Material	Pore size [µm]	Thickness* [µm]	Flow rate** [ml/min]	Bubble point*** [Bar]
Cellulose acetate	0.2	120	>15	3.5
	0.45	120	>35	2.5

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

- Adsorption: bovine serum albumin < 10 µg/cm^2
- Extractables with water less than 1 %
- Sterilisation: by autoclaving at 121°C or 134°C, with γ-radiation, dry heat or ethylene oxide
- Maximum temperature: 180°C
- The resistance to various chemical solvents is summarised on page 32 f

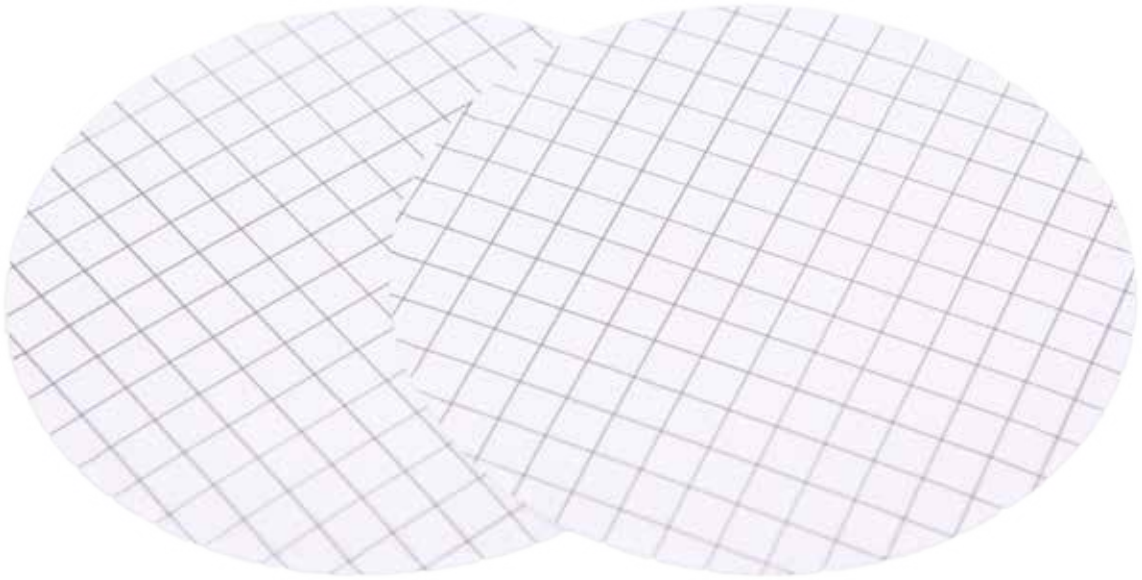
Applications

- Filtration of aqueous solutions for biological and clinical analysis
- 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 analysis
- Sterilisation of culture media (0.2 µm)

Ordering information

Part number	Pore size	Diameter	Quantity per box
AC02025BL	0.2 µm	25 mm	100
AC02047BL	0.2 µm	47 mm	100
AC04525BL	0.45 µm	25 mm	100

Part number	Pore size	Diameter	Quantity per box
AC04547BL	0.45 µm	47 mm	100
AC04550BL	0.45 µm	50 mm	100



Cellulose nitrate membrane filters

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

- Made of cellulose nitrate, hydrophilic
- Very high flow rate
- High non-specific adsorption
- Qualified for aqueous solutions (pH 4-8), hydrocarbons and some dilute 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 x 3.1 mm) or plain, sterile or non-sterile
- Pore size from 0.2 µm to 0.8 µm with a sharp size distribution
- Filter diameters from 25 mm to 50 mm

Sterility Test: No growth was observed when sterilized samples were subjected to the Seven Day Sterility Test as described by USP.
Microbial Test: Retention 10^7 organisms/cm^2 Serratia marcescens ATCC 14756 challenge. Recovery of Fecal Coliform > 90 %.

Technical data

ALBET LabScience

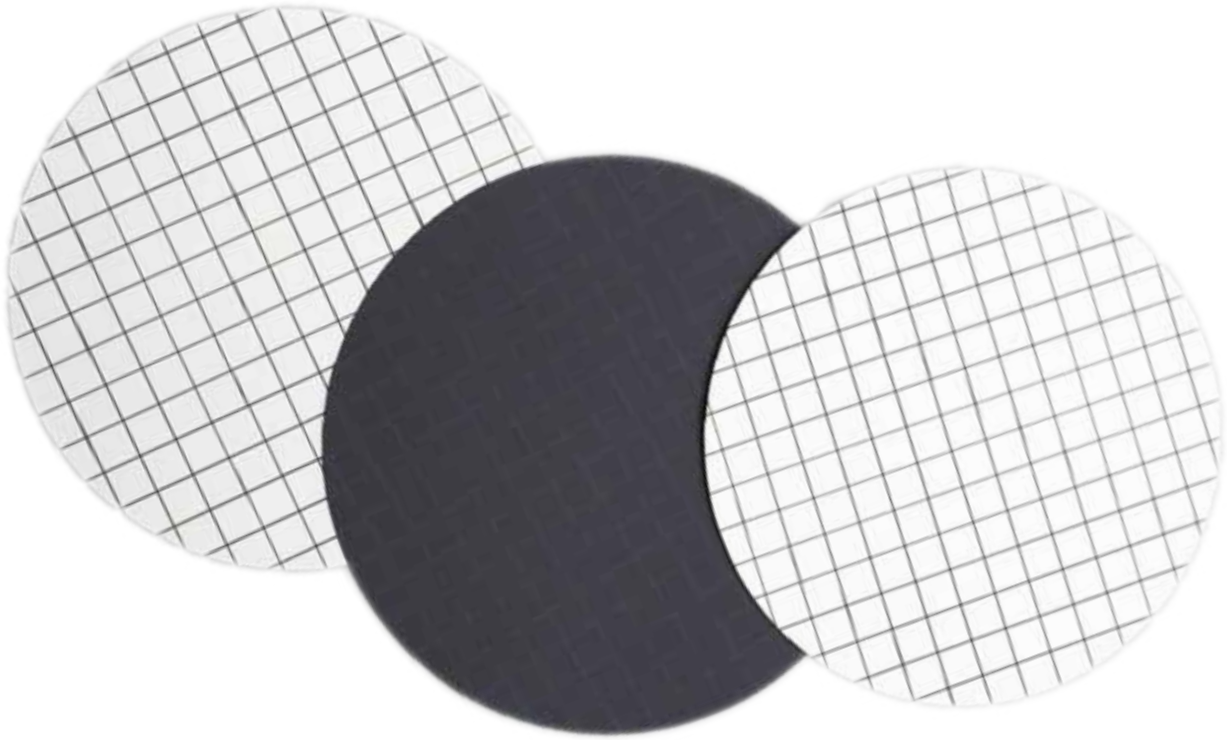
Material	Pore size [µm]	Thickness* [µm]	Flow rate** [ml/min]	Bubble point*** [Bar]
Cellulose nitrate	0.2	120	>10	2.7
	0.45	120	>20	2.0
	0.8	120	>40	1.0

* Acc. DIN 53105
** Acc. DIN 58355: Average value per cm^2 area at Δp = 0.7 bar
*** Acc. DIN 58355

- Adsorption: 160 µg/cm^2 for γ-globulin and pore 0.2 µm (decreases with increasing pore size)
- Extractables with water less than 1%
- No enhancement or inhibition by the grid lines, due to chemical extractables
- Maximum temperature 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 32f

Cellulose nitrate is the perfect membrane type for water, food and beverage analysis

Membranes



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 analysis (bacterial counts) of water, pharmaceuticals, beverages, cosmetics, etc.
- Sterilisation of solutions and culture media (0.2 µm) - Consider binding of proteins!
- Particle size analysis
- Pre-filtration and clarification of samples prior to further analysis
- Removal of particles in suspensions to determine the degree of impurity
- Measurement of sewage sludge in clarification plants
- Immunological analysis, which requires a very low level of extractable substance in water
- Analysis of cell solutions
- Diagnostic (due to the high level of non-specific adsorption)

Ordering information

Sterile membranes, 47 / 50 mm

Part number	Pore size	Diameter	Quantity per box
NCS02047BC	0.2 µm, white, sterile, grid	47 mm	100
NCS04547BC	0.45 µm, white, sterile, grid	47 mm	100
NCS04547BL	0.45 µm, white, sterile	47 mm	100

Part number	Pore size	Diameter	Quantity per box
NCS04547NC	0.45 µm, schwarz, sterile, grid	47 mm	100
NCS04550NC	0.45 µm, schwarz, sterile, grid	50 mm	100



Looking for filter papers? Our catalogue includes a wide range of products. Order your personal copy directly on our site www.hahnemuehle.com or send an e-mail to filtration@hahnemuehle.com

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

Ordering information

Non-sterile membranes

Part number	Pore size	Diameter	Quantity per box
NC02025BL	0.2 µm, white	25 mm	100
NC02047BL	0.2 µm, white	47 mm	100
NC02050BL	0.2 µm, white	50 mm	100
NC04525BL	0.45 µm, white	25 mm	100
NC04547BL	0.45 µm, white	47 mm	100
NC04547BC	0.45 µm, white, with grid	47 mm	100

Part number	Pore size	Diameter	Quantity per box
NC04550BL	0.45 µm, white	50 mm	100
NC08047BL	0.8 µm, white	47 mm	100
NC08050BL	0.8 µm, white	50 mm	100

Hahnemühle Filtration
Membranes



Regenerated cellulose membrane filters

Recommended for clarification, sterilisation and filtration of organic solutions and aqueous and non aqueous samples

- Made of regenerated cellulose, reinforced with non-woven cellulose, hydrophilic
- Easily wettable with water
- Low non-specific adsorption
- High mechanical strength
- Qualified for almost all solvents and aqueous solutions in the pH range 3-12
- Pore sizes 0.2 µm and 0.45 µm
- Filter diameters from 47 mm

Technical data

ALBET LabScience

Material	Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble point *** [Bar]
Regenerated cellulose	0.2	135	35	4.8
	0.45	135	64	2.6

* Acc. DIN 53105
** Acc. DIN 58355: Average value per cm^2 area at Δp = 0.7 bar
*** Acc. DIN 58355

- Adsorption: < 10 µg/cm^2 for bovine serum albumin
- Extractable with water less than 1%
- Sterilization: by autoclaving at 121°C or 134°C, dry heat (180°C), γ-radiation (25 kGy) or with ethylene oxide
- Maximum temperature 180°C
- The resistance to various chemical solvents is summarised on page 32

Applications

- Recommended for particle removal from organic solvents or mixtures of aqueous and non-aqueous samples
- Sterilisation of organic and aqueous solutions and mixtures of both
- Particle removal and degasing of mobile phases used in HPLC and GC

Ordering information

Part number	Pore size	Diameter	Quantity per box
CR02047BL	0.2 µm	47 mm	100
CR04547BL	0.45 µm	47 mm	100

Mixed cellulose ester membrane filters

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

- Made of a blend of cellulose nitrate and cellulose acetate, hydrophilic
- High flow rate
- High non-specific adsorption
- Qualified for aqueous solutions (pH 4-8), hydrocarbons and some dilute solvents
- Very uniform pore structure which ensures homogeneous distribution of the particles retained on the filter surface
- High mechanical stability
- Ideal for gravimetrical measurements
- Extractables with water less than 1%
- Available in white, with or without grid, sterile or non-sterile
- Pore size 0.2 µm and 0.45 µm
- Membrane diameters 47 mm and 50 mm

Technical data

Material	Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble point *** [Bar]
Mixed cellulose ester unsterile	0.2	130	10	3.5
	0.45	130	25	2.0
	3	130	100	0.5
	5	130	120	0.4
	8	130	150	0.2

* Acc. DIN 53105
** Acc. DIN 58355: Average value per cm^2 area at $\Delta p = 0.7$ bar
*** Acc. DIN 58355

- Adsorption: 160 µg/cm^2 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
- Maximum temperature 180°C
- The resistance to various chemical solvents is summarised on page 32

Hahnemühle Filtration
Membranes



Technical data

ALBET LabScience

Material	Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble point *** [Bar]
Mixed cellulose ester sterile	0.2	125	15	3.3
	0.45	125	35	1.8

* Acc. DIN 53105
** Acc. DIN 58355: Average value per cm^2 area at Δp = 0.7 bar
*** Acc. DIN 58355

- Adsorption: 160 µg/cm^2 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
- Maximum temperature 180°C
- The resistance to various chemical solvents is summarised on page 32

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 analysis (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) – Consider binding of proteins!
- Pre-filtration, clarification, sterilisation prior to further analysis (0.45 µm)

Ordering information – unsterile

Part number	Pore size	Diameter	Quantity per box
MCE02050BL	0.2 µm, white	50 mm	100
MCE04525BL	0.45 µm, white	25 mm	100
MCE04547BL	0.45 µm, white	47 mm	100
MCE30047BL	3 µm, white	47 mm	100

Ordering information – unsterile

Part number	Pore size
MCE50047BL	5 µm, white
MCE80047BL	8 µm, white
MCE04547BC	0.45 µm, white, grid
MCE04550BC	0.45 µm, white, grid
MCE04550NC	0.45 µm, black, grid



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- Gravimetrical Measurements, removal of particles in suspensions to determine the degree of impurity (sewage plants etc.)
- Analysis of cell solutions
- Particle analysis
- 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
- Gridded membranes (black grid on white membrane) for counts of colonies as a standard method of quantification
  Black grid, clearly defined sections (3.1 x 3.1 mm grid)
  Special ink, non-toxic and totally free from bacterial growth inhibitors
- Sterilised membranes (packaged in individual blisters) ensure, that the filter is not contaminated. Available in different formats

Sterility Test: No growth was observed when sterilized samples were subjected to the Seven Day Sterility Test as described by USP.
Microbial Test: Retention 10^7 organisms/cm^2 Serratia marcescens ATCC 14756 challenge. Recovery of Fecal Coliform > 90 %.

Diameter	Quantity per box
47 mm	100
47 mm	100
47 mm	100
50 mm	100
50 mm	100

Ordering information – sterile

Part number	Pore size	Diameter	Quantity per box
MCES02047BC	0.2 µm, white, sterile, grid	47 mm	100
MCES02050BC	0.2 µm, white, sterile, grid	50 mm	100
MCES04547BC	0.45 µm, white, sterile, grid	47 mm	100
MCES04550BC	0.45 µm, white, sterile, grid	50 mm	100

Hahnemühle Filtration
Membranes



Nylon membrane filters

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

- Made entirely of polyamide, hydrophilic
- Qualified for many solvents and alkaline solutions, pH range 3-14
- High non-specific adsorption
- High mechanical stability
- Pore size 0.2 µm and 0.45µm
- Filter diameter 47 mm

Technical data

ALBET LabScience

Material	Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble point *** [Bar]
Nylon	0.2	130	>4	3.1
	0.45	130	>16	1.5

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

- Adsorption: bovine serum albumin 100 µg/cm^2 (for 0.2 µm pore size)
- Extractables with water less than 1%
- Sterilization: by autoclaving (at 121°C) or ethylene oxide
- Maximum temperature 134 °C
- The resistance to various chemical solvents is summarised on page 32 f

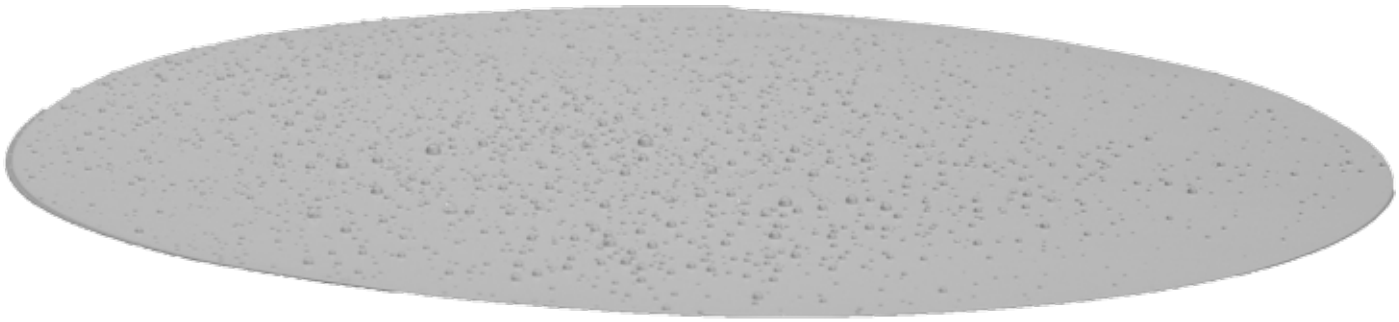
Applications

- Particle removing filtration of water, and aqueous solutions and solvents for HPLC
- Isolating Legionella
- These filters are not recommended for applications like sterilisation of cell solutions as they can cause significant loss of tracers. For these applications, it is preferable to use ALBET LabScience cellulose acetate (CA-)membranes, which have a low level of adsorption.

Ordering information

Part number	Pore size	Diameter	Quantity per box
NY02047BL	0.2 µm	47 mm	100
NY04547BL	0.45 µm	47 mm	100

Nylon Membranes are hydrophilic and are perfect for clarification of buffers and medias with a low rate of extractables



PTFE membranes filters

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
- Pore sizes 0.2 µm, 0.45 µm and 5 µm
- Filter diameters 47 mm

Technical data

ALBET LabScience

Material	Pore size [µm]	Thickness * [µm]	Flow rate ** [ml/min]	Bubble point *** [Bar]
PTFE	0.2	160	>6	1.0
	0.45	160	>30	0.6
	5	180	>90	0.1

* Acc. DIN 53105
** Acc. DIN 58355: Average value per cm^2 area at Δp = 0,9 bar
*** Acc. DIN 58355, with isopropanol 60%

- Adsorption 8 µg/cm^2 for gamma-globulin (pore size 0.2 µm)
- Extractables with water not detected
- Sterilisation: by autoclaving (at 121°C or 134°C) or by ethylene oxide
- Maximum temperature 145°C
- The resistance to various chemical solvents is summarised on page 32

Applications

- Filtering chemically aggressive samples
- Clarifying corrosive substances, strong acids and alkalis (0.45 µm)
- Clarification of samples and mobile phases of HPLC and GC (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

Part number	Pore size	Diameter	Quantity per box
PT02047BL	0.2 µm	47 mm	100
PT04525BL	0.45 µm	25 mm	100
PT04547BL	0.45 µm	47 mm	100

Syringe filters

Hahnemühle is proud to offer a selected range of reassuringly high quality single use syringe filters. Favoured by respected companies in the Pharmaceutical and Chemical industries and for the high turnover requirements for Analysis in the Food, Beverage and Environmental Analysis industries. All require a syringe filter with a consistently excellent performance and reliability.

ALBET LabScience

Hahnemühle service is well-known for flexibility to meet the requirements in accordance to customer needs.

Please contact your local Sales Office for further information and availability.

Syringe Filters HPLC tested

Syringe filter overview Membrane-Diameter (mm)

Membrane [mm]	Pore size (µm)	Overmoulded edge sterile		Overmoulded edge non-sterile		
		25	30	13	25	30
Cellulose acetate	0.2	+	+		+	
	0.45	+	+		+	+
Regenerated Cellulose	0.2			+	+	
	0.45			+	+	+



Membrane [mm]	Pore size (µm)	Overmoulded edge sterile		Overmoulded edge non-sterile		
		25	30	13	25	30
NY (Polyamid)	0.2			+	+	
	0.45			+	+	
PTFE	0.2			+	+	
	0.45			+	+	+

Syringe filters



Cellulose acetate syringe filters

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)
- Perfect for aqueous solutions (pH4 - 8) and the most of alcohols, carbohydrates and oils
- High flow rates and high total throughput: 0.2 µm: 16.1 ml/min/cm²; 0.45 µm: 54.7 ml/min/cm² (10 psi)
- Low hold-up 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 34
- Membrane diameter 13 mm, 25 mm and 30 mm
- Pore sizes 0.2 and 0.45 µm
- Individual sterile peel-packs

Technical data

ALBET LabScience

Material	Membrane Diameter	Housing 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
Cellulose acetate membrane	13 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	1.09	1-10	< 25	6	50	γ-irradiation
	25 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	4.08	10-100	< 100	6	50	γ-irradiation
	30 mm	Polypropylene	Female Luer-Lock	Male Luer-Slip	5.39	>100	< 200	6	50	γ-irradiation



Applications

- Filtration of biological fluids, serum and nutrient media with a minimum loss of proteins due 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)

Hahnemühle syringe filters are HPLC tested – no external peaks in UV radiation are guaranteed

Ordering information

Part number	Features	Diameter	Quantity per box
SAC02025100	0.2 µm, non-sterile	25 mm	100
SACS0202550	0.2 µm, sterile	25 mm	50
SACS0203050	0.2 µm, sterile	30 mm	50
SAC04525100	0.45 µm, non-sterile	25 mm	100
SAC04525500	0.45 µm, non-sterile	25 mm	500

Part number	Features	Diameter	Quantity per box
SAC04530100	0.45 µm, non-sterile	30 mm	100
SAC04530500	0.45 µm, non-sterile	30 mm	500
SACS0452550	0.45 µm, sterile	25 mm	50
SACS0453050	0.45 µm, sterile	30 mm	50

Other design and pack sizes are available on request.

Hahnemühle Filtration
Syringe filters





Regenerated cellulose syringe filters

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

- Regenerated cellulose membrane, hydrophilic
- Low protein adsorption
- High flow rate, high total throughput
- Resistant to almost all solvents and aqueous solutions in pH range 3-12
- Sterilisation by gamma irradiation or ethylene oxide, autoclaving is not recommended
- The resistance to various chemical solvents is summarised on page 34
- Membrane diameters 13 mm, 25 mm and 30 mm
- Pore sizes 0.2 and 0.45 µm

Technical data

ALBET LabScience

Material	Membrane Diameter	Housing 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
Regenerated cellulose Membrane	13 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	1.09	1-10	< 25	6	50	γ-irradiation
	25 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	4.08	10-100	< 100	6	50	γ-irradiation
	30 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	5.39	>100	< 200	6	50	γ-irradiation

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

Part number	Features	Diameter	Quantity per box
SCR02013100	0.2 µm, non-sterile	13 mm	100
SCR02025100	0.2 µm, non-sterile	25 mm	100
SCR04513100	0.45 µm, non-sterile	13 mm	100

Part number	Features	Diameter	Quantity per box
SCR04525100	0.45 µm, non-sterile	25 mm	100
SCR04530100	0.45 µm, non-sterile	30 mm	100

Other design and pack sizes are available on request.



Nylon syringe filters

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

- Nylon membrane, hydrophilic
- Perfect for dilute organic solvents (such as acetone, methylene chloride and acetonitrile) and alkaline solutions
- Do not contain wetting agents
- High flow rate and high flow through volume
- Sterilisation by gamma irradiation or ethylene oxide, autoclaving is not recommended
- The resistance to various chemical solvents is summarised on page 34
- Membrane diameters 13 mm, 25 mm and 30 mm
- Pore sizes 0.2 and 0.45 µm

Technical data

ALBET LabScience

Material	Membrane Diameter	Housing 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
Nylon Membrane	13 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	1.09	1-10	< 25	6	50	γ-irradiation
	25 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	4.08	10-100	< 100	6	50	γ-irradiation
	30 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	5.39	>100	< 200	6	50	γ-irradiation

Applications

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

Ordering information

Part number	Features	Diameter	Quantity per box
SNY02013100	0.2 µm, non-sterile	13 mm	100
SNY02025100	0.2 µm, non-sterile	25 mm	100
SNY02025500	0.2 µm, non-sterile	25 mm	500

Part number	Features	Diameter	Quantity per box
SNY04513100	0.45 µm, non-sterile	13 mm	100
SNY04525100	0.45 µm, non-sterile	25 mm	100
SNY04525500	0.45 µm, non-sterile	25 mm	500

Other design and pack sizes are available on request.

Hahnemühle Filtration
Syringe filters



PTFE syringe filters

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

- Polytetrafluorethylene (PTFE, Teflon) membrane, hydrophobic
- Very high flow rate
- High chemical resistance to most solvents and acids
- Free from wetting agents
- Low hold up volume
- Sterilisation by autoclaving at 121 °C or by ethylene oxide
- The resistance to various chemical solvents is summarised on page 34
- They must be pre-wetted with a polar solvent such as ethanol or isopropanol before filtering aqueous samples
- Membrane diameters 13 mm, 25 mm and 30 mm
- Pore sizes 0.2 and 0.45 µm

Technical data

ALBET LabScience

Material	Membrane Diameter	Housing 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
PTFE membrane	13 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	1.09	1-10	< 25	6	50	γ-irradiation
	25 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	4.08	10-100	< 100	6	50	γ-irradiation
	30 mm	Polypropylen	Female Luer-Lock	Male Luer-Slip	5.39	>100	< 200	6	50	γ-irradiation



Applications

- Sterilisation (0.2 µm) and clarification (0.45 µm) of most acids and aggressive solvents
- Degassing solvents (0.45 µm)
- Venting of 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
- 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 before being analysed (0.45 µm)

Due to the colour code of Hahnemühles Syringe Filters a mix-up can be excluded.
Orange = Cellulose acetate
Light blue = Regenerated Cellulose
Blue = Nylon
Pink = PTFE

Ordering information

Part number	Features	Diameter	Quantity per box
SPT02013100	0.2 µm, non-sterile	13 mm	100
SPT02025100	0.2 µm, non-sterile	25 mm	100
SPT04513100	0.45 µm, non-sterile	13 mm	100

Part number	Features	Diameter	Quantity per box
SPT04525100	0.45 µm, non-sterile	25 mm	100
SPT04525500	0.45 µm, non-sterile	25 mm	500
SPT04530100	0.45 µm, non-sterile	30 mm	100

Other design and pack sizes are available on request.

Epilogue



Parameters and testing methods

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 rate DIN 58355 part 1	The time taken for a certain amount of prefiltered, deionised water (or ethanol for PTFE filters) to pass through the membrane filter is determined at a vacuum of 0.9 bar.	ml/min/cm^2
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 cm^2.	ml/min/cm^2
Thickness	The determination is carried out using callipers with 2 cm^2 jaws and a contact pressure of 0.1 bar (100 g/cm^2).	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 DIN 53 141 part 1	A 10 cm^2 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 (loss in weight) 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	A medium containing test bacteria is filtered through the membrane filter (microorganism density 107 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*	Visual assessment
Checking the sterilisation method with bio-indicators DIN 58 948 part 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 treatment - *Bacillus subtilis* γ-Irradiation - *Bacillus pumilus*	Visual assessment

Chemical resistance – Membranes

Membrane	AC	NC	MCE	CR	NY	PTFE
STERILISATION						
Ethylene oxide	++	++	++	++	++	++
Gamma irradiation	++	++	++	++	–	–
Autoclaving 121 °C, 30 min	++	++	++	++	++	++
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	–	++	++	++	++	++
Tetrahydrofuran	–	–	–	++	++	++
Toluene	+	++	++	++	++	++

Membrane	AC	NC	MCE	CR	NY	PTFE
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 %	–	–	–	–	–	++
Sulfuric acid, 25 %	–	–	+	+	–	++
Sulfuric 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	++
limited compatible	+
not compatible	–
not analyzed	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 filters

Membrane		AC	CR	NY	PTFE
Housing	**PP**				
STERILISATION					
Ethylen oxide	++	++	++	++	++
Gamma irradiation	–	++	–	–	–
Autoclaving 121 °C, 30 min	++	+	+	+	++
SOLVENTS					
Acetone	++	–	++	++	++
Acetonitrile	++	–	++	++	++
Gasoline	++	++	++	++	++
Benzyl alcohol	+	+	+	++	++
n-Butanol	++	+	++	++	++
Chloroform	++	–	++	++	++
Cyclohexane	+	+	+	++	++
Cyclohexanone	+	–	+	++	++
Diethylacetamide	++	–	++	++	++
Diethyl ether	++	+	++	++	++
Dimethyl formamide	+	–	+	+	++
Dimethylsulfoxide	++	–	++	++	++
Dioxane	++	–	++	++	++
Ethanol, 98 %	+	+	+	++	++
Ethylene glycol	++	++	++	++	++
Glycerin	+	+	+	++	++
n-Hexane	+	+	+	++	++
Isopropanol	++	+	++	++	++
n-Propanol	++	+	++	++	++
Isopropyl acetone	++	+	++	++	++
Methanol, 98 %	+	+	+	++	++
Methylen chloride	++	–	++	+	++
Methyl ethyl ketone	+	–	+	++	++
Methyl isobutyl ketone	+	–	+	-	++
Monochlorobenzene	+	+	+	++	++
Perchloroethylene	++	–	++	++	++
Propylene glycol	++	+	+	++	++
Pyridine	++	–	++	++	++
Carbon tetrachloride	–	-	–	++	++
Tetrahydrofuran	++	–	++	++	++
Toluene	++	–	++	++	++
Trichlorethylene	++	++	++	++	+
Xylene	+	++	+	++	++
ACIDS					
Formic acid	+	+	-	-	++
Acetic acid, 25%	+	-	+	++	++
Acetic acid, 80%	+	-	+	+	++

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

Legend

compatible	++
limited compatible	+
not compatible	–
not analyzed	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.

Epilogue

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Hahnemühle



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