

## Products for Microbiological Control



Benefit from Sartorius' long-standing expertise in microbiological quality control while increasing performance and enhancing your workflows. To help improve the safety of quality-critical processes, we offer premium products for microbial limit testing, sterility testing, air monitoring and Mycoplasma detection. Obtain reproducible, reliable results for in-process and final release testing to meet the industry's requirements of today and anticipate the demands of tomorrow.

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sartorius

Microsart® e.jet

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Microsart® Media

A background image showing a laboratory setting. A gloved hand is pouring a yellow liquid from a bottle into a beaker. There are other bottles and containers in the background, all slightly out of focus.

## ■ Microbiological Enumeration

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Microbial Enumeration is the quantitative determination of microorganisms present in a sample. To assure the quality of a manufacturing process, raw materials, in-process samples, as well as final products, are subject to microbiological testing. These samples are examined for microbial colony and |or particle counts to ensure product safety and compliance. Whether it is about testing the sterility of a final product or evaluating the microbial contamination of water, it is essential to be able to rely on the quality of results test after test. At the same time, it is important to be able to comply with the ever increasing and demanding requirements of international and national regulations.

The potential health impact of pathogens or other contaminations in water, beverages or pharmaceutical products makes the absolute reliability of the test results indispensable. With public safety in mind, Membrane Filtration is still the established method of choice for the detection and quantification of microorganisms in liquid samples. The principle of this method is based on the concentration of microorganisms from relatively large samples on the surface of the membrane filter, and on subsequently culturing these captured microbes on a nutrient medium.

Benefit from Sartorius' long-standing expertise in Microbiological Quality Control and choose from a wide range of dedicated products for Microbial Limit testing and more. The comprehensive range of Membrane Filters, Filtration Units, Filtration Systems and Culture Media will help you reach the highest levels of safety with reproducible, reliable results for in-process and final release testing – while streamlining your workflow and simplifying your testing procedures.

Find out more about our filtration equipment, membrane filters and smart consumables which offer:

- Full compliance with regulations
- Total Ease of Use
- Systematic risk mitigation
- Highest Level of Safety and Efficiency

## ■ Gridded Membrane Filters

Cellulose Nitrate (Cellulose Mixed Ester)



### **Sterile and Individually Packaged for Colony Counting**

Sterile, individually packed filters have long become standard for routine microbiological quality control because of the user benefits they offer.

They are pre-sterilized and ready-to-use and save preparatory time. As they are individually packed, they avoid the possibility of contamination of remaining filters in opened packs and conform with GLP – with filter identification and lot number printed on each individual envelope.

These membrane filters are in accordance with the following norms: ISO 7704, ISO 7899-2, ISO 8199, ISO 9308-1 and ISO 16266. In combination with Sartorius Nutrient Pads, they offer excellent growth results and are in accordance with e.g. the AFNOR (French Standards), the APHA Standard Methods, the European Brewery Community, the European Drinking Water Guideline 98/83, the European Pharmacopoeia or the United States Pharmacopoeia.

### **The Membrane Filters**

Cellulose Nitrate membranes are mixed cellulose ester membranes containing cellulose nitrate and cellulose acetate, a material which assures effective retention with high-flow rates and optimal colony growth. The printed grid with a size of 3.1×3.1 mm makes the counting easier, especially for higher bacteria counts and for microcolonies, but does neither inhibit nor enhance the growth. The various filter colours allow the best contrast to the colonies and particles for easy and reliable quantification and identification.

### **High-Flow Membranes**

The standard membrane filter for microbiological analysis is a 0.45 µm filter. One special variant is the High-Flow membrane. It provides 30% higher flow rates in comparison to traditional 0.45 µm membranes due to the special pore structure which thus allows shorter filtration times. Especially for the detection of *E. coli*, High-Flow Membranes are highly recommended as they achieve the best growth promotion results. As every Sartorius 0.45 µm membrane filter lot, these membranes are also tested and released according to ISO 7704.

### **Additional Membrane Filters**

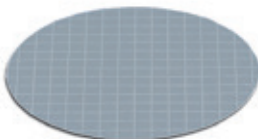
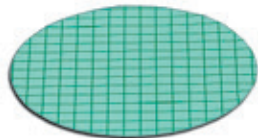
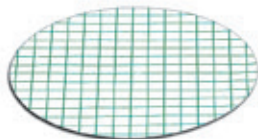
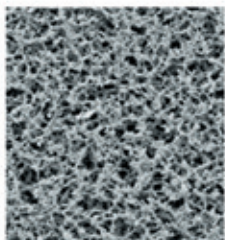
Cellulose nitrate (cellulose ester) membrane filters, gridded, non-sterile packaged (page 10).

Cellulose nitrate (cellulose ester) and cellulose acetate membrane filters, white, individually, sterile packaged (page 14).

Hydrophobic edge membranes are used mainly in the sterility testing of solutions containing antibiotics (page 16).

## ■ Gridded Membrane Filters

Cellulose Nitrate (Cellulose Mixed Ester), Individually, Sterile Packaged



### Applications

Membrane filters for colony counting, particle testing and microscopy.

### Benefits

Some of the advantages you will benefit from when using this type of membrane filter:

- Outstanding recovery rates for microorganisms
- 0.45 µm are acc. to ISO 7704
- High-Flow membranes available
- Three different colours available
- Certified quality
- Gamma irradiated, 25 kGrey
- Easy counting of colonies due to perfect visibility of grid lines

### □ Specifications

Design	47 or 50 mm in diameter, white, grey or green and gridded
Growth Promotion Test acc. to ISO 7704	<ul style="list-style-type: none"> <li>- No enhancement or inhibition by the grid lines</li> <li>- No enhancement or inhibition due to chemical extractables</li> <li>- No enhancement or inhibition by the sterilization process</li> </ul>
Sterility test	Sterile
Thermal resistance	130°C max.
Thickness acc. to DIN 53105	115–145 µm
Chemical compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113 (page 113).

### Typical Performance Rates for Various Pore Sizes

Pore size		0.2 µm*	0.45 µm**	0.45 µm High-Flow**	0.65 µm
Flow rate for water per cm <sup>2</sup> at 1 bar acc. to DIN 58355	in ml/min	20	70	100	130
Coliform retention	in %	100	100	100	n. a.
Recovery rate lot-released acc. to ISO 7704	in %	≥ 90	≥ 90	≥ 90	≥ 90

\*) Pore size determined by quantitative retention of *Brevundimonas diminuta* in accordance with the ASTM Document F 838-83 (1993) Standard test method for determining bacterial retention of membrane filters utilized for liquid filtration.

\*\*) Pore size determined by quantitative retention of *Serratia marcescens* in accordance with the Standard Methods of Water and Waste Water



### □ Ordering Information

#### White Membrane with Black Grid, for Detection of Bacteria with Dyed Media, Particle Count and Microscopy, Type 114, Individually, Sterile Packaged

Pore Size	Diameter	Pack Size	Order No.
0.2 µm	47 mm	100	11407--47----ACN
	47 mm	1,000	11407--47----ACR
	50 mm	100	11407--50----ACN
	50 mm	1,000	11407--50----ACR
0.45 µm	47 mm	100	11406--47----ACN
	47 mm	1,000	11406--47----ACR
	50 mm	100	11406--50----ACN
	50 mm	1,000	11406--50----ACR
0.45 µm High-Flow*	47 mm	100	114H6--47----ACN
	47 mm	1,000	114H6--47----ACR
	50 mm	100	114H6--50----ACN
	50 mm	1,000	114H6--50----ACR
0.65 µm	47 mm	100	11405--47----ACN
	50 mm	100	11405--50----ACN
0.8 µm	47 mm	100	11404--47----ACN
	47 mm	1,000	11404--47----ACR
	50 mm	100	11404--50----ACN
1.2 µm	47 mm	100	11403--47----ACN
	47 mm	1,000	11403--47----ACR
	50 mm	100	11403--50----ACN
	50 mm	1,000	11403--50----ACR

#### White Membrane with Green Grid, for Detection of Bacteria with Dyed Media, Particle Count and Microscopy, Type 139, Individually, Sterile Packaged

0.45 µm	47 mm	100	13906--47----ACN
	47 mm	1,000	13906--47----ACR
	50 mm	100	13906--50----ACN
	50 mm	1,000	13906--50----ACR
0.45 µm High-Flow*	47 mm	100	139H6--47----ACN
	47 mm	1,000	139H6--47----ACR
	50 mm	100	139H6--50----ACN
0.65 µm	47 mm	100	13905--47----ACN
1.2 µm	47 mm	100	13903--47----ACN

#### Green Membrane with Dark-Green Grid, Providing Optimal Contrast to Light-Colored or Transparent Bacteria Colonies, Type 138, Individually, Sterile Packaged

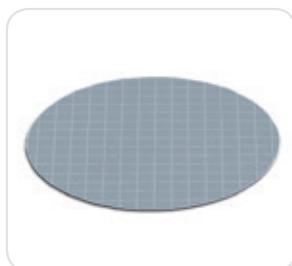
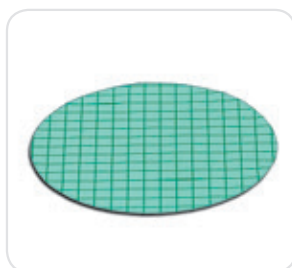
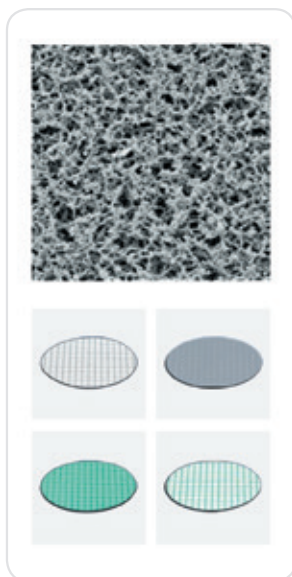
0.45 µm	47 mm	100	13806--47----ACN
	47 mm	1,000	13806--47----ACR
	50 mm	100	13806--50----ACN
	50 mm	1,000	13806--50----ACR

#### Grey Membrane (After Wetting Black) with White Grid, for Detection of Yeasts and Molds, Particle Count and Microscopy, Type 130, Individually, Sterile Packaged

0.45 µm	47 mm	100	13006--47----ACN
	47 mm	1,000	13006--47----ACR
	50 mm	100	13006--50----ACN
	50 mm	1,000	13006--50----ACR
0.45 µm High-Flow	47 mm	100	130H6--47----ACN
	47 mm	1,000	130H6--47----ACR
	50 mm	100	130H6--50----ACN
	50 mm	1,000	130H6--50----ACR
0.65 µm	47 mm	100	13005--47----ACN
	50 mm	100	13005--50----ACN
	50 mm	1,000	13005--50----ACR
0.8 µm	47 mm	100	13004--47----ACN
	47 mm	1,000	13004--47----ACR
	50 mm	100	13004--50----ACN

## ■ Gridded Membrane Filters

Cellulose Nitrate (Cellulose Mixed Ester), Non-Sterile Packaged



### Applications

Membrane filters for colony counting, particle testing and microscopy.

- Outstanding recovery rates for microorganisms
- 0.45  $\mu\text{m}$  are acc. to ISO 7704
- Three different colours available

### Benefits

Some of the advantages you will benefit from when using this type of membrane filter:

### □ Specifications

Design	25, 47 or 50 mm in diameter, white, grey or green and gridded
Growth Promotion Test acc. to ISO 7704	- No enhancement or inhibition by the grid lines - No enhancement or inhibition due to chemical extractables
Thermal resistance	130°C max.
Thickness acc. to DIN 53105	115–145 $\mu\text{m}$
Chemical compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113 (page 113).

### Typical Performance Rates for Various Pore Sizes

Pore size		0.2 $\mu\text{m}^*$	0.45 $\mu\text{m}^{**}$	0.65 $\mu\text{m}$
Flow rate for water per $\text{cm}^2$ at 1 bar acc. to DIN 58355	in ml/min	20	70	130
Coliform retention	in %	100	100	n. a.
Recovery rate lot-released acc. to ISO 7704	in %	$\geq 90$	$\geq 90$	$\geq 90$

\*) Pore size determined by quantitative retention of *Brevundimonas diminuta* in accordance with the ASTM Document F 838-83 (1993) Standard test method for determining bacterial retention of membrane filters utilized for liquid filtration.

\*\*) Pore size determined by quantitative retention of *Serratia marcescens* in accordance with the Standard Methods of Water and Waste Water

### □ Ordering Information

#### White Membrane with Black Grid, for Detection of Bacteria with Dyed Media, Particle Count and Microscopy, Type 114, Non-Sterile

Pore Size	Diameter	Pack Size	Order No.
0.2 µm	25 mm	100	11407--25-----N
	47 mm	100	11407--47-----N
	47 mm	1,000	11407--47-----R
	50 mm	100	11407--50-----N
0.45 µm	25 mm	100	11406--25-----N
	47 mm	100	11406--47-----N
	47 mm	1,000	11406--47-----R
	50 mm	100	11406--50-----N
	50 mm	1,000	11406--50-----R
0.65 µm	47 mm	100	11405--47-----N
0.8 µm	25 mm	100	11404--25-----N
	47 mm	100	11404--47-----N
	50 mm	100	11404--50-----N
1.2 µm	25 mm	100	11403--25-----N
	47 mm	100	11403--47-----N
	50 mm	100	11403--50-----N

#### White Membrane with Green Grid, for Detection of Bacteria with Dyed Media, Particle Count and Microscopy, Type 139, Non-Sterile

0.45 µm	47 mm	100	13906--47-----N
	47 mm	1,000	13906--47-----R
	50 mm	100	13906--50-----N
	50 mm	1,000	13906--50-----R

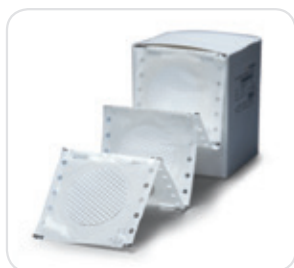
#### Green Membrane with Dark-Green Grid, Providing Optimal Contrast to Light-Colored or Transparent Bacteria Colonies, Type 138, Non-Sterile

0.45 µm	47 mm	100	13806--47-----N
	47 mm	1,000	13806--47-----R
	50 mm	100	13806--50-----N
	50 mm	1,000	13806--50-----R

#### Grey Membrane (After Wetting Black) with White Grid, for Detection of Yeasts and Molds, Particle Count and Microscopy, Type 130, Non-Sterile

0.45 µm	25 mm	100	13006--25-----N
	47 mm	100	13006--47-----N
	47 mm	1,000	13006--47-----R
	50 mm	100	13006--50-----N
0.65 µm	47 mm	100	13005--47-----N
	50 mm	100	13005--50-----N
0.8 µm	47 mm	100	13004--47-----N
	50 mm	100	13004--50-----N

## ■ Microsart® e.motion Membrane Filters



The Microsart® e.motion membrane filters specifically designed for use with the Microsart® e.motion dispenser allows simple insertion and faster exchange of filter types - even without having to completely use up a complete package quantity. Each box contains 100 membrane filters individually sealed on a special pleated band and is designed for easy opening and sealing for storage. Microsart® e.motion - reliable help in your lab.

### Benefits

Some of the advantages you will benefit from when using the Microsart® e.motion membrane filters:

- Outstanding recovery rates for microorganisms
- 0.45 µm are acc. to ISO 7704
- Multi-fit: Fits into various dispensers
- Protective paper-free
- Packaged on a special pleated band
- Product data are printed on
- High-Flow membranes available
- Gamma irradiated, 25 kGrey

### □ Specifications

Please refer to the membrane type: Cellulose nitrate (cellulose ester), gridded, individually, sterile packaged. See page 8

### □ Ordering Information

**Order Numbers for Microsart® e.motion Membrane Filters**  
**Diameter 47 mm or 50 mm, in Pack of 3 × 100 Membranes, Individually, Sterile Packaged, Without Protective Paper**

Membrane Filter Color   Grid Color	Pore Size	Order No.
White   black	0.2 µm	11407Z-47----SCM
White   black	0.2 µm	11407Z-50----SCM
White   black	0.45 µm High-Flow	114H6Z-47----SCM
White   black	0.45 µm High-Flow	114H6Z-50----SCM
White   black	0.45 µm	11406Z-47----SCM
White   black	0.45 µm	11406Z-50----SCM
White   black	0.8 µm	11404Z-47----SCM
White   black	1.2 µm	11403Z-47----SCM
White   black	1.2 µm	11403Z-50----SCM
White   black	3 µm	11402Z-47----SCM
White   green	0.45 µm High-Flow	139H6Z-47----SCM
White   green	0.45 µm	13906Z-47----SCM
White   green	0.45 µm	13906Z-50----SCM
Green   dark green	0.45 µm	13806Z-47----SCM
Green   dark green	0.45 µm	13806Z-50----SCM
Grey*   white	0.45 µm High-Flow	130H6Z-47----SCM
Grey*   white	0.45 µm High-Flow	130H6Z-50----SCM
Grey*   white	0.45 µm	13006Z-47----SCM
Grey*   white	0.45 µm	13006Z-50----SCM
Grey*   white	0.65 µm	13005Z-47----SCM
Grey*   white	0.65 µm	13005Z-50----SCM
Grey*   white	0.8 µm	13004Z-47----SCM
Grey*   white	0.8 µm	13004Z-50----SCM

\* Grey membranes after wetting black

Microsart® e.motion Membrane Filters are also available together with Nutrient Pads (page 21).

## ■ Microsart® e.motion Dispenser



Fully automated membrane filter dispenser for high throughput of membrane filters.

The membrane filters are automatically individually removed from their sterile packaging – either in a touch-free mode via an optical sensor or at the touch of a button. A foot switch can be optionally connected to the dispenser. Thanks to their motorized traction roller, each filter is quickly and reliably dispensed.

A dispensing operation is triggered when the optical sensor detects approaching tweezers. It's simple and fast.

### Applications

Membrane filters for colony counting, particle testing and microscopy.

### Benefits

The clear, compact design of the dispenser allows quick and easy cleaning.

The dispenser's low weight makes it easy to be transported. Both its functions and design are ideal, giving you the versatility and flexibility you need in your lab.

Some of the advantages you will benefit from when using the Microsart® e.motion dispenser:

- Fully automated membrane filter dispenser
- Works hands-free by an optical sensor
- Works by the touch of a button
- Rapid and reliable transport
- Easy insertion of the filter band
- Easy-to-clean
- Robust
- Small footprint

### □ Specifications

Dimensions (L×H×W) in mm	204×213×165
Weight	2.9 kg
Operating voltage	110 V/230 V optional
Frequency	50–60 Hz
Max. power	Consumption 10 W
Dispensing speed	0.5 sec
Dispenser delay	5 sec
Certificates	CE Mark and EMC Directive, European Standards EN 50081-1 and -2, EN 50082-1 and -2, EN 61010

### □ Ordering Information

Description	Order No.
Microsart® e.motion dispenser, fully automated membrane filter dispenser	16712
Foot switch for Microsart® e.motion dispenser	1ZE---0028

## ■ Ungridded Membrane Filters

Cellulose Nitrate and Cellulose Acetate, White, Individually, Sterile Packaged



Sterile, individually packed filters have long become standard for routine microbiological quality control. They are pre-sterilized and ready-to-use and save preparatory time. As they are individually packed, they avoid the possibility of contaminating the remaining filters in opened packs and conform with GLP, having the filter identification and lot number printed on each individual envelope.

### Materials

The membranes are made of even cellulose nitrate (cellulose ester – a material which assures effective retention with high-flow rates and optimal colony growth) or cellulose acetate (a material which combines high-flow rates and thermal stability with very low adsorption characteristics.)

### Applications

Membrane filters for colony counting, sterility testing, particle testing and microscopy.

### Additional Applications

11301, a white CN membrane filter with a pore size of 8  $\mu\text{m}$  is used as a prefilter in a special prefilter attachment (16807) for bacteriological analysis. It retains the coarse suspended particles, whereas it allows microorganisms to pass through. These microbes are trapped on the surface of the underlying bacteria-retentive membrane filter (e.g. 0.45  $\mu\text{m}$ ).

11107, a white CA membrane filter with a pore size of 0.2  $\mu\text{m}$  is the filter of choice for sterile filtration, such as nutrient media, buffer and sera. This membrane is validated by the Bacteria Challenge Test.

### Benefits

Some of the advantages you will benefit from when using this type of membrane filter:

- Outstanding recovery rates for microorganisms
- Defined particle retention
- 0.45  $\mu\text{m}$  are acc. to ISO 7704
- 0.2  $\mu\text{m}$  are validated by BCT
- Certified quality
- Gamma-irradiated, 25 kGrey

## □ Specifications

Design	25, 47 or 50 mm in diameter, white
Growth Promotion Test acc. to ISO 7704	– No enhancement or inhibition by the sterilization process – No enhancement or inhibition due to chemical extractables
Sterility test	Sterile
Thermal resistance	CN: 130°C max.   CA: 180°C max.
Thickness acc. to DIN 53105	CN: 115–145 µm   CA: 120 µm (average value)
Chemical compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113 and Cellulose Acetate type 111 (page 113).

## □ Ordering Information

### Cellulose Nitrate Membrane Filters, White, for Colony Counting, Sterility Testing, Particle Count and Microscopy, Type 113, Individually, Sterile Packaged

Pore Size	Diameter	Pack Size	Order No.
0.45 µm	25 mm	100	11306--25----ACN
	47 mm	100	11306--47----ACN
	50 mm	100	11306--50----ACN
0.65 µm	47 mm	100	11305--47----ACN
	50 mm	100	11305--50----ACN
0.8 µm	47 mm	100	11304--47----ACN
	50 mm	100	11304--50----ACN
1.2 µm	47 mm	100	11303--47----ACN
	50 mm	100	11303--50----ACN
3 µm	47 mm	100	11302--47----ACN
	50 mm	100	11302--50----ACN
8 µm	47 mm	100	11301--47----ACN
	50 mm	100	11301--50----ACN

### Cellulose Acetate\* Membrane Filters, White, for Colony Counting, Sterility Testing, Particle Count and Microscopy, Type 111, Individually, Sterile Packaged

0.2 µm	47 mm	100	11107--47----ACN
	50 mm	100	11107--50----ACN
0.45 µm	47 mm	100	11106--47----ACN
	50 mm	100	11106--50----ACN

\* If cellulose nitrate is not compatible

## Hydrophobic Edged Membrane Filters

Cellulose Nitrate (Cellulose Mixed Ester), Cellulose Acetate and Regenerated Cellulose Individually, Sterile and Non-Sterile



Hydrophobic edge membranes are used mainly for colony counting and sterility testing of solutions containing substances with antibiotic characteristics. The hydrophobic edge avoids the penetration of any growth-inhibitory substance into the membrane clamp zone where it could not be rinsed out and the substance could inhibit microbial growth during incubation.

### Materials

The membranes are available in three different materials:

- Cellulose nitrate (cellulose ester) – a material which assures effective retention with high-flow rates and optimum colony growth
- Cellulose acetate – a material which combines high-flow rates and thermal stability with very low adsorption characteristics
- Regenerated cellulose – a material which combines excellent chemical resistance and thermal stability with very low adsorption characteristics

### Applications

Membrane filters for colony counting and sterility testing

### Benefits

Some of the advantages you will benefit from when using this type of membrane filter:

- Outstanding retention rates for microorganisms
- 0.45  $\mu\text{m}$  are acc. to ISO 7704
- 0.2  $\mu\text{m}$  are validated by BCT
- Certified quality

## Specifications

Design	25, 47 or 50 mm in diameter, white or white with black grid
Growth Promotion Test acc. to ISO 7704	<ul style="list-style-type: none"> <li>- No enhancement or inhibition by the grid lines</li> <li>- No enhancement or inhibition due to chemical extractables</li> <li>- No enhancement or inhibition by the sterilization process</li> </ul>
Sterility test	Sterile
Thermal resistance	CN: 130°C max.   CA and RC: 180°C max.
Thickness acc. to DIN 53105	CN: 115–145 $\mu\text{m}$   CA: 120 $\mu\text{m}$ (average value)   RC: 160–200 $\mu\text{m}$
Chemical compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents, RC is resistant to almost all solvents and is compatible in a pH-range of 3–12. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113, page 113, Cellulose Acetate type 111 and Regenerated Cellulose type 184.



### □ Ordering Information

#### Cellulose Nitrate Membrane Filters, White with Black Grid, for Colony Counting and Sterility Testing, Type 131, Pack Size 100

Pore Size	Diameter	Hydrophobic Edge	Packaged	Order No.
0.2 µm	47 mm	3 mm	Individually, sterile packaged	13107--47----ACN
	50 mm	3 mm		13107--50----ACN
0.2 µm	25 mm	3 mm	Non-sterile	13107--25-----N
	47 mm	3 mm		13107--47-----N
	47 mm	6 mm		13107--47----HCN
	50 mm	3 mm		13107--50-----N
0.45 µm	47 mm	3 mm	Individually, sterile packaged	13106--47----ACN
	47 mm	6 mm		13106--47----HEN
	50 mm	3 mm		13106--50----ACN
0.45 µm	25 mm	3 mm	Non-sterile	13106--25-----N
	47 mm	3 mm		13106--47-----N
	47 mm	6 mm		13106--47----HCN
	50 mm	3 mm		13106--50-----N
8 µm	47 mm	3 mm	Non-sterile	13101--47-----N
	50 mm	3 mm		13101--50-----N

#### Cellulose Nitrate Membrane Filters, White, for Colony Counting and Sterility Testing, Type 131, Pack Size 100

8 µm	50 mm	3 mm	Non-sterile	13101--50----AHN
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#### Cellulose Acetate\* Membrane Filters, White with Black Grid, for Colony Counting and Sterility Testing, Type 135, Pack Size 100

0.2 µm	47 mm	3 mm	Individually, sterile packaged	13507--47----ACN
0.2 µm	47 mm	3 mm	Non-sterile	13507--47-----N
0.45 µm	47 mm	3 mm	Individually, sterile packaged	13506--47----ACN
	50 mm	3 mm		13506--50----ACN
0.45 µm	47 mm	3 mm	Non-sterile	13506--47-----N
	47 mm	6 mm		13506--47----HCN

#### Cellulose Acetate\* Membrane Filters, White with Black Grid, for Colony Counting and Sterility Testing, Type 135, Pack Size 100 Packaged of 10 Discs per Sleeve

0.45 µm	47 mm	3 mm	Sterile	13506--47----ALS
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#### Regenerated Cellulose\* Membrane Filters, White, for Colony Counting and Sterility Testing, Type 184, Pack Size 100

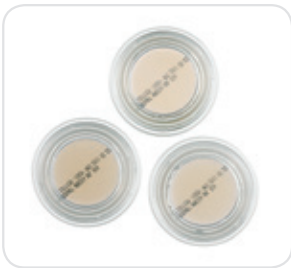
0.45 µm	47 mm	3 mm	Individually, sterile packaged	18406--47----ACN
	47 mm	4 mm		18406--47----HDN

\* If cellulose nitrate is not compatible



## ■ Microsart® @media

### Advanced System for Agar and Membrane Transfer



Microsart® @media are media dishes pre-filled with different agar media types, sterile packaged and ready-to-use. Together with the Microsart® @filter units, they introduce a brand new agar and membrane transfer concept for the Microbial Limit Test. The innovative active lid of Microsart® @media allows a touch-free membrane transfer from the Microsart® @filter base and thus reduces the risk of secondary contamination to an absolute minimum.

#### Applications

Microsart® @media and the Microsart® @vance® product line enhance the safety of microbiological quality control in biopharmaceutical laboratories. The products are designed for microbiological in process and final product controls of non-sterile pharmaceuticals according to the following regulations: EP 2.6.12, 2.6.13 and USP 61, 62 (microbiological examination of non-sterile products), EP 5.1.4, USP 2021 (microbiological quality of non-sterile pharmaceutical preparations and substances for pharmaceutical use) and the EP and USP chapters concerning water (USP 1231, EP and USP purified water, highly purified water and water for injections).

#### Features

##### Innovative Membrane Transfer Concept

The active lid enables touch-free membrane transfer and, therefore, reduces the risk of secondary contamination. Thanks to its special design, no air bubbles are entrapped.

#### Benefits

##### Easy Handling

Fits perfectly onto the Microsart® @filter base and thus allows an easy and reliable transfer of the membrane filter onto the agar. No powerful cracking of plastic is needed!

##### Safe and Reliable

Touch-free membrane transfer rules out manipulation and handling, minimizing major sources of secondary contamination. Results in best growth conditions and reliable results.

##### Time-saving

Innovative click-fit closure permits fast and easy removal of the funnel after filtration.





### Ordering Information

Media Type	Target Microorganisms	Typical Incubation Time and Temperature	Order No.
TSA (Tryptic Soy Agar)	Total Count	48 to 72 hrs (USP) or 1 to 5 days (EP) at 30 to 35°C	14313--47----ACN
SDA (Sabouraud Dextrose)	Yeasts and molds	5 to 7 days at 20 to 25°C	14314--47----ACN
R2A	Total Count	5 to 7 days at 20 to 28°C	14322--47----ACN
TSA (Tryptic Soy Agar) with Lecithin & Polysorbate	Total Count	48 to 72 hrs (USP) or 1 to 5 days (EP) at 30 to 35°C	14315--47----ACN
SDA (Sabouraud Dextrose Agar) with Lecithin, Polysorbate 80 & Chloramphenicol	Yeasts and molds	5 to 7 days at 20 to 25°C	14316--47----ACN
PCA (Plate Count Agar)	Water, Waste Water and dairy products	48 to 72 hrs at 32 to 35°C	14317--47----ACN

### Accessories

Description	Order No.
Microsart® e.jet Transfer Pump	166MP-4
Combi.jet manifold	16848-CJ
Microsart® Base 47 mm	1ZU---0002
Silicone Pressure Tubing, pressure sided, 1 meter lengths	1ZAS--0007
Silicone tubing pressure-sided, 2 m	1ZAS--0019
Silicone tubing pressure-sided, 10 m	1ZAS--0020
Minisart® SRP25 vent filters	17575-----ACK

## ■ Nutrient Pad Sets

Dehydrated Media Pads in Petri Dishes, with Suitable Membrane Filters for Economical, Time-Saving Microbiological Quality Control



Sartorius Nutrient Pad Sets have been used successfully in the membrane filter method for 30 years. Practical and easy to handle, they reduce labor and simplify many microbiological testing procedures.

Nutrient pads are sterile, dehydrated culture media. Once they are moistened with 3.0–3.5 ml of sterile and demineralized (or distilled) water, they are ready to use immediately.



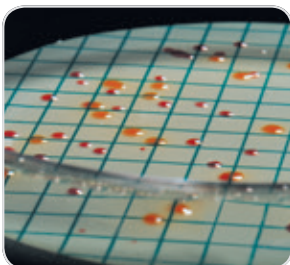
### Ready-to-Use up to 24 Months

The standard NPS box contains 100 sterile nutrient pads, each of which is individually inserted in a petri dish and sterilized. Ten each of these petri dishes are sealed in an aluminum bag. This special packaging in bags protects the sensitive formula constituents of the nutrient pads during transport and storage from fluctuations in humidity and temperature. As a result, it guarantees the high quality of our NPS throughout their entire shelf life up to 24 months. This makes the Sartorius Nutrient Pads Sets unique: No other ready-to-use culture media around the globe assures such consistently high quality and reproducible results up to 24 months.



### Compliance with International Standards

Currently, Sartorius offers more than 30 different Nutrient Pad Set types to meet the diverse objectives of microbiological analysis. Aside from the European drinking water directive, they comply with other international regulations and recommendations: international pharmacopoeias, DIN and ISO standards, the American Standards for Water and Foods, mineral water regulations, brewery guidelines, such as MEBAC or EBC, and recommendations of the food industry, such as LMBG, NCA and ICUMSA, etc.



### Inclusive Membranes

All Nutrient Pad Set types are supplied with the suitable membrane filters, which are also pre-sterilized and individually packaged. Nutrient Pad Sets are also available with Microsart® e.motion Membrane Filters which are specially designed for the Microsart® e.motion Dispenser and can be conveniently inserted. The membrane filters then are automatically removed from their sterile package. All membrane filters tailored to meet the special requirements of microbial detection are available with 47 mm or 50 mm diameters.

### Benefits

#### Economy

No time-consuming and labor-intensive preparation of the nutrient media (sterilization, cleaning, etc.).

#### Easy Handling

Nutrient Pad Sets can also be used in laboratories without comprehensive microbiological equipment.

#### Consistently Quality

During the production, each nutrient pad set batch is compared with the corresponding agar medium, in order to guarantee consistently quality and reproducible results.

#### Trouble-Free Storage

Nutrient Pad Sets can be stored at room temperature in a warehouse, up to 24 months.

## □ Ordering Information

NPS Type (Filter Type) <sup>1</sup>	Determination of	Order No. <sup>2</sup>
<b>Nutrient Pad Sets for Total Colony Counting,</b>		
individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters (order no. -RDN = Microsart® e.motion Membranes)		
Caso (1)	Total count	14063--47-----N
R2A (1)	Total count	14084--47----RDN
R2A (1)	Total count	14084--47-----N
Standard TTC (1)	Total count	14055--47----RDN
Standard TTC (1)	Total count	14055--47-----N
Standard TTC I mod. (1)	Total count	14085--47-----N
Standard (1)	Total count	14064--47-----N
TGE   Tryptone Glucose Extract (1)	Total count	14076--47----RDN
TGE   Tryptone Glucose Extract (1)	Total count	14076--47-----N
Yeast Extract (1)	Total count	14090--47-----N

### **Nutrient Pad Sets for E. coli, Coliforms and Enterobacteria,**

individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters (order no. -RDN = Microsart® e.motion Membranes)

Chromogenic Coliform (acc. ISO 9308-1)	E. coli and coliforms	14049--47----RDN 14049--47-----N
CHROMOCULT®* (7)	E. coli and coliforms	14087--47----RDN
CHROMOCULT®* (7)	E. coli and coliforms	14087--47-----N
ECD (2)	E. coli	14082--47-----N
Endo (9)	E. coli and coliforms	14053--47----RDN
Endo (9)	E. coli and coliforms	14053--47-----N
MacConkey (2)	Enterobacteria, E. coli	14097--47-----N
m FC (2)	E. coli and coliforms	14068--47-----N
Teepol   Lauryl Sulphate (2)	E. coli and coliforms	14067--47----RDN
Teepol   Lauryl Sulphate (2)	E. coli and coliforms	14067--47-----N
Tergitol TTC (2)	E. coli and coliforms	14056--47----RDN
Tergitol TTC (2)	E. coli and coliforms	14056--47-----N

### **Nutrient Pad Sets for Other Faecal Bacteria,**

individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters (order no. -RDN = Microsart® e.motion Membranes)

Azide   KF Strep (1)	Enterococci	14051--47----RDN
Azide   KF Strep (1)	Enterococci	14051--47-----N
Bismuth Sulfite (1)	Salmonellae	14057--47-----N

### **Nutrient Pad Sets for Non-Faecal, Pathogenic Bacteria,**

individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters (order no. -RDN = Microsart® e.motion Membranes)

Cetrimide (2)	Pseudomonas aeruginosa	14075--47----RDN
Cetrimide (2)	Pseudomonas aeruginosa	14075--47-----N
Chapman (2)	Staphylococci, Staph. aureus	14074--47-----N

\* Trademark owner and manufacturer is Merck KGaA

NPS Type (Filter Type) <sup>1</sup>	Determination of	Order No. <sup>2</sup>
<b>Nutrient Pad Sets for Yeasts and Molds,</b> individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters (order no. -RDN = Microsart® e.motion Membranes)		
Lysine (3)	Wild yeasts	14061--47-----N
Malt Extract (8)	Yeasts and molds	14086--47----CCN
Malt Extract (6)	Yeasts and molds	14086--47-----N
Sabouraud (10)	Yeasts and molds	14069--47-----N
Schaufus Pottinger   m green yeast and mold (4)	Yeasts and molds	14070--47-----N
Schaufus Pottinger   m green yeast and mold (5)	Yeasts and molds	14072--47-----N
Schaufus Pottinger   m green yeast and mold (6)	Yeasts and molds	14080--47----RDN
Schaufus Pottinger   m green yeast and mold (6)	Yeasts and molds	14080--47-----N
Schaufus Pottinger   m green yeast and mold (3)	Yeasts and molds	14083--47-----N
Schaufus Pottinger   m green yeast and mold (8)	Yeasts and molds	14091--47----RDN
Schaufus Pottinger   m green yeast and mold (8)	Yeasts and molds	14091--47-----N
Wallerstein Nutrient   WL Nutrient (2)	Yeasts and molds and bacteria	14089--47-----N
Wort (3)	Yeasts and molds	14058--47----RDN
Wort (3)	Yeasts and molds	14058--47-----N
Wort (8)	Yeasts and molds	14092--47----RDN



NPS Type (Filter Type) <sup>1</sup>	Determination of	Order No. <sup>2</sup>
<b>Nutrient Pad Sets for Product-Spoiling Microorganisms,</b> individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters (order no. -RDN = Microsart® e.motion Membranes)		
Glucose Tryptone (2)	Thermophilic spore formers and mesophilic bacteria	14066--47-----N
Jus de Tomate   Tomato Juice (1)	Leuconostoc oenos and other wine-spoiling organ.	14079--47-----N
MRS (1)	Lactobacilli and other soft drink-spoiling microorganisms	14077--47-----N
Orange Serum   pH 5.5 (1)	Acid-tolerant microorganisms	14062--47----RDN
Orange Serum   pH 5.5 (1)	Acid-tolerant microorganisms	14062--47-----N
Orange Serum   pH 3.2 (6)	Acid-tolerant microorganisms	14096--47----RDN
Orange Serum   pH 3.2 (6)	Acid-tolerant microorganisms	14096--47-----N
VLB-S7-S (2)	Lactobacilli and Pediococci and other beer-spoiling microorganisms	14059--47-----N
Weman (1)	Mesophilic slime-forming bacteria esp. <i>Leu. mesenteroides</i>	14065--47-----N

**Nutrient Pad Sets Starter Kit,**

individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

Mixed types: Endo, Standard, Wort (1, 2, 3)	<i>E. coli</i> and coliforms, total count, yeasts and molds	14095--47-----N
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Special brochure available on request f.o.c. Order no. SM-4017-e.

1) The membrane filters are selected for optimum growth, together with the corresponding nutrient media. The supplied membrane filter type is listed within brackets:

- (1) = Green with dark-green grid, 0.45 µm pore size
- (2) = White with green grid, 0.45 µm pore size
- (3) = Grey (after wetting black) with white grid, 0.65 µm pore size
- (4) = White with green grid, 0.65 µm pore size
- (5) = White with green grid, 1.2 µm pore size
- (6) = Grey (after wetting black) with white grid, 0.8 µm pore size
- (7) = White with black grid, 0.45 µm pore size
- (8) = Grey (after wetting black) with white grid, 0.45 µm pore size
- (9) = White with green grid, 0.45 µm pore size, High-Flow (ideal for *E. coli*)
- (10) = Grey (after wetting black) with white grid, 0.45 µm pore size, High-Flow

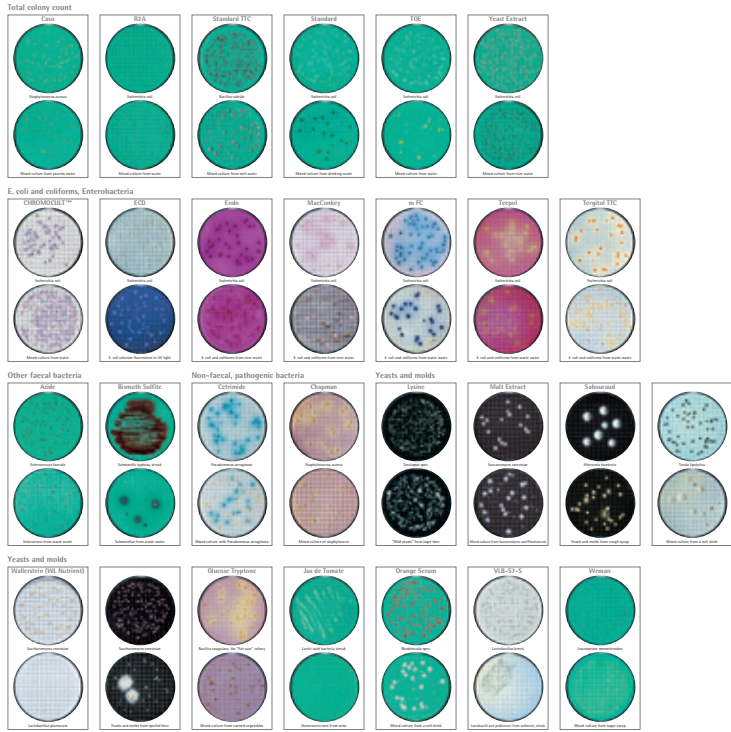
2) Diameter of the membrane filter, 47 mm. Order number for Nutrient Pad Set with 50 mm membrane filter as above, but --47-----N replaced by --50-----N.

Most of the NPS types are also available with Microsart® e.motion Membrane Filters: Order number as above, but ---N replaced by -RDN.

Other NPS types and NPS with Microsart® e.motion Membrane Filters on request.



# Nutrient Pad Sets



Product	Detection and enumeration of...	Nutrient Pad type
Beer	Lactobacilli and Pediococci and other lactic acid organisms	VIB-S1-S
	Total colony count	Standard, Standard TTC, MacConkey
Food	Yeast and molds	Multi Extract*, Maltose Nutrition, Wort
	Acid-tolerant microorganisms	Orange Serum
	Enterobacteria, E. coli and coliforms	CHROMODISP™, E. coli, Ends, (MacConkey), mFC, Topical   Laural Sulphate, Topical TTC
	Enterococci, Enterococcus faecalis	Acidic 1-F Strips
	Pseudomonas aeruginosa	Citronide
	Salmonellae	Bismuth Sulfite
	Staphylococci, Staphylococcus aureus	Chapsman
	Thermophilic spore formers and anaerobic bacteria	Glucose Tryptone
	Total colony count	Casa, Standard, Standard TTC, TBE, Tryptone-Glucose Extract
	Yeast and molds	Multi Extract*, Wort
Fruit juice	Enterobacteria, E. coli and coliforms	Ends, (MacConkey) Topical TTC*
	Oenococcus and other product spoiling organisms	Ans de Ternate   Tomato Juice, Orange Serum
Milk	Yeast and molds	Multi Extract*, in Green yeast and mold   Schaeffus Putref., Maltose Nutrition, Wort
	E. coli and coliforms	Ends
Pharmaceuticals, HPLC assay materials and cosmetics	Enterococci, Enterococcus faecalis	Acidic 1-F Strips
	Salmonellae	Bismuth Sulfite
	Staphylococci, Staphylococcus aureus	Chapsman
	Total colony count	Casa, R2A
	Yeast and molds, Candida albicans	Salvaseed
	Acid-tolerant microorganisms, Lactic-acid bacteria	Orange Serum, VLB-S-7-S
	Enterobacteria, E. coli and coliforms	Ends, MacConkey
	Mycophilic spore-forming bacteria, Clostridia	Wexman
	Total colony count	Standard*, Standard TTC*, TBE   Tryptone-Glucose Extract
	Yeast and molds	Multi Extract*, in Green yeast and mold   Schaeffus Putref., Maltose Nutrition, Wort
Sugar, major products	E. coli and coliforms	Ends
	Mycophilic spore-forming bacteria, Clostridia	Wexman
Water, general quality, natural water, waste water	Acid-tolerant microorganisms, Lactic-acid bacteria	Orange Serum
	Enterobacteria, E. coli and coliforms	CHROMODISP™, E. coli, Ends, (MacConkey), mFC, Topical   Laural Sulphate, Topical TTC
	Enterococci, Enterococcus faecalis	Acidic 1-F Strips
	Pseudomonas aeruginosa	Citronide
	Salmonellae	Bismuth Sulfite
	Staphylococci, Staphylococcus aureus	Chapsman
	Total colony count	Casa, R2A, Standard, Standard TTC, TBE   Tryptone-Glucose Extract, Yeast Extract
	Yeast and molds, Candida albicans	Salvaseed
	Acid-tolerant microorganisms, Lactic-acid bacteria	Orange Serum, Wort (Bovly) fortified with 5-8% ethanol
	Oenococcus and other wine spoiling microorganisms	Ans de Ternate   Tomato Juice
Yeast and molds	Multi Extract*, in Green yeast and mold   Schaeffus Putref., Maltose Nutrition, Wort	

turning science into solutions

## Nutrient Pad Set Poster

The photo shows a poster, original size 70 cm x 50 cm, with growth patterns and typical applications for the Nutrient Pad Sets, described on the previous page. On request, you can obtain this poster free of charge. Order no. SM-0001-e.

\* These IPTs types are suitable for the determination of the mentioned microorganisms, although the media are not explicitly declared in references. The description of the typical results in any pictures show typical appearance of the mentioned microorganisms. In particular cases, color and shape of the colonies and even form the expected bacteria. Further steps may be necessary to identify the final. Microscopic results must not be taken for correspondence. In particular, samples submitted by any customer from the use of its products. Nutrient Pad Set IPTs are subject to continuous product improvement as part of our product development program to align our products with changing application requirements. For current specifications and to release criteria please visit our homepage under [www.sartorius-media.com/IPTs/EN](http://www.sartorius-media.com/IPTs/EN)

\*\* Trade mark owner and manufacturer is Merck KGaA

SM-0001-EN-02/2023-10-01-000001

## ■ Culture Media in Bottles and Tubes

### Absorbent Pads and Petri Dishes



#### Agar Media

The traditional culture media for microorganisms is agar media. This can be used for the membrane filtration method or for direct incubation. There are two different forms available: Agar media in tubes are for pouring agar plates. The content of one tube is sufficient for two 90 mm or three 60 mm petri dishes. Agar media in bottles are the cost-effective alternative for casting plates.



#### Liquid Broth Media

Liquid culture media broth for direct incubation or for wetting an absorbent pad before a membrane filter is placed on it. They are available in tubes and bottles.

#### Absorbent Pads

Sartorius 1.4 mm thick absorbent pads are wetted with the appropriate liquid culture medium before a membrane filter is placed on them. They come pre-sterilized in plastic magazines, which fit onto the Sartorius manual dispensing device. The absorbent pads are available in two diameters:

- 47 mm with approx. 3 ml absorption capacity and
- 50 mm with approx. 3.5 ml absorption capacity

### □ Ordering Information

#### Agar Media in 250 ml Bottles, 4 Bottles per Box

Determination of	Agar Type	Order No.
Total count	Nutrient	14144-----A
Yeasts and molds	Wort	14157-----A
Wild yeasts	Lysine	14143-----A
Lactobacilli and Pediococci and other beer-spoiling organisms	VLB-S7-S	14148-----A



#### Agar Media in 20 ml Tubes, 50 Tubes per Box

Determination of	Agar Type	Order No.
Total count	Nutrient	14137-----K
Total count	Standard	14131-----K
Yeasts and molds	Wort	14138-----K
Acid-tolerant microorganisms	Orange serum	14130-----K
Leuconostoc oenos and other wine-spoiling organ.	Jus de tomate (tomato juice)	14140-----K



#### Liquid Broth Media, for Drinking Water Analysis in 100 ml Bottles, 4 Bottles per Box

Determination of	Media Type	Order No.
Lactose fermenting Enterobacteria (E. coli and coliform bacteria)	Lactose Broth	14155-----A

**Broth Media in 20 ml Tubes, 50 Tubes per Box**

Determination of	Broth Type	Order No.
Lactobacilli and Pediococci and other beer-spoiling organisms	VLB-S7-S	14127-----K

**Absorbent Pads, 47 mm, Sterile Packaged in 10 Magazines, Each with 100 Pads**

Description	Packaging	Order No.
Absorbent Pads, 10×100 pads	1,000 per box, incl. one dispenser	15410--47----ALR
Absorbent Pad Set, 10×100 pads plus 1,000 membrane filters (0.45 µm, white   green)	1,000 per box, incl. two dispensers	13906--47----APR

**Absorbent Pads, 47 mm, Sterile Packaged of 10 Discs per Sleeve**

Description	Packaging	Order No.
Absorbent Pad Set, 10×10 pads in sleeves plus 100 membrane filters (0.2 µm, white   black)	100 per box	13707--47----ALN
Absorbent Pad Set, 10×10 pads in sleeves plus 100 membrane filters (0.45 µm, white   black)	100 per box	13706--47----ALN

**Absorbent Pads, 50 mm, Sterile-Packaged in 10 Magazines, Each with 100 Pads**

Description	Packaging	Order No.
Absorbent Pads, 10×100 pads	1,000 per box, incl. one dispenser	15410--50----ALR

**Absorbent Pads, 50 mm, Sterile-Packaged in Petri Dishes**

Description	Packaging	Order No.
Absorbent Pad Set, 100 pads in petri dishes, sterile packaged	100 per box	15400--50-----N
Absorbent Pad Set, 100 pads in petri dishes plus 100 membrane filters (0.45 µm, green   dark green)	100 per box	15400--50----FRN

**Disposable Petri Dishes, Auto-Sterile, 100 per Box**

Diameter	Order No.
60 mm	14311--60-----N
90 mm	14311--90-----N



## ■ Biosart® 100 Monitors



The membrane filtration method is the suitable technique for microbiological analysis of pharmaceuticals, water, cosmetics, foods and beverages. The use of ready-to-use disposable units are optimal for these applications.

### Biosart® 100 Monitors

Biosart® 100 Monitors have been specifically designed for the detection and enumeration of microorganisms in pharmaceuticals, cosmetics, food, beverages, water and other liquids. These sterile disposables with an incorporated membrane filter and cellulose pad are ready to use. After filtration, just remove the 100 ml funnel to convert the Monitor into a petri dish eliminating the need for membrane manipulation. Culture media for wetting the pad are available in individually sterilized, convenient plastic ampoules. Biosart® 100 Monitors are ready-to-use filter units designed to be placed onto the bases of a vacuum manifold, eliminating the cleaning and sterilization required of reusable funnels.

### Compliance with International Standards

The membrane filter method is accepted worldwide and the preferred method of choice for the analysis of microbial contamination in liquid samples. Biosart® 100 Monitors and Media are in compliance with the membrane filtration procedures referenced in the:

- European drinking water directive (Council Directive 98/83/EC on the quality of water)
- Standard Methods for the Examination of Water and Waste Water, 20th edition
- U.S. Environmental Protection Agency, 600/8-78-017

- International Standard's microbiological methods, such as ISO 7704, ISO 9308-1, DIN EN ISO 16266, ISO 8199
- WHO Guidelines for Drinking Water Quality, 1997
- International Pharmacopoeia, such as the current editions of the USP and EP

### High-Flow Membranes

Biosart® 100 Monitors are also available with the new 0.45 µm High-Flow membranes. The special pore structure allows shorter filtration times due to 30% higher flow rates. Especially E. coli shows best growth promotion on High-Flow Membranes.

### Applications

Microbial enumeration, particle testing and microscopy

### Benefits

#### Superior Performance

- High-flow rate
- High total throughput

#### Safe and Reliable

- Sterile or individually, sterile packaged
- Consistent recovery
- Membranes meet ISO 7704
- Membranes available in various colours
- Without any hydrophobic adhesive areas

#### Economical

- Ready to connect and easy to use
- Minimal amount of equipment needed

## □ Specifications

Housing	Polystyrene
Membrane filter	Cellulose nitrate (cellulose ester): choice of white, green or grey, with grid; Regenerated cellulose: white; membranes removable for filing
Plug and adapter	Polyethylene
Pad	Cellulose
Capacity	100 ml, 10 ml graduations
Pore size	0.2 µm, 0.45 µm or 0.8 µm
Filter diameter	47 mm
Filtration area	14.5 cm <sup>2</sup>
Max. operating pressure	Vacuum only
Outlet	6.5 × 1.5 mm
Lot certificates	Recovery rate, sterility and specifications

## □ Ordering Information

### Biosart® 100 Monitors, 100 ml, 47 mm, Individually Packaged, Sterile, 48 Units

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.2 µm	CN white   black	16401-47-07--ACK
0.45 µm	CN white   black	16401-47-06--ACK
0.45 µm	CN green   dark green	16402-47-06--ACK
0.45 µm	CN grey   white**	16403-47-06--ACK

### Biosart® 100 Monitors, 100 ml, 47 mm, Packaged on Trays, Sterile, 48 Units

0.2 µm	CN white   black	16401-47-07----K
0.45 µm High-Flow	CN white   black	16401-47-H6----K
0.45 µm	CN white   black	16401-47-06----K
0.45 µm	CN green   dark green	16402-47-06----K
0.45 µm	CN grey   white**	16403-47-06----K
0.8 µm	CN grey   white**	16403-47-04----K
0.45 µm	RC white	16404-47-06----K



### Biosart® 100 Monitors, 100 ml, 47 mm, Sterile, 48 Units

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.45 µm High-Flow	CN white   black	16401-47-H6-V--K
0.45 µm	CN white   black	16401-47-06-V--K
0.45 µm	CN grey   white**	16403-47-06-V--K
0.8 µm	CN grey   white**	16403-47-04-V--K

\* CN = Cellulose Nitrate (Cellulose ester)

RC = Regenerated Cellulose

\*\* Grey membranes after wetting black

### Biosart® 100 Monitor Adapters and Membrane Lifter

Description	Adaptation	Order No.
Biosart® 100 Adapter, polypropylene with a silicone O-ring	Biosart® 100 Monitor onto Sartorius stainless-steel base 1ZU---0002 Microsart® Base 47 mm (stainless-steel base for Combisart® and Microsart® Combi.jet)	16424
Biosart® 100 Adapter, silicone	Biosart® 100 Monitor onto Sartorius stainless-steel frits e.g. 16840 (Combisart® single base, 50 mm) or onto 16841 (individual base)	16414
Biosart® 100 Membrane Lifter, ABS	For easy transfer of the membrane onto agar	16417

## ■ Biosart® 100 Nutrient Media



Each box of Biosart® 100 Nutrient Media contains 50 ampoules with sterile media, each with 2.5 ml and a lot certificate. If stored under proper conditions (+4°C), the culture media have a shelf life of 12 months (except for Endo, KF Strep, Lauryl Sulfate and Tergitol which have a 9 month shelf life). Biosart® 100 Nutrient Media comply with international regulations and recommendations: International pharmacopoeias, DIN and ISO standards, the American Standards for Water and Foods, mineral water regulations, guidelines of the food and beverage industries.

Within the scope of the quality assurance procedure and the stringent quality control standards every batch has passed Sartorius in-house tests of growth promotion, sterility, physical and technical parameters

have been passed successfully. Biosart® 100 Nutrient Media are convenient in use and eliminating the handling of glass ampoules.

### Application

Microbial enumeration.

### Benefits

#### Safe and Reliable

- Pre-sterilized media
- Certificate of Quality for every batch
- In compliance with international standards
- Consistent recovery

#### Economical

- Ready-to-use
- Long shelf life

## □ Ordering Information

### Biosart® 100 Nutrient Media, 2.5 ml, Individually, Sterile-Packaged in Ampoules, 50 Units

Media Type	Determination of	Order No.
Caso (acc. USP)	Total count	16400-02----CA-K
R2A (acc. EP)	Total count	16400-02----RA-K
TGE   Total Count	Total count	16400-02----TC-K
Total Count TTC	Total count	16400-02----TZ-K
m Endo	E. coli and coliforms	16400-02----EN-K
m FC	E. coli and coliforms	16400-02----MF-K
Lauryl Sulfate   Teepol	E. coli and coliforms	16400-02----LS-K
Tergitol TTC	E. coli and coliforms	16400-02----TT-K
KF Strep   Azide	Enterococci	16400-02----KF-K
Cetrimide	Pseudomonas aeruginosa	16400-02----CE-K
Sabouraud (acc. USP)	Yeasts and molds	16400-02----SB-K
m Green yeast and mold   Schaufus Pottinger	Yeasts and molds	16400-02----MG-K
m Green yeast and mold selective	Yeasts and molds	16400-02----GS-K
Wort	Yeasts and molds	16400-02----WZ-K
WL Nutrient   Wallerstein Nutrient	Yeasts and molds and bacteria	16400-02----WN-K
WL Differential   Wallerstein Differential	Bacteria in fermentation processes	16400-02----WL-K
Orange Serum	Acid-tolerant microorganisms	16400-02----OS-K
MRS	Lactobacilli and other soft drink-spoiling microorganisms	16400-02----MR-K



## ■ Microsart® Funnel 100 | Microsart® Funnel 250

Sterile Disposable Funnels with Click-Fit



In microbiological quality control, sterility of the equipment used for processing samples is a necessary basic requirement. The re-useable funnels made of stainless-steel or other materials which are used for membrane filtration are usually sanitized between samples by flaming or with hot water. Both of these methods can be insufficiently reliable if not properly performed. Alternatively, the funnels can be sterilized by autoclaving which often is too laborious for routine use. A disposable filter funnel is the ideal choice for more reliability and saving time.

### Description

Microsart® Funnels are sterile plastic funnels, which are available for the filtration of various sample volumes. They allow quick performance of the filtration steps required in the routine testing of water, food and beverages, pharmaceutical and cosmetic products.

The funnel is made of polypropylene and thus is elastic enough for optimal sealing with a Click-Fit closure. Graduations are marked to allow accurate sample volumes. The large inner diameter ensures a high-flow rate and the optimized shape allows thorough rinsing of the system subsequent to filtration: no liquid is retained in the filter funnel.

### Microsart® Base 47 mm

The Microsart® Base 47 mm is the perfect addition to existing Combisart® and Microsart® Combi.jet stainless-steel manifolds. The slightly recessed frit ensures the plane positioning of the membrane filter. Recessed parts for the tweezers at the rim of the base make sure that the membrane can be removed easily after filtration.

### Microsart® Funnel Dispenser

The Funnel Dispenser for secure removal of single, sterile Microsart® Funnels. Even after opening the bag, the remaining funnels are protected from secondary contamination.

### Applications

Colony counting, particle testing and microscopy.

### Benefits

Some of the advantages you will benefit from when using Microsart® Funnel 100 | 250:

#### – Reliable Results

Use a new, sterile funnel for each test for secure prevention of cross contamination!

#### – Time-Saving

Just change the funnel, rather than spending time and money sanitizing it!

#### – Simpler Handling

No more flaming, thus no holding of hot funnels! The clear material allows easy visualisation of the status of filtration, particularly useful in routine testing.

## □ Specifications

Material	Polypropylene
Capacity	100 ml, graduations at 20, 50 and 100 ml 250 ml, graduations at 50, 100, 200 and 250 ml
Filter diameter	47 mm, prefilter 40 mm (particle testing only)
Filtration area	13.2 cm <sup>2</sup>
Max. operating pressure	Vacuum only
Sterilization	Ethylene oxide
Lot certificate	Sterility and performance test

## □ Ordering Information

### Microsart® Funnel 100, Sterile Disposable Funnel, 100 ml, 100 Units

Description	Order No.
Microsart® Funnel 100, sterile in 5 sealed bags	16A07--10-----N

### Microsart® Funnel 250, Sterile Disposable Funnels, 250 ml, 96 Units

Description	Order No.
Microsart® Funnel 250, sterile in 6 sealed bags	16A07--25-----N



### Accessories and Replacement Parts

Description	Order No.
Microsart® Funnel Dispenser Funnel dispenser for secure removal of single, sterile Microsart® Funnels	16A08
Microsart® Base 47 mm, with frit, stainless-steel base for Combisart® and Microsart® Combi.jet Optimized for the use with 47 mm membranes, Click-Fit closure for Microsart® Funnel, Microsart® @filter and other funnel types sealed by bayonet closure	1ZU---0002
Silicone O-ring for Microsart® Base 47 mm male thread (pack size 3)	6980274
Replacement frit for Microsart® Base, stainless-steel	1ZU---0001

Further information about Microsart® Combi.jet and Combisart® stainless-steel manifolds are on the following pages.

## ■ Microsart® @filter 100 | Microsart® @filter 250

Sterile Disposable Filter Units for Advanced Colony Counting



The pharmaceutical and biotech industries are driven by the need to optimize their work flows and increase efficiency without compromising their level of safety. Products and raw materials used in the pharmaceutical or biotech industry require control of microbial levels during processing and handling. All components of the filtration system must comply with international guidelines, such as USP, EP or ISO standards.

### Description

Microsart® @filter 100 and 250 filter units are a ready-to-use combination of funnel, filter base and gridded membrane in one unit. The range of Microsart® @filter types has been tailored to meet individual needs: It is possible to choose between two volume sizes, 100 ml and 250 ml, different pore sizes and different filter colours for contrasting backgrounds during evaluation. The filter units exist as tray versions with lids or are stacked in bags for safe removal using the Microsart® Funnel Dispenser.

Despite the diversity of Microsart® @filters one thing is common: The optimal design.

- Click-Fit fastening allows for easy removal of funnels
- Leaking-free procedure due to innovative Click-Fit and bayonet closures
- Bayonet closure allows for easy mounting and removal of units
- Sterile Filter Base with recesses allows for simple membrane removal
- Innovative geometry of the funnel allows for effective rinsing after filtration (no sample residue is left in the funnel)

They have been specifically developed for the detection and enumeration of microorganisms in pharmaceuticals, biopharmaceuticals and cosmetics.

### Microsart® @vance®

The Microsart® product family consists of all the most recent products from Sartorius for microbiological analysis, which are especially characterized by innovation and clever design.

Microsart® @filter not only saves time and labor costs but minimizes the risk of secondary contamination – that's advanced colony counting by Sartorius.

### Microsart® Funnel Dispenser

The Funnel Dispenser for secure removal of single, sterile Microsart® @filter. Even after opening the bag, the remaining funnels are protected from secondary contamination.

### Applications

Filtration and enumeration of microorganisms in liquids like pharmaceuticals, biopharmaceuticals and cosmetics.

### Benefits

Some of the advantages you will benefit from when using Microsart® @filter units:

#### Safe and Reliable

- **Sterile Packaged**  
Sterilization at the point of use is not required
- **Fully Disposable Base and Funnel**  
Preparation- and sterilization-free procedure reduces the risk of secondary contamination
- **Optimized Design and Materials**  
No liquid remains after filtration, eliminates the need of rinsing

#### Easy Handling

- **Click-Fit Closure**  
Fast in routine analysis, eliminates the risk of leakage

#### Economy

- **Adaptable on Combisart®**  
Given flexibility, no additional investment required
- **Transparent Funnel Material**  
Visibility of the complete filtration

## Specifications

Materials	Funnel: Polypropylene, Base: ABS (Acrylnitril-Butadien-Styrol), Membrane filter: Cellulose Nitrate (C. mixed Ester), Regenerated Cellulose; choice of various colours and pore sizes
Capacity	100 ml, graduations at 20, 50 and 100 ml 250 ml, 50, 100, 200 and 250 ml graduations
Filter diameter	47 mm, prefilter 40 mm (particle testing only)
Filtration area	13.2 cm <sup>2</sup>
Max. operating pressure	Vacuum only
Sterilization	Gamma irradiation
Lot certificate	Recovery rate, sterility and performance test

## Ordering Information



### Microsart® @filter 100, Sterile Disposable Filter Units with Lid, 47 mm, 100 ml, Packaged on Trays, Ideal for the Use in Clean Benches, 24 Units

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.2	CN white   black	16D01--10-07--TG
0.45, High-Flow	CN white   black	16D01--10-H6--TG
0.45, High-Flow	CN grey   white**	16D03--10-H6--TG
0.45	CN green   dark green	16D02--10-06--TG
0.45	RC white (w/o grid)	16D05--10-06--TG***
0.45	CN white   black	16D01--10--06--TG

### Microsart® @filter 250, Sterile Disposable Filter Units with Lid, 47 mm, 250 ml, Packaged on Trays, Ideal for the Use in Clean Benches, 16 Units

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.2	CN white   black	16D01--25-07--TF
0.45, High-Flow	CN white   black	16D01--25-H6--TF
0.45, High-Flow	CN grey   white**	16D03--25-H6--TF
0.45	CN green   dark green	16D02--25-06--TF
0.65	CN grey   white**	16D03--25-05--TF
0.45	CN white   black	16D01--25--06--TF

**Microsart® @filter 100, Sterile Disposable Filter Units, 47 mm, 100 ml, Stacked and Packaged in Bags, Ideal for the Use with Microsart® Funnel Dispenser, 60 Units**

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.2	CN white   black	16D01--10-07--BL
0.45, High-Flow	CN white   black	16D01--10-H6--BL
0.45, High-Flow	CN grey   white**	16D03--10-H6--BL
0.45	CN green   dark green	16D02--10-06--BL
0.45	RC white (w/o grid)	16D05--10-06--BL***
0.45	CN white   black	16D01--10-06--BL

**Microsart® @filter 250, Sterile Disposable Filter Units, 47 mm, 250 ml, Stacked and Packaged in Bags, Ideal for the Use with Microsart® Funnel Dispenser, 48 Units**

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.2	CN white   black	16D01--25-07--BK
0.45, High-Flow	CN white   black	16D01--25-H6--BK
0.45, High-Flow	CN grey   white**	16D03--25-H6--BK
0.45	CN green   dark green	16D02--25-06--BK
0.65	CN grey   white**	16D03--25-05--BK
0.45	CN white   black	16D01--25-06--BK

**Microsart® @filter 100, Individually Sterile Packed, 100 ml Capacity, with Covers, 27 Units**

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.45, High-Flow	CN white   black, 100 ml	16D01--10-H6-ACG
0.45, High-Flow	CN black   white, 100 ml	16D03--10-H6-ACG
0.2	CN black   white, 100 ml	16D01--10-07-ACG

**Microsart® @filter 250, Individually Sterile Packed, 250 ml Capacity, with Cover, 18 Units**

Pore Size	Membrane Filter* Color   Grid Color	Order No.
0.45, High-Flow	CN white   black, 250 ml	16D01--25-H6-ACF
0.45, High-Flow	CN black   white, 250 ml	16D03--25-H6-ACF
0.2	CN white   black, 100 ml	16D01--25-07-ACF

**Accessories**

Description	Order No.
Lids for Microsart® @filter 100 and 250, Pack size: 100 (4 bags with 25 pieces each), gamma sterilized	1ZSF-K0007
Microsart® Funnel Dispenser	16A08

Funnel dispenser for secure removal of single, sterile Microsart® @filter packaged in bags.

\* CN = Cellulose Nitrate (Cellulose ester), RC = Regenerated Cellulose

\*\* Grey membranes after wetting black

\*\*\* not to be used in combination with Microsart® @media

## ■ Biosart® 250 Funnels



In microbiological quality control, sterility of the equipment used for processing samples is a necessary basic requirement. The reusable funnels made of stainless-steel or other materials which are used for membrane filtration are usually sanitized between samples by flaming or with hot water. Both of these methods can be insufficiently reliable when not properly performed. Alternatively, the funnels could be sterilized by autoclaving, but this is too laborious for routine use. A disposable sterile funnel in a certified quality is the ideal solution.

### Description

The Biosart® 250 Funnel has been specifically designed for microbiological and analytical quality assurance. Biosart® 250 are sterile funnels which allows for fast filtration required in the routine testing of pharmaceutical and cosmetic products, water, food and beverages and other liquids. A Sartorius gridded membrane is placed on a stainless-steel filter support. A Biosart® 250 Funnel is simply fitted on and the sample is filtered. The funnel is made of polypropylene and is sufficiently elastic for optimal sealing with a bayonet-type closure. Graduations are marked at 50, 100, 150, 200 and 250 ml for exact

sample volumes. The large inner diameter ensures a high-flow rate. The conical form allows a thorough rinsing of the system subsequent to filtration. No liquid is retained in the filter funnel.

### Applications

Microbial enumeration, particle testing and microscopy

### Benefits

#### Superior Performance

- High-flow rate
- High total throughput

#### Safe and Reliable

- Sterile or individually, sterile packaged
- No risk of cross contaminations
- No leakages due to proven closure technique
- No holding of hot funnels
- Visibility of the complete filtration

#### Economical

- Ready to connect and easy to use
- Minimal amount of equipment needed
- Autoclavable (to a limited extend)

### □ Specifications

Material	Polypropylene
Capacity	250 ml, 50 ml graduations
Filter diameter	47 mm (or 50 mm), prefilter 40 mm
Filtration area	12.5 cm <sup>2</sup>
Max. operating pressure	Vacuum only
Sterilization	16407--25----ALK: Ethylene oxide 16407--25----ACK: Gamma Irradiation
Lot certificates	Sterility and performance tests

### □ Ordering Information

#### **Biosart® 250 Funnels, Ready to Use Filter Funnels, 250 ml, 50 Units**

<b>Description</b>	<b>Order No.</b>
Biosart® 250 Funnel, 50 units, individually, sterile-packaged	16407--25----ACK
Biosart® 250 Funnel, 50 units, sterile-packaged	16407--25----ALK

Further information available on request f.o.c. Order no. SL-3017-e





## ■ Combisart® – The Sterile-Vented Filter Station

### Individual and Multi-Branch Systems



The Sartorius Combisart® system enables you to select the optimal hardware and consumables for your needs in microbiological analysis or particle count in quality assurance. Combisart® features a modular design and field-proven standard accessories to make your choice easier.

#### Description

At the heart of the Combisart® system is a high-grade stainless-steel manifold or individual system designed to accommodate all types of filter holders and funnels such as:

- Ready-to-use units like Microsart® Funnels 100 and 250, Microsart® @filter 100 and 250, Biosart® 100 Monitors and Biosart® 250 Funnels
- Flammable units such as stainless-steel funnels for colony counting
- Autoclavable reusable funnels made of glass or polycarbonate



The outlet of the 1- and 3-branch manifolds are newly Quick Connection Nipples, which could be used together with Quick Connection Couplings (more information under Microsart® Combi.jet) or as hose nipples for vacuum tubings. The low height of the manifold ports is particularly advantageous for working on a clean bench. For low number of samples, we recommend the use of the 1-branch manifold 16844 or the individual base 16841 on the top of a suction flask. For large number of samples, we recommend the 3- or 6-branch manifolds.

#### Sterile Venting

A special feature of the Combisart® system is the stainless-steel three-way valve (tap). This allows the vacuum for each filter holder to be individually controlled and each filter station to be sterilely vented. This rules out secondary contamination of the underside of the filter.



#### Sterilization

The system is compliant with ISO 8199 with regards to the sterilization methods of the equipment described in the "General Guide to enumeration of micro-organisms by culture". Since the most reliable sterilization method is autoclaving, the Combisart® design offers a unique advantage for this method. After inserting the membrane filters in the filter holders, you can simply unscrew them as an entire unit from each workstation and autoclave them. This method increases reliability and saves sterilization capacity.

#### The Right Equipment for Your Application

In connection with the single base 16840 (for 50 mm membranes) the manifolds are flexible to adapt disposable Biosart® 250 or stainless-steel funnels. The stainless-steel filter support of the single base 16840 allows a homogenous distribution of the residues on the membrane filter surface.

Alternatively to 16840, the Microsart® Base 1ZU---0002 is highly recommended for all 47 mm membrane filters, Microsart® Funnels and for Microsart® @filter.

The adapter 16424 ensures that the Biosart® 100 Monitors are positioned perfectly, minimizing the risk of contamination during filtration.

3 or 6 polycarbonate holders of the type 16511 can be screwed onto the manifold directly.

Glass units (16306 or 16307) can be fitted by using corresponding adapter-|stopper-combinations.

**Maximum Flexibility**

The turnable single base for 50 mm membranes 16840 or the Microsart® Base 47 mm features additional advantages you will benefit from:

- You can pour out a non-filterable sample from each unit
- Filtration equally easy for left- or right handed users in your laboratory, because funnels can be positioned to suit the individual user

Some of the advantages you will benefit from when using the Combisart® System:

**Safe and Reliable**

- Sterile venting of each membrane after filtration
- Sterilization acc. to ISO 8199
- Special polished stainless-steel surfaces allow easy cleaning and rinsing
- Low height is advantageous for working on a clean bench

**Saves Time**

- Filtration of 3 or 6 samples in parallel
- Easy pouring out of non-filterable samples
- Equally easy for right- and left-handed users

**Economical**

- Maximum flexibility due to different set-ups
- Space-saving in the autoclave
- Stainless-steel 304 – long lifecycle

**Combisart® Hardware Setups**

Filtration systems fast and easy completed at [www.sartorius.com/microbio](http://www.sartorius.com/microbio)

## □ Specifications

Stainless-steel quality	High-grade stainless-steel: B.S. 304S31   AISI 304
Dimensions in mm (L   H   D)	3-branch manifold: 435   103   120 6-branch manifold: 910   103   120
Max. operating pressure	Vacuum only
Sterilization	By autoclaving (max. 134°C), By dry heat (max. 180°C), By flaming, By other methods acc. to ISO 8199
Parts and materials	Lid, funnel, base part, filter support, clamp and tap made of stainless-steel. Silicone flat gasket. Silicone lid seal
Flow rate per filter station for water at 90% vacuum	200 ml/min with 0.2 µm membrane filter 600 ml/min with 0.45 µm membrane filter
Filtration area	12.5 cm <sup>2</sup> (if using stainless-steel funnels)
Suitable membrane filter diameter	50 mm (47 mm, if using a 47 mm frit 6980103)
Outlet spout (individual system)	10 mm outer diameter
Inlet (branches only)	Female thread, TR 20×2
Outlet (1- and 3-branches only)	Quick Connection Nipple DN 7 (tubings with DN 10 are connectable)
Outlet (6-branch)	Hose nipple DN 10

## □ Ordering Information

### Combisart® Individual System and Multi-Branch Manifolds, Made of High-Grade Stainless-Steel, Pre-Assembled with Stainless-Steel Funnels and Lids

Description	Capacity	Order No.
Combisart® individual filter holder, stainless-steel, 100 ml	1 × 100 ml	16219-CS
Combisart® individual filter holder, stainless-steel, 500 ml	1 × 500 ml	16201-CS
Combisart® 1-branch stainless-steel manifold, 100 ml	1 × 100 ml	16844-CS
Combisart® 1-branch stainless-steel manifold, 500 ml	1 × 500 ml	16845-CS
Combisart® 3-branch stainless-steel manifold, 100 ml	3 × 100 ml	16824-CS
Combisart® 3-branch stainless-steel manifold, 500 ml	3 × 500 ml	16828-CS
Combisart® 6-branch stainless-steel manifold, 100 ml	6 × 100 ml	16832-CS
Combisart® 6-branch stainless-steel manifold, 500 ml	6 × 500 ml	16831-CS

### Combisart® Individual and Multi-Branch Bases, Made of High-Grade Stainless-Steel, Without Funnels and Lids, to Accommodate Various Funnel Types

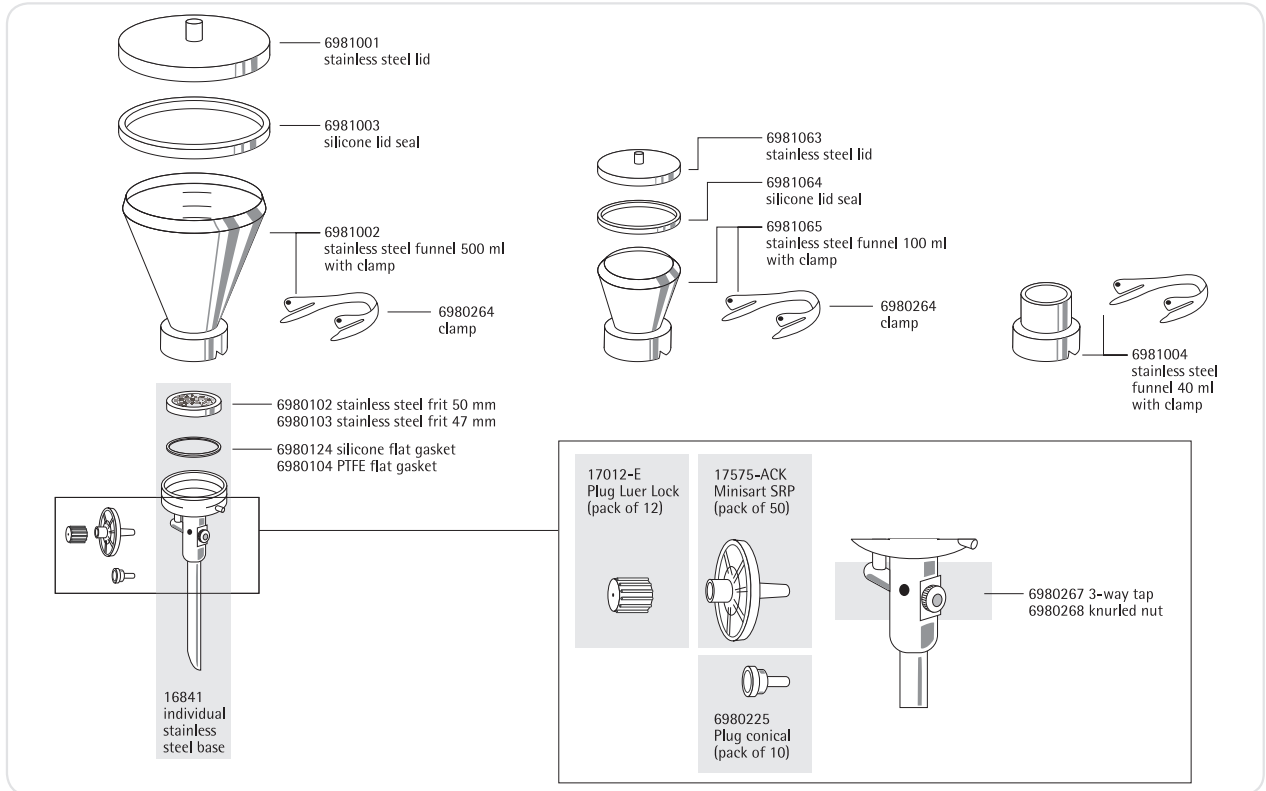
Description	Order No.
Combisart® individual base, stainless-steel, with frit (50 mm), to accommodate stainless-steel funnels and Biosart® 100   250	16841
Combisart® 1-branch stainless-steel manifold, without frit	16844
Combisart® 3-branch stainless-steel manifold, without frits	16842
Combisart® 6-branch stainless-steel manifold, without frits	16843
Combisart® Single base with frit (for 50 mm membranes), stainless-steel, accommodate stainless-steel funnels and Biosart® 100   250	16840
Microsart® Base 47 mm, with frit, stainless-steel base for Combisart® and Microsart® Combi.jet Optimized for the use with 47 mm membranes, Click-Fit closure for Microsart® Funnel, Microsart® @filter and other funnel types sealed by bayonet closure	1ZU---0002

#### Combisart® Hardware Set-Ups

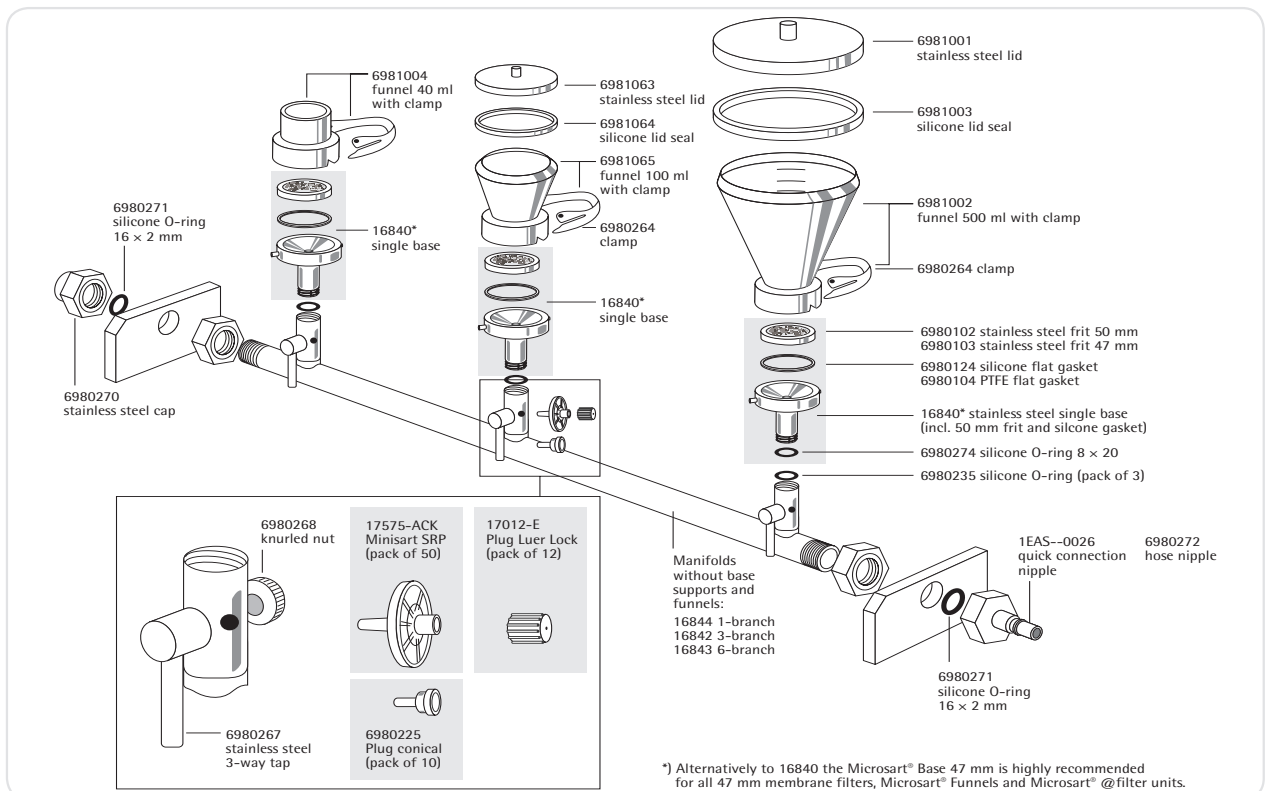
Choose complete filtration systems easy and fast under:  
[www.sartorius.com/microbio](http://www.sartorius.com/microbio)



Replacement Parts for Combisart® Individual Filter Holders



Replacement Parts for Combisart® Manifolds



\*) Alternatively to 16840 the Microsart® Base 47 mm is highly recommended for all 47 mm membrane filters, Microsart® Funnels and Microsart® @filter units.

**Accessories and Replacement Parts for the Combisart® System**

<b>Description</b>	<b>Qty.</b>	<b>Order No.</b>
Minisart® SRP25, sterile filter for venting, 0.2 µm, individually sterile-packaged, could be autoclaved 5 times	50	17575-----ACK
Plug luer lock, to close the Minisart® inlet, if sterile venting is not required	12	17012-----E
Plug, conical, to close the venting hole beside the 3-way-valve, if sterile venting is not required	10	6980225
Silicone O-ring for single base 16840 male thread (also 1ZU---0002)	3	6980274
Silicone O-ring for manifold female threads	3	6980235
Silicone flat gasket underneath the frit (16840)	1	6980124
PTFE flat gasket underneath the frit (16840)	1	6980104
Stainless-steel frit, 50 mm diameter (16840)	1	6980102
Stainless-steel frit, 47 mm diameter (16840)	1	6980103
Quick Connection Nipple, stainless-steel	1	1EAS--0026
Hose nipple, stainless-steel, DN 10	1	6980272
Stainless-steel frit for Microsart® Base 47 mm (1ZU---0002)	1	1ZU---0001
Rubber vacuum hose (1 m)	1	16623
Tubing with Coupling Quick Con., PSU	1	1ZA---0006
Vacuum hose with Quick Con., silicone, 1 m	1	1ZAS--0016
Silicone tubing, pressure-sided, 1 m	1	1ZAS--0007
Silicone tubing, pressure-sided, 10 m	1	1ZAS--0020
Silicone tubing, pressure-sided, 2 m	1	1ZAS--0019

**Funnels, Lids, Seals and Filter Holders to Connect on the Combisart® System**

<b>Description</b>	<b>Capacity</b>	<b>Membrane Filter Diameter</b>	<b>Order No.</b>
Stainless-steel funnel with closure clamp	100 ml	47   50 mm	6981065
Lid, stainless-steel	for 100 ml funnel		6981063
Lid seal, silicone	for 100 ml funnel		6981064
Stainless-steel funnel with closure clamp	500 ml	47   50 mm	6981002
Lid, stainless-steel	for 500 ml funnel		6981001
Lid seal, silicone	for 500 ml funnel		6981003
Stainless-steel funnel with closure clamp	40 ml	47   50 mm	6981004
Polycarbonate filter holder, complete with filter support and funnel	250 ml	47 mm	16511
Glass filter holder, complete with filter support, funnel and metal clamp	30 ml	25 mm	16306
Glass filter holder, complete with filter support, funnel and metal clamp	250 ml	47   50 mm	16307

**Combisart® Adapter, to Accommodate Various Funnel Types**

<b>Description</b>	<b>Adaptation</b>	<b>Order No.</b>
Biosart® 100 Adapter, silicone	Biosart® 100 Monitors onto 16840 (Combisart® single base) or onto 16841 (individual base)	16424
Biosart® 100 Adapter, stainless-steel with silicone stopper	Biosart® 100 Monitors onto Combisart® manifolds 16844, 16842 and 16843	16835
Glass funnel Adapter, stainless-steel with silicone stopper	16306   15 (glass funnel, 30 ml) onto Combisart® manifolds 16844, 16842 and 16843	16836
Glass funnel Adapter, stainless-steel with silicone stopper	16307 (glass funnel, 250 ml) onto Combisart® manifolds 16844, 16842 and 16843	16837

## ■ Microsart® Combi.jet

### 2-Branch Stainless-Steel Manifold for Microbiological Analysis



The Microsart® Combi.jet is a 2-branch manifold, made of high-grade stainless-steel. The manifold has been specifically designed for the use together with the Microsart® e.jet Transfer Pump. The system is able to create sufficient vacuum for vacuum filtration concomitantly transferring the filtered liquid directly to waste. Microsart® Combi.jet and Microsart® e.jet can be easily connected and disassembled by the innovative Quick Connection technology.

#### Compact Design

The complete traditional equipment, such as connectors, tubes, suction flask, protection filter, Woulff's bottle and a vacuum pump, requires a lot of laboratory space and is time consuming to operate and maintain. Microsart® Combi.jet reduces operating complexity due to its small and compact design. The Transfer Pump Microsart® e.jet fits visually and ergonomically into this design.

#### Quick Connection

Building up the vacuum filtration system is easy and fast thanks to the innovative Quick Connection Coupling and Nipples at the Microsart® Combi.jet manifold and Microsart® e.jet Transfer Pump. Simply push-to-connect for assembling and pull-to-disassemble the whole system within seconds.

#### Sterile Venting

A special feature of the Microsart® Combi.jet manifold are the stainless-steel three-way valves (taps). They allow the vacuum for each filter holder to be individually controlled and each filter station to be sterilely vented. This rules out secondary contamination of the underside of the filter.

#### Maximum Flexibility

The Microsart® Combi.jet enables you to select the optimal hardware and consumables for your needs in microbiological analysis in quality assurance. The heart of the whole system is the Microsart® Combi.jet, the stainless-steel 2-branch manifold, designed to accommodate all types of filter holders and funnels such as:

- Ready-to-use units Microsart® @filter 100 and 250
- Ready-to-use units Microsart® Funnel 100 and 250
- Ready-to-use units Biosart® 100 Monitors
- Ready-to-use units Biosart® 250 Funnels
- Flammable units such as stainless-steel funnels
- Autoclavable glass filter holders
- Autoclavable polycarbonate filter holder

#### Reliability: Ideal for Microbiology Applications

- Sterile venting after filtration
- Easy to clean and sanitize
- Smooth and reliable filtration

#### Economically Efficient

- Saving time due to Quick Connection technology
- Saving work space (saves 70%)
- No need for suction flasks and water traps

## □ Specifications

### Microsart® Combi.jet

Stainless-steel quality	High-grade stainless-steel: B.S. 304S31   AISI 304
Dimensions in mm (L   H   D)	246   98   130
Max. operating pressure	Vacuum only
Sterilization	By autoclaving (max. 134°C)
Parts and materials	Manifold: stainless-steel, silicone O-ring
Quick Connection Coupling	PVDF, closure: stainless-steel, sealing: FKM   FPM
Inlet (manifold)	Female thread, TR 20×2
Outlet	Quick Connection Coupling (female), inner diameter NW 7, non-shut-off

### Microsart® Base 47 mm

Materials	stainless-steel, silicone O-ring
Suitable membrane filter diameter	47 mm
Filtration area (e. g. for the use with Microsart® Funnels)	12.5 cm <sup>2</sup>

## □ Ordering Information

### Microsart® Combi.jet 2-Branch Manifold, Made of High-Grade Stainless-Steel, Without Frits and Funnels, to Accommodate Various Funnel Types

Description	Order No.
Microsart® Combi.jet 2-branch manifold, without base support and frits	16848-CJ
Microsart® Base 47 mm, with frit, stainless-steel base for Combisart® and Microsart® Combi.jet Optimized for the use with 47 mm membranes, Click-Fit closure for Microsart® Funnel, Microsart® @filter and other funnel types sealed by bayonet closure	1ZU---0002

### Accessories and Replacement Parts

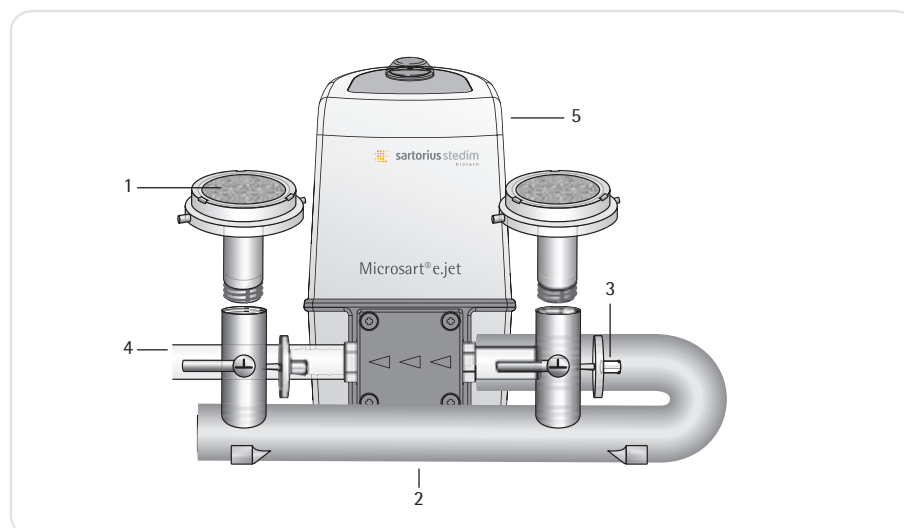
Description	Qty.	Order No.
Minisart® SRP25, sterile filter for venting, 0.2 µm, individually sterile-packaged, could be autoclaved 5 times	50	17575-----ACK
Plug luer lock, to close the Minisart® inlet, if sterile venting is not required	12	17012-----E
Plug, conical, to close the venting hole beside the 3-way-valve, if sterile venting is not required	10	6980225
Silicone O-ring for Microsart® Base 47 mm male thread	3	6980274
Silicone O-ring for manifold female threads	3	6980235
Combisart® single base, stainless-steel, optimal for the use with 50 mm membrane filters, funnel closure by bayonet or adapter	1	16840
Microsart® Combi.jet Coupling, Quick Connection, PVDF	1	1EAS--0022

Funnels and filter holders to connect onto the Microsart® Combi.jet manifold are equivalent to those for the use with the Combisart® system (page 41).



## ■ How to Set-up a Vacuum Filtration System

### Microsart® Combi.jet 2-Branch Stainless-Steel Manifold plus Microsart® e.jet



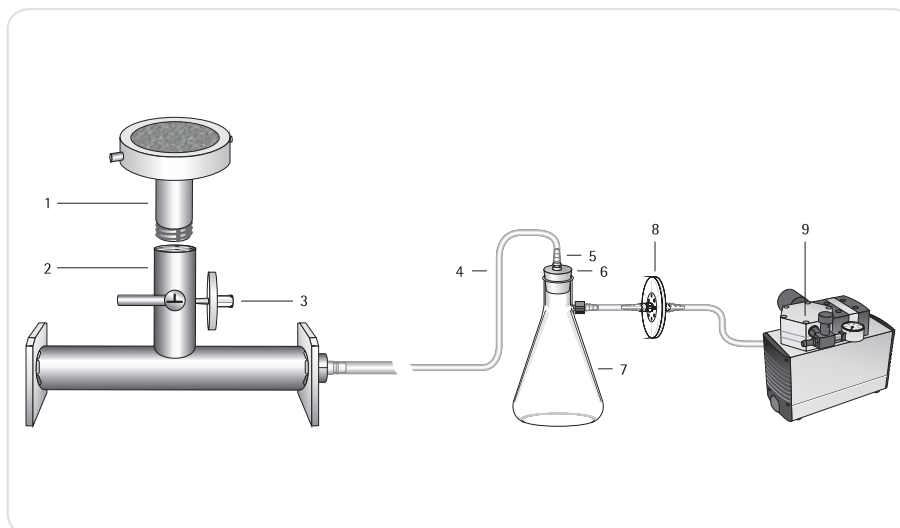
The filter stations are directly connected to the Transfer Pump for simultaneous transfer of the filtrate to waste. Easy assembling thanks to Quick Connection technology.

### □ Ordering Information

Pos.	Description	Qty.	Order No.	Detailed Information on Page
Microsart® Combi.jet stainless-steel equipment:				48
1	Microsart® Base 47 mm	2	1ZU---0002	
2	Microsart® Combi.jet 2-branch manifold	1	16848-CJ	
Sterile venting of the filter station:				45
3	Minisart® SRP25, 0.2 µm	1	17575-----ACK	
4	Silicone tubing, pressure-sided, 1 m	2*	1ZAS--0007	61
	Silicone tubing, pressure-sided, 2 m		1ZAS--0019	
	Silicone tubing, pressure-sided, 10 m		1ZAS--0020	
Vacuum Pump:				60
5	Microsart® e.jet Transfer Pump, 230 V, 50 Hz	1	166MP-4	
Additional accessories:				
	Microsart® @filter 100, sterile filter units, packaged on trays	1	16D01--10-H6--TG	35
	Stainless-steel tweezers	1	16625	65
	Colony Counter	1	17649	64
	Incubator	1	18119	64
	Container for anaerobic incubation	1	16671	65

\* required length depends on distance between Transfer Pump and drain

### Combisart® 1-Branch Stainless-Steel Manifold Plus Microsart® mini.vac



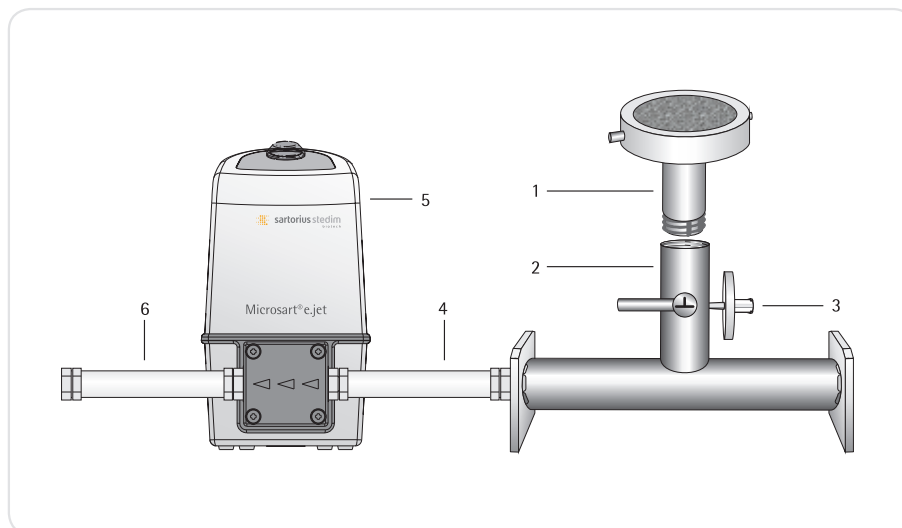
The filter station is connected to a suction flask, which is connected to a filtrate-protected vacuum pump.

### Ordering Information

Pos.	Description	Qty.	Order No.	Detailed Information on Page
Combisart® stainless-steel equipment:				41
1	Combisart® single base, 50 mm	1	16840	
2	Combisart® 1-branch manifold	1	16844	
Sterile venting of the filter station:				45
3	Minisart® SRP25, 0.2 µm	1	17575-----ACK	
4	Rubber vacuum hose, 1 m	3*	16623	57
Suction flask and stopper:				56
5	Tube connector	1	17204	
6	Silicone stopper	1	17173	
7	Suction flask, 2 liters	1	16672	
Water trap for pump protection:				57
8	Vacusart®, 0.45 µm	1	17804-----M	
Vacuum Pump:				58
9	Microsart® mini.vac, 230 V, 50 Hz	1	16694-2-50-06	
	Microsart® mini.vac, 115 V, 60 Hz		16694-1-60-06	
Additional accessories:				
	Microsart® e.motion Dispenser	1	16712	13
	Stainless-steel tweezers	1	16625	65
	Colony Counter	1	17649	64
	Incubator	1	18119	64
	Stainless-steel prefilter attachment	1	16807	65
	Container for anaerobic incubation	1	16671	65

\* required length depends on distance between the filter station and the vacuum source

### Combisart® 1-Branch Stainless-Steel Manifold plus Microsart® e.jet



### Ordering Information

Pos.	Description	Qty.	Order No.	Detailed Information on Page
Combisart® stainless-steel equipment:				
1	Combisart® single base, 50 mm	1	16840	41
2	Combisart® 1-branch manifold	1	16844	
Sterile venting of the filter station:				
3	Minisart® SRP25, 0.2 µm	1	17575-----ACK	45
Silicone tubing with Quick Connection Coupling, 20 cm, vacuum-sided				
4	Silicone tubing with Quick Connection Coupling, 1 m, vacuum-sided	1	1ZA---0006 1ZAS--0016	61
Vacuum Pump:				
5	Microsart® e.jet Transfer Pump	1	166MP-4	60
Silicone tubing, pressure-sided, 1 m				
6	Silicone tubing, pressure-sided, 2 m	2*	1ZAS--0007 1ZAS--0019 1ZAS--0020	61
Silicone tubing, pressure-sided, 10 m				
Additional accessories:				
	Microsart® e.motion Dispenser	1	16712	13
	Stainless-steel tweezers	1	16625	65
	Colony Counter	1	17649	64
	Incubator	1	18119	64
	Stainless-steel prefilter attachment	1	16807	65
	Container for anaerobic incubation	1	16671	65

\* required length depends on distance between vacuum source and drain

**Accessories and Replacement Parts**

Description	Qty.	Order No.
Rubber vacuum hose (1 m)	1	16623
Vacuum tubing with Quick Connection, silicone, 20 cm	1	1ZA---0006
Vacuum tubing with Quick Connection, silicone, 1 m	1	1ZAS--0016
Silicone tubing, pressure-sided, 1 m	1	1ZAS--0007
Silicone tubing, pressure-sided, 10 m	1	1ZAS--0020
Silicone tubing, pressure-sided, 2 m	1	1ZAS--0019



## Traditional Multi-Branch Manifolds and Individual Filter Holders

Made of Stainless-Steel, Glass and Polycarbonate



### Individual Filter Holders

The three stainless-steel holder types differ only in the funnel capacity (either 40 ml, 100 ml or 500 ml). They have been designed specifically for applications in which the particles or microorganisms retained on the membrane filter surface are of interest. The stainless-steel frit filter support ensures a uniform distribution of the residues. Simple handling is very important regarding routine examinations. Stainless-steel taps in the base allow the vacuum to be turned on and off. The special closure clamps simplify the addition or removal of the funnels adding to the ease of use.



### Multi-Branch Manifolds

The manifold systems are available with 100 ml or 500 ml capacity funnels. The three or six separate filter holders save time when mass examinations have to be carried out. Due to the stainless-steel taps on the manifold ports, the vacuum for each holder can be turned on and off individually. The stainless-steel frit allows homogenous dis-



### Specifications

Stainless-steel quality	High-grade stainless-steel: B.S. 304S31   AISI 304
Dimensions in mm (W   H   D)	3-branch manifold: 3 × 100 ml: 432   184   120 3 × 500 ml: 442   262   132 6-branch manifold: 6 × 100 ml: 906   268   120 6 × 500 ml: 916   329   132
Max. operating pressure	Vacuum or max. 2 bar pressure (29 psi)
Sterilization	By autoclaving (max. 134°C), By dry heat (max. 180°C), By flaming, By other methods acc. to ISO 8199
Parts and materials	Lid, funnel, base part, – filter support, clamp and tap made of stainless-steel. Silicone flat gasket. Silicone lid seal
Flow rate per filter station for water at 90% vacuum	200 ml/min with 0.2 µm membrane filter 600 ml/min with 0.45 µm membrane filter
Filtration area	12.5 cm <sup>2</sup>
Suitable membrane filter diameter	50 mm (47 mm, if using a 47 mm frit filter support 6980103)
Outlet spouts (individual system)	10 mm outside diameter
Outlet (branches only)	Hose nipple, DN 10



tribution of the residues on the membrane filter surface. Funnel and filter support can be disinfected by flaming.

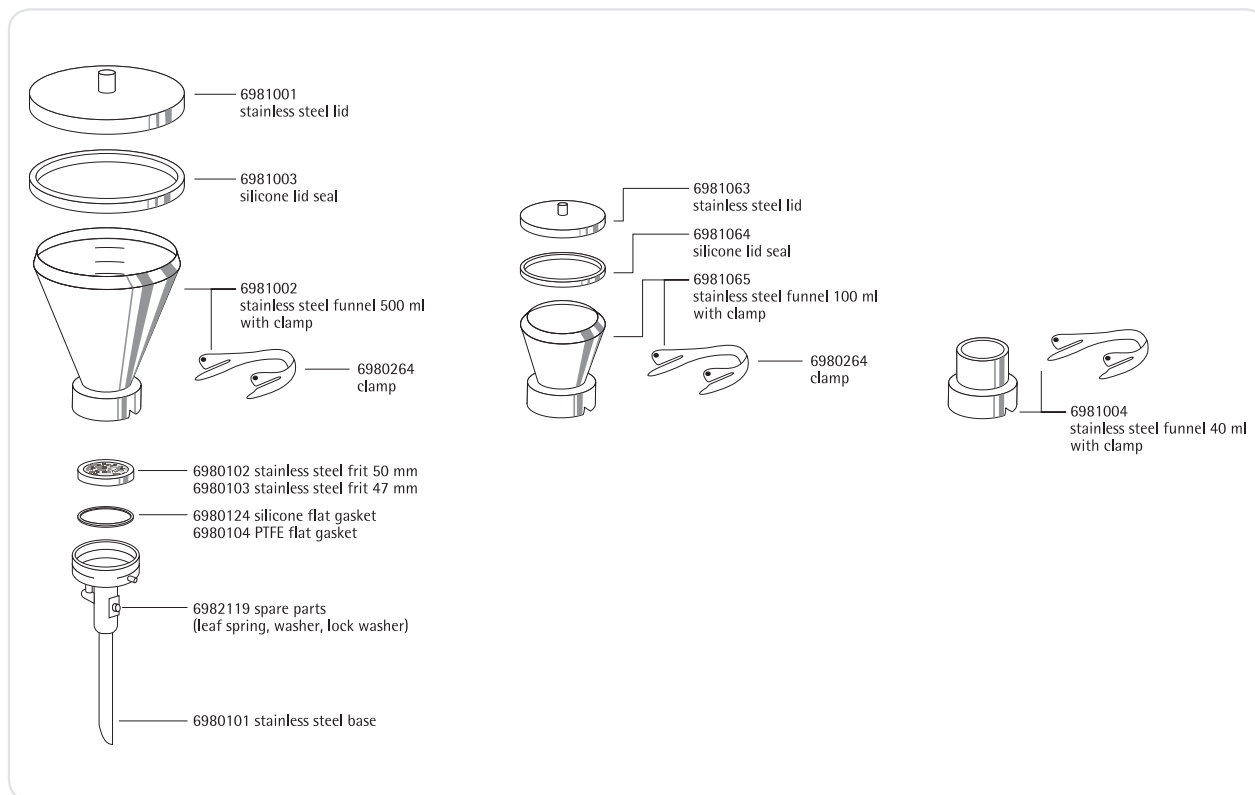
### Glass Filter Holders

These filter holders are available for the filtration of small volumes with a 30 ml top part and for larger volumes with a 250 ml top part. They can be sterilized by autoclaving (max. 134°C) or by dry heat (max. 180°C). The glass frit ensures uniform distribution of retained residue.

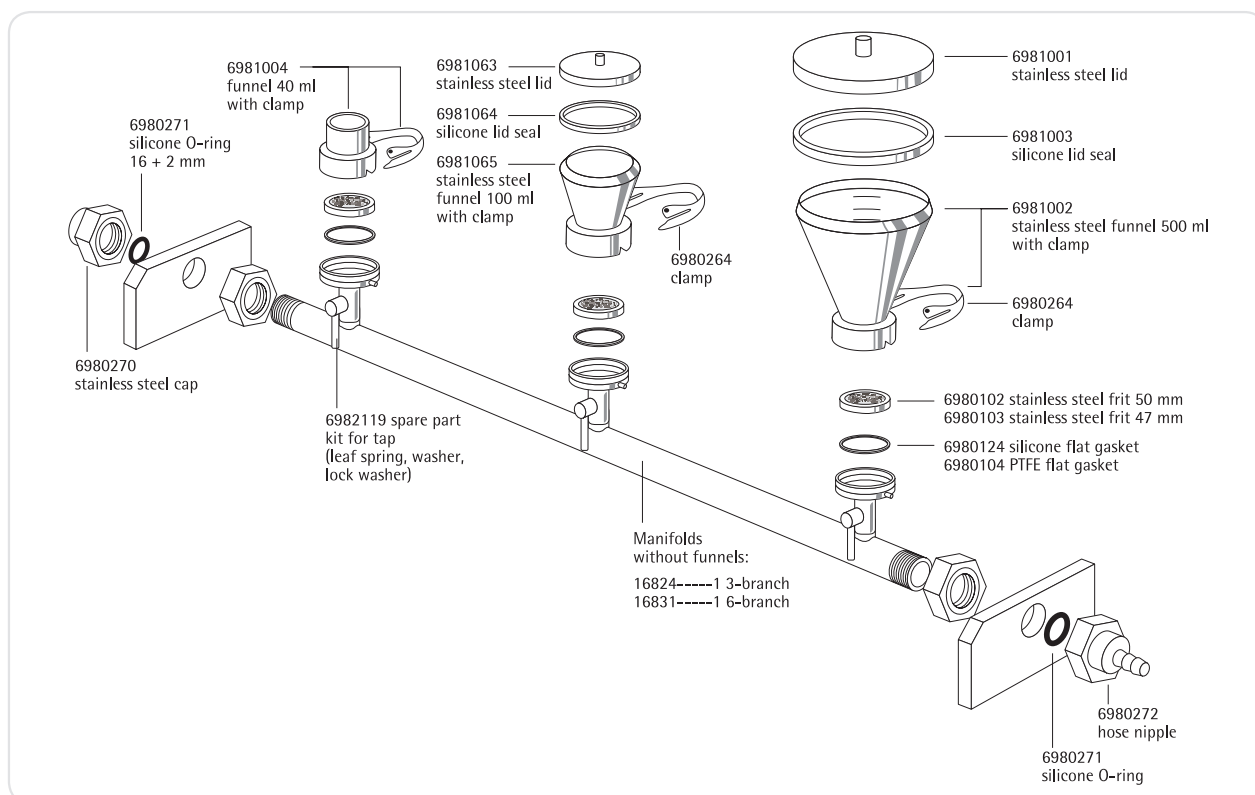
### Polycarbonate Filter Holders

Type 16510 is complete with receiver flask, and can be operated with vacuum as well as with slight overpressure (0.5 bar is recommended for highest standing times). Type 16511 is like 16510, but without receiver flask. It is used on a suction flask or a vacuum manifold e. g. Combisart® systems. Both devices can be sterilized by autoclaving (max. 121°C).

### Replacement Parts for Traditional Individual Filter Holders



### Replacement Parts for Traditional Manifolds



## □ Ordering Information



### Individual Stainless-Steel Filter Holders, Pre-Assembled with Stainless-Steel Funnels and Lids

Description	Capacity	Order No.
Individual stainless-steel filter holder, 100 ml	1 × 100 ml	16219
Individual stainless-steel filter holder, 500 ml	1 × 500 ml	16201
Individual stainless-steel filter holder without lid, 40 ml	1 × 40 ml	16220



### Multi-Branch Manifolds, Stainless-Steel, with Stainless-Steel Funnels and Lids

Description	Capacity	Order No.
3-branch stainless-steel manifold, 100 ml	3 × 100 ml	16824
3-branch stainless-steel manifold, 500 ml	3 × 500 ml	16828
6-branch stainless-steel manifold, 100 ml	6 × 100 ml	16832
6-branch stainless-steel manifold, 500 ml	6 × 500 ml	16831



### Glass Filter Holders

Description	Membrane Filter Diameter	Capacity	Order No.
Glass filter holder, complete with filter support, funnel and metal clamp	25 mm	30 ml	16306
Glass filter holder, complete with filter support, funnel and metal clamp	47   50 mm	250 ml	16307



### Polycarbonate Filter Holder

Description	Membrane Filter Diameter	Capacity	Order No.
Polycarbonate filter holder, with 250 ml top part and receiver flask, for vacuum or pressure filtration	47 mm	250 ml	16510
Polycarbonate filter holder, with 250 ml top part, for vacuum filtration only	47 mm	250 ml	16511



## ■ Accessories for Vacuum Filter Holders and Manifold Systems

### ■ Suction Flasks and Stoppers



#### Suction Flask, 2 Liter Capacity

Vacuum-resistant flask made of duran 50 glass with plastic safety hose nipple according to the German Industrial Standard No. 12476. Outer diameter of the hose nipple, 9 mm. Inner diameter of the opening, 60 mm. Stoppers are not enclosed.

A 1-liter capacity flask is available for countries which do not have safety restrictions on glass hose nipples.

### □ Ordering Information

#### Suction Flasks

Description	Order No.
Suction flask, 5 liters acc. to DIN 12476, incl. stopper 75 D and glass tube	16672-----1
Suction flask, 2 liters acc. to DIN 12476, without stopper	16672
Tube connector for connecting a Combisart® stainless-steel manifold to a suction flask 1 or 2 liters (not necessary when a Vacusart® is connected directly to the bored stopper)	17204
Suction flask, 1 liter (not available in countries which have safety restrictions on glass hose nipples)	16606

#### Replacement Parts

Description	Order No.
Glass tube for silicon stopper 75 D for suction flask 5 liters 16672-----1	1EAQ--0017
Bored stopper 75 D for suction flask 5 liters 16672-----1	1EAS--0019
Assembling kit for hose barb for suction flask 5 liters 16672-----1	1EA---0018
Hose barb, complete, Polypropylene, for suction flask 2 liters 16672	6983003

#### Bored Stoppers for Suction Flask 2 Liters 16672

Description	Adaptation	Order No.
Silicone stopper	Combisart® individual base 16841 or other individual stainless-steel filter holders (16201, 16219, 16220) onto the suction flask 16672	17173
Silicone stopper	16306   15 (glass funnels, 30 ml) onto the suction flask 16672	17174
Silicone stopper	16307 (glass funnel, 250 ml) onto the suction flask 16672	17175

#### Bored Stoppers for Suction Flask 1 Liter 16606

Description	Adaptation	Order No.
Silicone stopper	Combisart® individual base 16841 or other individual stainless-steel filter holders (16201, 16219, 16220) onto the suction flask 16606	17004
Silicone stopper	16306   15 (glass funnels, 30 ml) onto the suction flask 16606	17005
Silicone stopper	16307   16 (glass funnel, 250 ml) onto the suction flask 16606	17006



## ■ Water Traps

Used between suction flask and vacuum source, in order to prevent overflow of filtrate into an electric vacuum pump.



## ■ Vacusart®

Vacusart® is a ready-to-connect filtration unit, consisting of a polypropylene housing and a hydrophobic, but air-permeable PTFE membrane with a pore size of 0.45 µm. Vacusart® is perfectly suitable for the protection of vacuum pumps. It could be put directly into the hole of the bored stopper and connected with the rubber hose to the vacuum pump.

## □ Ordering Information

Description	Order No.
Vacusart® water trap, pack of 3	17804-----M



## ■ Woulff's Bottle, 500 ml

Used between suction flask and vacuum source. Allows simple control of the vacuum with glass units without a separate tap and prevents the filtrate from overflowing from the suction flask.

## □ Ordering Information

Description	Order No.
Woulff's bottle, 500 ml	16610



## ■ Rubber Vacuum Hose (1 Meter)

Thick walled rubber hose for connecting the system components, e. g. suction flasks, vacuum pumps, etc. When ordering, please state length required in meters.

## □ Ordering Information

Description	Order No.
Rubber vacuum hose (1 meter)	16623

## ■ Electric Vacuum Pumps



### ■ Microsart® mini.vac | Microsart® maxi.vac

Sartorius neoprene membrane pumps, operate with low noise level, are oil and maintenance free and has providing reliable sources of vacuum.

The new vacuum pump series provides up to date technology for daily use in the Microbiology laboratory environment.

The vacuum produced by the new pumps is controlled and can be easily adjusted to your specifications. Thus damageable cells (e.g. bacteria) are concentrated on the surface or a membrane filter under better conditions, which results in decreased sub lethals, higher recovery rates and shorter incubation times.

### □ Specifications

	<b>Microsart® maxi.vac</b> <b>16694-2-50-22</b> <b>16694-1-60-22</b>	<b>Microsart® mini.vac</b> <b>16694-2-50-06</b> <b>16694-1-60-06</b>
Delivery	22 l/min	6 l/min
Ultimate Vacuum	100 mbar	100 mbar
Noise level [100 mbar]	57.5–59.0 dBA	53.5 dBA
Operating Pressure	1 bar	2.5 bar
Materials (contact with filtrate possible)	Aluminum, CR (Neoprene), NBR (Perbunan)	PPS, EPDM, FPM (Fluoroelastomer)
Connectors for Tube (mm)	ID 9	ID 4
Ambient Temperature	5... 40°C	5... 40°C
Mains	16694-2-50-22: 230 V   50 Hz 16694-1-60-22: 115 V   60 Hz	16694-2-50-06: 230 V   50 Hz 16694-1-60-06: 115 V   60 Hz
Motor Protection	IP 44	IP 20
Power P1	130 W	65 W
Operating Current	0.9 A	0.63 A
Weight	7.1 kg	1.9 kg
Dimensions W   H   D (mm)	261   204   110	164   141   90
Recommended application	All multi-branch manifolds	Single filtration run up to 3-branch manifolds

## □ Ordering Information

Description	Order No.
Microsart® maxi.vac for multiple filtration runs, 230 V, 50 Hz	16694-2-50-22
Microsart® maxi.vac for multiple filtration runs, 115 V, 60 Hz	16694-1-60-22
Microsart® mini.vac up to 3 filter stations in parallel, 230 V, 50 Hz	16694-2-50-06
Microsart® mini.vac up to 3 filter stations in parallel, 115 V, 60 Hz	16694-1-60-06

### Replacement Parts

Description	Order No.
Replacement kit for 16694-2-50-22 and -1-60-22, set of one membrane, two valve springs and two head seals	1ED---0055
Replacement kit for 16694-2-50-06 and -1-60-06, set of one membrane, two valve springs and two head seals	1ED---0054
Sound absorber for 16694-2-50-22 and -1-60-22	1EH---0002
Sound absorber for 16694-2-50-06 and -1-60-06	1EH---0001
Fine adjustment head for 16694-2-50-22 and -1-60-22	1EV---0002
Fine adjustment head for 16694-2-50-06 and -1-60-06	1EV---0001
Fine adjustment head for 16694-2-50-06 and -1-60-06, for pressure filtration	1EV---0003



## ■ Microsart® e.jet Transfer Pump with Quick Connection

The Microsart® e.jet is a new vacuum laboratory pump able to create sufficient vacuum for vacuum filtration and concomitantly transferring the filtered liquid directly to waste. The second generation of Microsart® e.jet is ideal for sample preparation in Microbiology achieving a trans membrane pressure of 600 mbar and a higher flow rate of > 4.0 NI/min (4.0 Norm-liters water displacement by air in one minute). Constant flow rates and a defined maximum vacuum guarantee smooth and reliable filtration.

### Reducing Operating Complexity

Until now vacuum equipment for the Membrane Filtration Method consists of numerous parts including connectors, tubes, vacuum containers, protection filter, Woulff's bottle and a vacuum pump. After several samples the vacuum must be broken to empty the filtrate collection container. The complete traditional equipment requires far more laboratory space and is time consuming to operate and maintain. Microsart® e.jet will eliminate the need for side-arm flasks or Woulff's bottles from the laboratory filtration bench.

The Microsart® e.jet pump is an ideal accessory for manifolds up to 3 filter stations. Compared to traditional equip-

ment Microsart® e.jet and a stainless-steel manifold require only 30% of the average space meaning in particular less congestion working in Laminar Flow Cabinets.

Traditional vacuum pumps often lose their efficiency and capability to generate sufficient vacuum, when liquid is drawn into the pump head. The Microsart® e.jet is designed to pump both gas and liquids, meaning no loss of efficiency or malfunctions from water drawn into the pump head.

### Quick Connection

Building up the vacuum filtration system is easy and fast thanks to the innovative Quick Connections. The Microsart® e.jet Transfer Pump is equipped with Quick Connection Nipples assembled to Quick Connection Couplings on hose nipples for DN 10 tubings. Simply push-to-connect for assembling and pull-to-disassemble the whole system within seconds. The Quick Connections are non-shut-off.

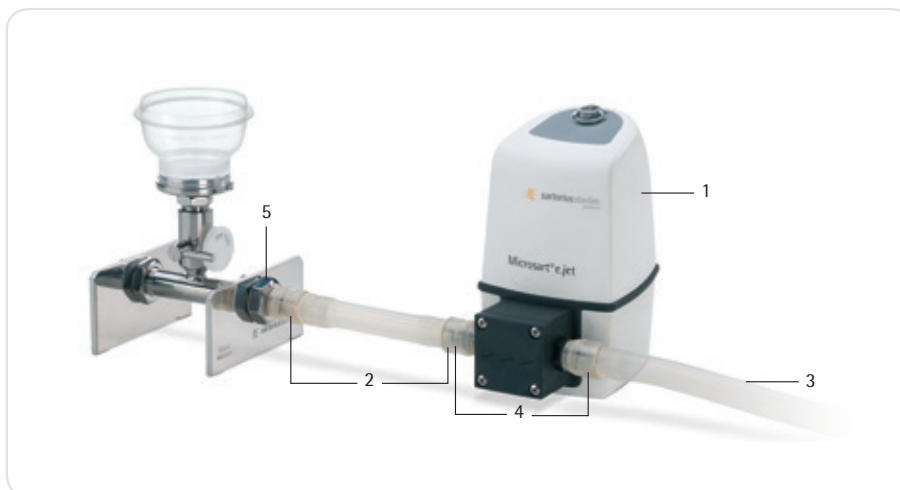
Some of the advantages you will benefit from when using the Microsart® e.jet

- Ideal for microbiology applications
- No need of suction flasks and water traps
- Saving 70% of work space while saving money – that's economic efficiency

## □ Specifications

Flow rate	> 4.0 NI/min
Max. vacuum	0.4 bar
Max. pressure	1.0 bar
Mains	100–240 V   47–63 Hz
Materials (in contact with filtrate)	PTFE, ETFE, Polypropylene, EPDM, POM, PSU
Weight	Pump: 1425.3 g Power supply: 242.6 g
Dimensions (W   L   H)	120 × 170 × 190 mm
Max. ambient temp.	+5...+40°C
Max. temp of liquid	+5...+80°C
Max. viscosity	<150 cSt
Protection type	IP 64
Protection class	III
Inlet   Outlet	Quick Connection on hose nipples for DN 10 tubings

### Microsart® e.jet with Quick Connection



### Ordering Information

Description	Order No.	No. in Picture
Microsart® e.jet Transfer Pump with Quick Connection, without tubings, inlet and outlet hose nipples for DN 10 tubings	166MP-4	1

### Accessories

Description	Order No.	No. in Picture
Tubing with Quick Connection Coupling (PSU), silicone, 20 cm, for vacuum-sided connection, inner diameter DN 10, outer diameter DN 20, wall thickness 5 mm (when ordering, please state length required in meters)	1ZA---0006	2
Silicone tubing with Quick Connection Coupling, 1 m, vacuum sided	1ZAS--0016	
Silicone tubing, 1 m, for pressure-sided connection, inner diameter DN 10, outer diameter DN 14, wall thickness 2 mm	1ZAS--0007	3
Silicone tubing pressure-sided, 2 m	1ZAS--0019	
Silicone tubing pressure-sided, 10 m	1ZAS--0020	
Foot switch for Microsart® e.jet Transfer Pump	1ZE---0053	

### Replacement Parts

Description	Order No.	No. in Picture
Pump head complete for 166MP-3 and 166MP-4	1EP---0003	
Power supply complete for 166MP-3 and 166MP-4	1EE---0012	

### Threaded Fittings

Quick Connection set, 2 Nipples (POM) on R3/8" male thread and 2 Couplings (PSU) on DN 10 hose nipple	1EAS--0027	4
Quick Connection Nipple, stainless-steel	1EAS--0026	5
DN 10 hose nipple on R3/8" male thread	1EAF--0020	



## Traditional Pumps

### Description

Multiple filtration runs:  
13 mbar final vacuum, 26 l/min max., 220 V, 50 Hz

Order No.

16612

Multiple filtration runs:  
13 mbar final vacuum, 26 l/min max., 110 V, 60 Hz

16615

Individual filtration run:  
100 mbar final vacuum, 20 l/min max., 220 V, 50 Hz

16692

Individual filtration run:  
100 mbar final vacuum, 20 l/min max., 110 V, 60 Hz

16695



### Replacement Parts

#### Description

Set of two neoprene membranes, four valve springs  
and two neoprene head seals for 16612/16615

Order No.

6986017

Set of one neoprene membrane, two valve springs  
and one neoprene head seal for 16692/16695

6986105

Rubber tubing

16623





### ■ Water Jet Pump

Simple vacuum source. For connection to a water tap with G3/4 male thread.

#### □ Ordering Information

Description	Order No.
Water jet pump, with G 3/4 female thread	16611



### ■ Hand-Operated Vacuum Pump

Practical vacuum source e.g. for the use outside of a laboratory. Up to 80% vacuum can be obtained. The body is made of PVC. Supplied completely with gauge, vacuum release lever and a 60 cm clear plastic tubing.

#### □ Ordering Information

Description	Order No.
Hand-operated vacuum pump with gauge	16673



### ■ Dosing Syringe

The most convenient way to moisten the NPS with water is to use a dosing syringe with an adapted Minisart® syringe filter. Simultaneous sterilization and dispensing of demineralized water in e.g. 3.5 ml steps

is easily done by simply dropping the sinker at the end of the suction tubing into the water, then filling the dosing syringe and dispensing sterile water by operating the trigger automatically.

#### □ Ordering Information

Description	Order No.
Dosing syringe, 0.5–5 ml	16685-----2
Minisart®, 0.2 µm, individually, sterile-packaged	17597-----K
Replacement part: tubing with sinker for 16685-2 and 16685	6986125
Service Kit for Dosing Syringe 16685-----2	1EP---0002



## Colony Counter

Compact, handy battery-operated colony counter, as simple to use as a ball point pen, and has a 4-digit LCD-display. The counter is supplied with an additional marker refill.

### Ordering Information

Description	Order No.
Colony counter	17649
Replacement part: Black marker refill	6981540



## Incubator

Compact, space-saving incubator for the incubation of membrane filters on nutrient pads or other nutrient media. The incubator has a capacity of 18 liters and is designed to hold the following numbers and sizes of petri dishes: 200×47 mm or 160×56 mm | 60 mm or 72×90 mm.

The swing-up cover and removable insertion plate simplify loading and unloading. The cover is opaque, avoiding light penetration into the chamber.

### Specifications

Voltage	100–240 V
Frequency	50   60 Hz
Rated power	0.045 kW
Weight	7.2 kg (15 lbs)
Max. shelf load	2 kg (4.4 lbs)
Dimensions W   H   D (mm)	Inner 290   180   310 Outer 470   260   415
Temperature range	17°C to 40°C
Temperature stability at 37°C	Less than ±0.2°C
Temperature uniformity at 37°C	±1.2°C
Capacity	approx. 18 liters

### Ordering Information

Description	Order No.
Incubator	18119





### Stainless-Steel Tweezers

Membrane filters should only be handled with suitable tweezers to avoid contamination since the stainless-steel tweezers

can be flamed and are autoclavable. They have blunt-edged tips for a careful, firm hold of the membrane filter.

#### Ordering Information

Description	Order No.
Stainless-steel tweezers	16625



### Stainless-Steel Prefilter Attachment

The stainless-steel prefilter holder allows the removal of coarse, solid particles from samples for microbiological analysis before and during the actual bacteria retentive filtration. The device is clipped between funnel and base of the stainless-steel vacuum filter holders. It can be autoclaved and flamed. 11301, a white cellulose nitrate (cellulose mixed ester) membrane filter with a pore size of 8  $\mu\text{m}$  is used as a

prefilter which retains the coarse suspended particles from the sample, whereas it allows microorganisms to pass through. The microbes are trapped on the surface of the underlying bacteria-retentive membrane filter (e. g. 0.45  $\mu\text{m}$ ). After the filtration is completed, the test filter is incubated, and the colonies can grow on the filter surface without disturbance from, or being hidden by, an excess of particles.

#### Ordering Information

Description	Order No.
Stainless-steel prefilter attachment	16807
Cellulose nitrate membranes with 50 mm diameter and 8 $\mu\text{m}$ pore size for the prefilter holder, pack of 100, individually, sterile packaged	11301--50----ACN
Replacement part: support plate, autoclavable, flame treatment resistant	6981139



### Container for Anaerobic Incubation

Stainless-steel container with 11.8 cm inner diameter, 10.7 cm depth and with a metal insert for convenient insertion and removal of petri dishes. The plastic lid holds two taps for the vacuum exhaust and for

cleaning with inert gas, with 6 mm hose nipples (for 16623), vacuum gauge and sealing ring. For up to fourteen 60 mm, or up to six 90 mm petri dishes.

#### Ordering Information

Description	Order No.
Anaerobic container	16671



Sartorius  
70  
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Max 0.0%  
Esc

sartorius

## ■ Sterility Testing

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Sterility Testing is the analysis for sterility of defined pharmaceutical products which must be sterile according to international pharmacopeia. This test directly examines the final product in the given container, whether it might be filled in a syringe, bottle, vial or bag. There is also no exception on the physical form the pharmaceutical products may have. Liquids or powders, ointments or oils, creams and solid forms, suspensions and emulsions, they all have to be tested for microbial contamination.

The potential impact that pathogens could have on human or animal health, underlines the importance of the "Sterility Test". Almost any kind of microorganism, assume given the chance, can become pathogenous and do severe physical harm to living organisms. Injection of microorganisms directly into the bloodstream enables the infection and colonization of tissues which are usually considered as being sterile. The principle of the test for sterility is based upon the "membrane filtration method", which initially enables the concentration of microorganism from a variety of sample volumes, by simultaneously washing out growth inhibiting substances. After 14 days of cultivation in defined media the sample has to be analyzed visually for turbidity: No turbidity means no contamination!

Parenterals, ophthalmics and surgical devices have to follow the same stringent microbiological controls. They benefit from Sartorius' long-standing expertise in manufacturing a wide range of dedicated products, especially designed for use in cleanrooms. The comprehensive range of consumables with dedicated adapters, ensure reliable results and "make your lab life easier".

Find more about our Sterility Test solution, which fully complies to international pharmacopeia and our extensive service package:

- More than 20 different sterility test consumables available
- Dedicated cleanroom pumps for use in Isolator or Clean bench
- EXPAND® Training
- EXTEND Instrument Services
- CONFIDENCE® Validation Services

## ■ Sterisart NF – Sterility Test Consumables



Sterisart NF Septum version

Sterisart NF is a completely closed system for the sterility testing of pharmaceutical products. It is based on the membrane filter method, however it eliminates the procedure of manipulating the filters. By doing this it means the main risk of a secondary contamination and false positive results is eliminated. A peristaltic pump transfers the sample into the filtration units. After rinsing, the filtration units are filled with media and used for incubation of the filters without any contact to the environment.

As different pharmaceutical products and their containers need different systems for a convenient and secure sample transfer, different versions adapted to the needs are available. Detailed information can be found in the corresponding data sheets Order no. SLD1002-e, SL-2019-e, SLD2006-e, SLD2005-e, SLD2007-e, S--2019-e, SLD2009-e, SLD2011-e and the overview brochure Order no. SLD1004-e.

### Sterisart NF Offers the Following Features and Benefits

Unique Septum version for aseptic sampling and supplement.

The sterile, medical grade septum enables and facilitates the aseptic sampling out of the canister during | after 14 days of incubation, which is required for:

- dilution
- rapid detection

or for supplement of

- additives which inactivate growth inhibiting substances
- microorganism during validation (Bacteriostasis | Fungistasis test, Stasis Test)

Ergonomical and safe handling

- Easy to open packaging
- Large color-coded clamps for optimized use with gloves
- Protective shields to avoid injuries

Reliable results

- Sartochem® membrane for highest retention of microbes, low adsorption and high mechanical stability
- Gas-impermeable packaging for use in isolators
- Product and lot information on units and additionally as barcode on packaging

Flexible use

- Different variants with several user friendly adapters for the most common sample containers
- Septum variants for sampling during incubation

At Sartorius, together with our customers, we steadily improve the features and ease of use of every product we manufacture to make your life in the lab easier. The Sterisart NF Septum version features a septum with a membrane made of latex for aseptically taking samples out of the Sterisart NF canister without risking secondary contamination. This may be applicable for different purposes, for example for the validation of pharmaceutical products (stasis test), for the supplement of additives (B-Lactamase), or for the dilution and transfer of materials being tested that render the medium turbid USP <71>.

### Services

Validation on request, refer also to page 83.

Sterisart BD Media and Fluid refer to page 76.

## □ Specifications

Pore size of the Sartochem® membrane filter	0.45 µm, retention of 10 Million <i>Serratia marcescens</i> per cm <sup>2</sup> of active filtration area
Filter area	15.7 cm <sup>2</sup> in each Sterisart container
Flow rate (for water)	500 ml/min at 1 bar (approx. 15 psi)
Pore size of the air filters	0.2 µm PTFE, validated acc. to HIMA for the retention of <i>B. diminuta</i>
Sample container capacity	120 ml (graduation marks at 50, 75 and 100 ml)
Max. operating pressure	3 bar (approx. 44 psi) at 20°C
Max. operating temperature	50°C
Sterilization	ETO (ethylene oxid gas) or gamma irradiation

## ■ Sterisart NF alpha

Disposable units for sterility testing in clean rooms, individually, sterile packaged, ETO-sterilized, needles made of flame-sterilizable stainless-steel, 10 units

## □ Ordering Information

Description	Type of Sample	Type of Sample Container	Order No.
Sterisart NF alpha with long dual-needle metal spike, sterile-vented	LVPs	Closed glass bottles with septum	16466-----ACD
Sterisart NF alpha with long needle and protective plate, inclusive sterile venting needle	LVPs SVPs	Open containers (i.e. glass ampoules, glass bottles), collapsible bags	16467-----ACD
Sterisart NF alpha with Luer or Luer Lock connector, inclusive long needle and sterile venting needle	Medical devices	Tubing systems and bags with Luer or Luer Lock connectors	16468-----ACD





## ■ Sterisart NF gamma

Disposable units for sterility testing in isolators, individually sterile, double-packaged, gamma irradiated, needles made of flame-sterilizable stainless-steel, 10 units.

### □ Ordering Information



Description	Type of Sample	Type of Sample Container	Order No.
Sterisart NF gamma with long dual-needle metal spike, sterile-vented	LVPs	Closed glass bottles with septum	16466-----GBD
Sterisart NF gamma with long needle and protective plate, inclusive sterile venting needle	LVPs SVPs	Open containers (i.e. glass ampoules, glass bottles), collapsible bags	16467-----GBD
Sterisart NF gamma with Luer or Luer Lock connection, inclusive, long needle and sterile venting needle	Medical devices	Tubing systems and bags with Luer or Luer Lock connectors	16468-----GBD
Sterisart NF gamma with syringe-adaptor and long dual-needle metal spike, sterile-vented	Pre-filled syringes	Syringes with and without needles	16469-----GBD
Sterisart NF gamma with two dual-needle metal spikes of different length, one is sterile-vented	Lyophilisates, soluble powders, liquid antibiotics	Closed glass vials with septum	16475-----GBD
Sterisart NF gamma with short dual-needle metal spike, sterile-vented	SVPs	Closed glass vials with septum	16476-----GBD
Sterisart NF gamma with long needle (side opening, with solid pointed tip, non-coring), protective plate, inclusive sterile venting needle	LVPs, SVPs, eye drops	Closed plastic containers   vials   ampoules, plastic containers of Blow-Fill-Seal fillings	16477-----GBD
Sterisart NF gamma with female Luer Lock connector	<b>NEW</b> Medical devices	Containers   bags with Luer Lock male connectors	16478-----GBD



### ■ Sterisart NF gamma Septum **NEW**

Disposable units for sterility testing in isolators, Sterisart NF containers with integrated septum for reliable sterile sampling during incubation. Individually sterilized, double-packaged, gamma irradiated, needles made of flame-sterilizable stainless-steel, 10 units.

### □ Ordering Information

Description	Type of Sample	Type of Sample Container	Order No.
Sterisart NF gamma Septum with long dual-needle metal spike, sterile-vented	LVPs	Closed glass bottles with septum	16466-----GSD
Sterisart NF gamma Septum with long needle and protective plate, inclusive sterile venting needle	LVPs SVPs	Open containers (i.e. glass ampoules, glass bottles), collapsible bags	16467-----GSD
Sterisart NF gamma Septum with syringe-adapter and long dual-needle metal spike, sterile-vented	Pre-filled syringes	Syringes with and without needles	16469-----GSD
Sterisart NF gamma Septum with two dual-needle spikes of different length, one is sterile-vented	Lyophilisates, Soluble powders, Liquid antibiotics	Closed glass vials with septum	16475-----GSD
Sterisart NF gamma Septum with short dual-needle, sterile vented	SVPs	Closed glass vials with septum	16476-----GSD





### Accessories

#### Description

Sterisart NF gamma tubing system with two dual-needle metal spikes of different length, needles made of flammable stainless-steel

#### Application

Dissolving and diluting of hardly soluble powders in closed containers

#### Order No.

16470-----GBD



Needle with venting filter, 4 cm, stainless-steel, individually sterile packaged, gamma-irradiated, pack size 50

Sterile venting of containers with rinsing solution and nutrient media, additional sterile venting needles, equal to the included needles of the Sterisart NF units, i.e. type 16467, 16468 and 16477

16596-----HNK

Further units on request.

## ■ Sterisart Universal Pumps



International pharmacopeias require the complete sterility of pharmaceutical products that are injected into the blood stream or that otherwise enter the body below the skin surface. The manufacture of such products are required to supply proof of sterility of the final product batch.

The Sterisart Universal Pump is available in two versions: the basic version 16419 and the upgraded version 16420 with display and user software. The pump can be used in clean rooms, integrated into clean benches, or installed countersunk in the working surface of isolators. Its low, compact design has a space-saving footprint – a great benefit for most clean room benchtops and isolators.

### Additional Features and Benefits

- Enhanced safety due to the closed system without ventilation
- Robust stainless-steel housing
- Compact and ergonomic construction
- Modular design
- Pump available with special software (menu-driven prompts for operator guidance; all process sequences can be logged; barcode recognition)

Special brochures available on request.  
Order no. SLD1003-e, SLD2010

### Services

IQ | OQ and maintenance service on request, see also page 83

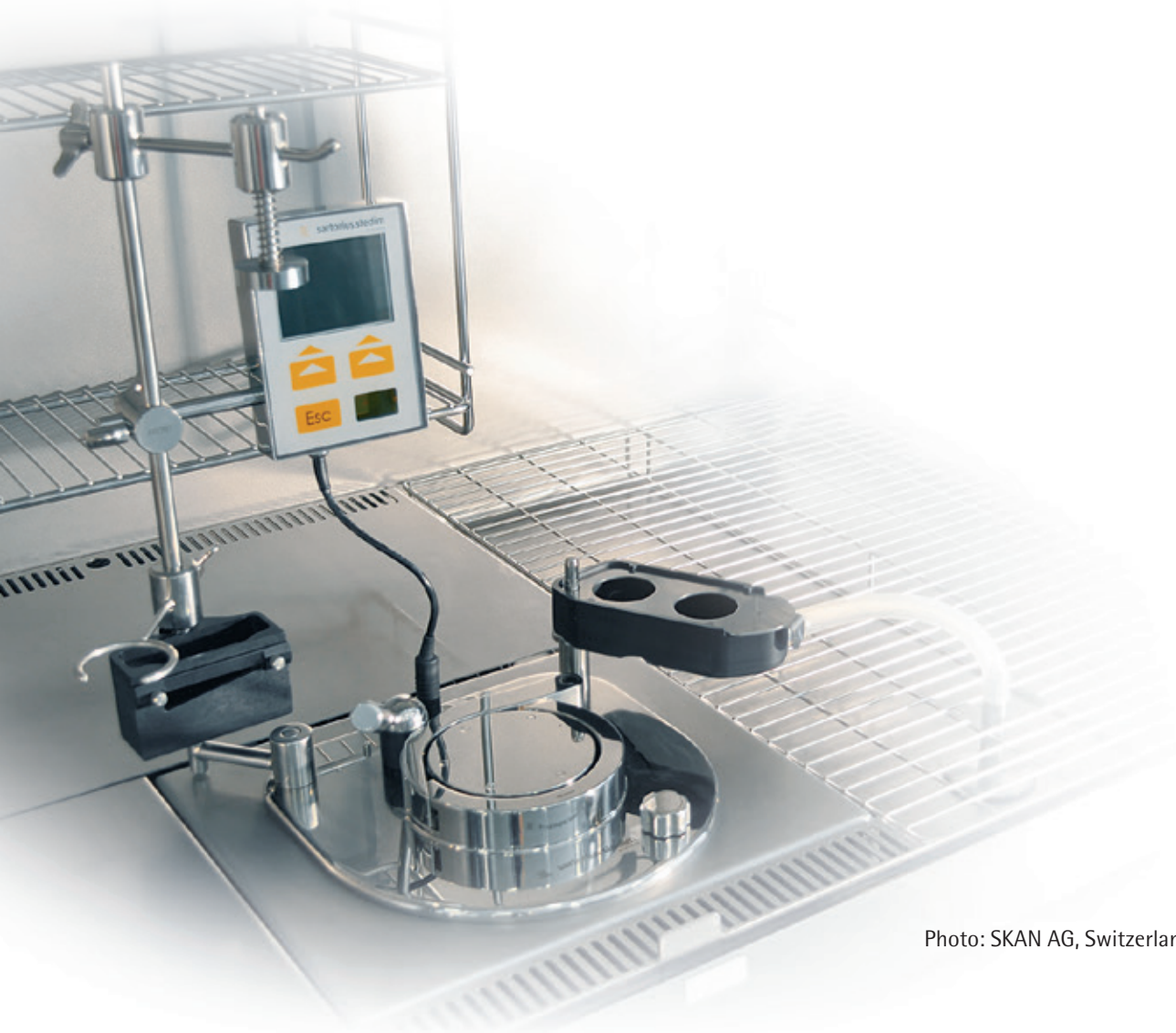


Photo: SKAN AG, Switzerland



## Specifications

Pump flow rate	70–650 ml/min
Power requirements	100–240 VAC
Frequency	50–60 Hz
Power consumption	100 W
Dimensions	
Pump	approx. 336×260×210 mm (with lever) (W×D×H)
Pump with holding ring for bottles, container	approx. 440×365×485 mm (W×D×H)
Weight	
Basic version 16419	approx. 13.5 kg
Upgraded version 16420 with display and user software	approx. 14.6 kg

## Ordering Information

Description	Order No.
Sterisart Universal pump, basic version	16419
Sterisart Universal pump, upgraded version with display and user software	16420

## Accessories

Description	Order No.
Footswitch	1ZE---0033
Adapter for Sterisart NF units, fitting into container for draining of Millipore Equinox pump	1ZG---0014
Transport trolley	1ZE---0039
Communication kit	1ZE---0040
Installation kit for isolators	1ZE---0050
Container for draining	1ZG---0028
Drain Tubing	1ZA---0002

Further accessories are available on request.

## ■ Sterisart BD Media and Fluids



Sterisart BD Media and Fluids are sterilized by autoclaving in their final primary bottles. They are used on clean benches or in clean rooms. Special packaging types are ideal for transferring media from non-sterile areas into sterile areas such as isolators.

- Transparent labels allow a clear view of media and cultures
- Labels resist alcohol and chlorine treatment
- Color-coded caps and labeling for the nutrient media allow easy product identification
- Specially developed clear FTM for much easier growth detection
- Growth performance test conforms to EP and USP requirements
- Extensive Certificates of Analysis showing microbial recovery of all microorganisms listed in EP and USP

### **Multi-packaged, ETO-sterile**

The autoclaved filled bottles are packaged into a polypropylene box which is then sealed into a Stericlin® bag and sterilized by ethylene oxide (ETO). This treatment provides a sterile outer surface of the bottles and the packaging. The multiple-packaging allows the transfer of the bottles into clean rooms from a non-sterile area into a sterile area.

- Sterile outer surface of the bottles eliminates the need for spraying down bottles before transferring them into clean rooms or isolators
- Polypropylene boxes reduce shedding of particles to a minimum
- Compact packaging saves working space.
- Optimal for small clean room areas such as isolators due to clever waste management

### **Individually Double-packaged, Sterile**

The filled bottles are packaged into two Stericlin® bags prior to autoclaving. This unique manufacturing process results in a bottle exterior that is free from microbial contaminants.

- Double-packaging ensures that the area under the cap remains sterile, therefore reducing the risk of false positive results
- Sterisart BD Media and Fluids are validated at a sterility assurance level (SAL) of  $10^{-6}$
- Sterisart BD Media and Fluids comply with the requirements set forth in the International Pharmacopoeia such as EP and USP
- Optimal for all clean room areas including isolators due to easy and reliable transfer into the sterile area



### Nutrient Media Types

#### **FTM – Fluid Thioglycollate Medium according to USP | EP:**

Liquid nutrient medium for the sterility testing of biologics and for the enrichment and cultivation of anaerobes, aerobes, and microaerophiles acc. to USP and EP. In order to avoid secondary contamination, the Sterisart BD Media Type FMT is not under vacuum, but the headspace of the FTM is gassed with a stream of nitrogen to maintain anaerobiosis.

Sterisart BD Media Type FTM contains a special quality of agar, resulting in a high clarity of the prepared medium.

Color code: red

#### **TSB – Tryptic Soy Broth according to USP | EP:**

A general purpose liquid nutrient medium used in sterility testing for the detection, isolation, and cultivation of fastidious and non fastidious microorganisms acc. to USP and EP.

Sterisart BD Media Type TSB is a nutritious medium that will support the growth of a wide variety of microorganisms, including common aerobic and facultatively anaerobic bacteria and fungi.

Color code: blue

### Rinsing and Diluting Fluids

#### **Fluid A and Fluid D according to USP**

Three different steps are required by the compendia depending on the condition of the sample:

- Rinsing: Sterile devices or materials are rinsed in order to release adhered microorganisms. After filtration of the sample, the Pharmacopoeia also require rinsing steps to be performed on the entire Sterisart NF unit
- Diluting: Small volumes or viscous liquids are diluted for better filterability
- Dissolving: Solid samples or ointments are dissolved for better filterability

#### **Fluid A (Peptone Water)**

Fluid A is used for diluting, dissolving and rinsing of all types of samples.

#### **Fluid D**

##### **(Fluid A with 0.1% Polysorbate 80)**

Fluid D is peptone water with 0.1% polysorbate 80 (TWEEN® 80). It is used for those samples types which contain lecithin or oil. Another application is to rinse articles and devices with bacteriostatic or fungistatic activity. Polysorbate 80 may act as an inactivator of microbicides present in or on a testing sample.

The use of Sterisart BD Fluid A and Fluid D does not affect the viability of microorganisms.

Both Sterisart BD Fluid Types, Fluid A and Fluid D, are according to the specifications of the United States Pharmacopoeia (USP).

Sterisart BD Media and Fluids on request

## EXPAND®

### Training Courses and Seminars



#### Sterility Testing

##### Who should attend

Staff working in the field of microbiological quality control who perform or are responsible for the performance of sterility testing.

“Because sterility testing is a very exacting procedure, where asepsis of the procedure must be ensured for a correct interpretation of results, it is important that personnel be properly trained and qualified” USP <71>.

This workshop is designed to give participants theoretical knowledge and practical experience in the handling of sterility testing in clean rooms and isolators.

##### Theoretical Aspects Include

- Regulation and guidance
- Sterility test methods | test limitations
- Validation
- Interpretation of sterility test results
- Microbiological monitoring

##### Practical Exercises

- Sterility testing of different sterile products (LVPs | SVPs | ampoules | syringes | medical devices)
- Performing sterility test in isolators

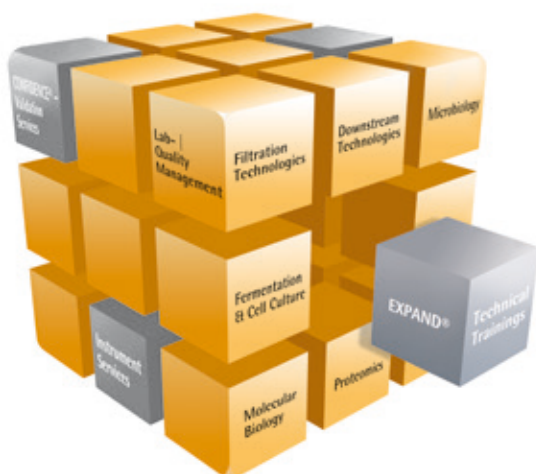
**Course date | venue**  
on demand

**Course Duration**  
1.5 days

Start first day: 1:00 pm  
End last day: 4:00 pm

**Trainer**  
Dr. Dagmar Simons

**Course Fee**  
on demand



## ■ Installation and Commissioning

### Sterisart Pump



The reliability and the service life of your equipment significantly depend on its installation and configuration according to the specifications.

Installation and commissioning by our service professionals will ensure that your Sterisart pump successfully operates right from the start.

Sartorius Service installs and configures according to regulatory requirements and quality standards.

#### Prerequisites Required by the Customer

- System is standing at the installation location
- Unobstructed access to the system
- Power is available at the installation location
- When ordering, a responsible person has to be appointed

#### □ Specifications

- Check of scope of delivery
- Check of device for transport damage
- Manufacturer's ID label check
- Installation of system components and utilities connection
- Positioning of the system at the installation location (not installation in isolator\*)
- Initial start-up
- Brief instructions to operating personnel (not application training)
- General maintenance discussion

\* The installation in an isolator is charged on time basis.

#### □ Ordering Information

Description	Order No.
Installation and Commissioning Sterisart Pump	S8740INST

## Preventive Maintenance

### Sterisart Pump



The objective of preventive maintenance is a continuous, precise operation of your equipment, to secure your investments for the long term and to guarantee correct and proper function.

Preventive maintenance will be performed in accordance with Sartorius' fixed standards and in between the contractually stipulated time intervals between the customer and Sartorius.

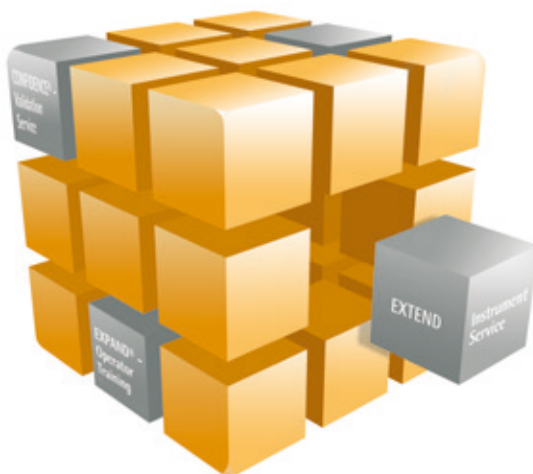
#### Prerequisites Required by the Customer

- System is standing at the maintenance location
- Unobstructed access to the system
- When ordering, a responsible person has to be appointed
- Access by automobile is possible | parking lot is available

Repairs, spare parts as well as shipping costs, travel costs and expenses are not covered in scope of services and will be invoiced separately.

#### Specifications

- Inspection visit at fixed intervals or as needed
- Visual inspection
- Maintenance check according to maintenance checklist
- Check of flow rate capacity and uniform performance
- Start-up test





## Validation of Sterility Testing with the Sterisart System



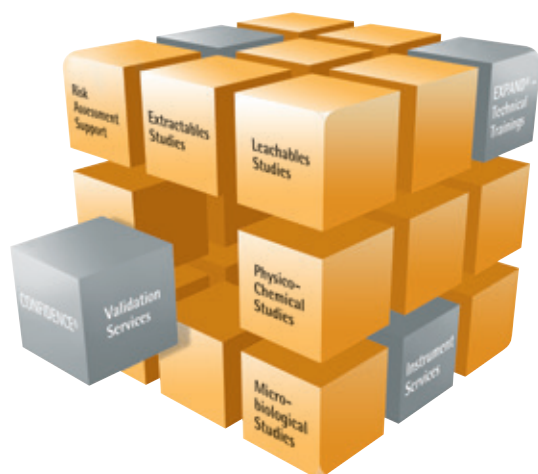
### Introduction

Sterility testing is a critical step in pharmaceutical product release. It is a very exacting procedure where aseptic conditions, well-trained personnel and validated methods must be adhered to for the consistent interpretation of results.

Validation of the sterility test is essential for a quality program and to meet regulatory requirements. Every precaution must be taken to ensure that the environment, procedures, test materials and personnel do not inadvertently contaminate routine testing while still making the detection of product contamination possible.

### Customized Study

- An experienced technical team will select representative products for testing based on a scientifically sound bracketing approach with supporting rationale
- Products are classified in groups according to their chemical and anti-microbial properties; the worst-case products are selected for testing
- Validation is conducted according to routine procedures using the same testing parameters, volume of filtered product, fluid rinse cycles and testing environment
- Tests are conducted by the laboratory according to USP and | or EP requirements

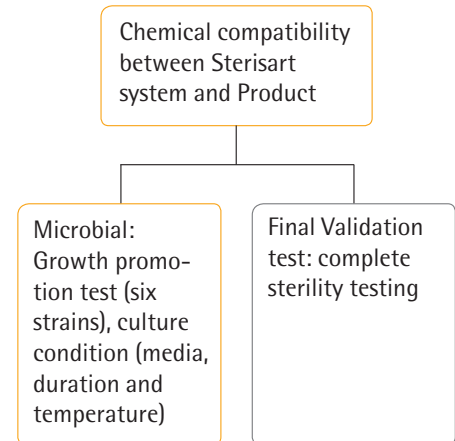


**Conducted by Confidence®**

1. Chemical compatibility between the product sample and the Sterisart system is demonstrated on all plastic parts (needles, connections, tubing and containers). In addition, the filter integrity of the Sartochem® membrane is tested.
2. Microbial growth should not be inhibited by the sample under routine testing conditions in a controlled environment.
  - One series of positive control tests is performed. Six strains (Staphylococcus aureus, Bacillus atrophaeus, Pseudomonas aeruginosa, Clostridium sporogenes, Candida albicans and Aspergillus brasiliensis) in neutral solution are individually inoculated directly into the filtration unit (100 CFU per filtration unit)
  - One series with strains is inoculated (100 CFU per filtration unit) in the solution to be tested and filtered through the filtration unit in routine conditions
  - The sterility and fertility of the Thioglycollate and Soybean Casein Digest media are checked
  - Equivalent microbial growth must be observed in both testing series
3. Sterility test  
Sterility testing is performed according to routine SOP in a controlled environment.

**Study Design**

All Sterisart disposable systems are designed with a unique and reliable membrane that has high retention of microorganisms, low adsorption and high chemical | mechanical stability.



- Conducted by Confidence® Validation Services
- Conducted by Customer

**Conducted by Customer**

Following the routine procedure, one complete sterility test validation run should be performed by the customer's operators in their routine environment.

**Regulatory Compliance**

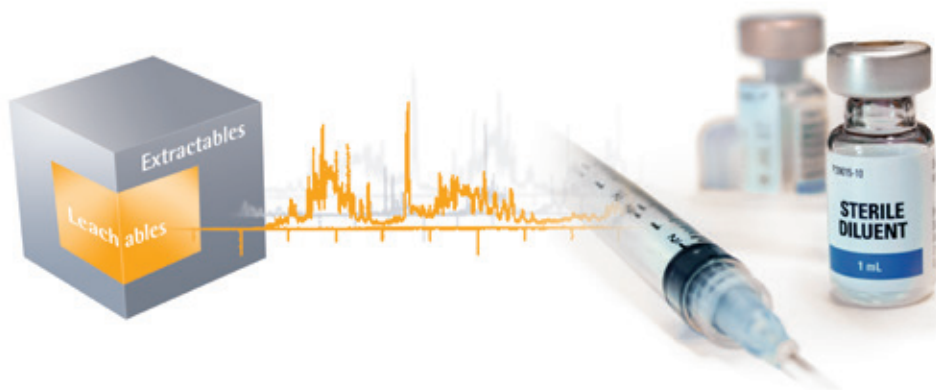
USP <71> Sterility Tests  
EP 2.6.1 Biological Tests – Sterility  
ISO17025 certified and FDA registered Laboratory – Complies with general requirements for the competence of testing and calibration laboratories, cGMP recommendations are applied for test procedures

**Documentation Provided**

Detailed protocols and reports including rationale, test results and method transfer assessment are provided based on the health authorities' requirements. Full traceability is given according to cGMP recommendations and internal quality systems.

**Assay Duration**

Typically five weeks after samples receipt and protocol approval, the study report for non-inhibitory products can be provided.





Microsart AMP  
Positive Control

Microsart AMP Mycoplasma  
Final Control

Microsart AMP Mycoplasma  
Rehydration

Microsart AMP Mycoplasma

Microsart AMP Mycoplasma  
CR Grade Water

## ■ Mycoplasma Contamination Control

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- 97 Microsart® Calibration Reagent





Mycoplasma are among the world's smallest bacteria capable of independent reproduction. They belong to the class of Mollicutes and have a very slow and parasitic growth. They cause many infections in humans, animals and plants. Mycoplasma are very difficult to control as they lack the bacterial cell wall, which is the main point of attack for many antibiotics. For this reason, a complete retention with conventional sterile filters (0.2  $\mu\text{m}$  pore size) is not possible. The risk is that Mycoplasma with a cell size between 0.5 and 0.8  $\mu\text{m}$  could pass through the pores due to their high flexibility and capacity for deformation. Without causing any visible changes in the culture a Mycoplasma contamination can reach high numbers, with no effect on viability and thus may go undetected. This means, the earlier you detect Mycoplasma contamination, the higher your long-term savings. Early detection means more time to react, saving you valuable time and considerable expense.

The detection of Mycoplasma with conventional methods is labour-intensive and requires a cultivation time of at least 28 days before a contamination with these slow-growing bacteria can be ruled out with certainty. Real-time PCR based kits offer a fast and easy-to-use solution for early detection at all stages of your process, whether you are screening in the lab or testing in your production line.

Sartorius offers the Microsart<sup>®</sup> AMP Mycoplasma, Microsart<sup>®</sup> ATMP Mycoplasma and Microsart<sup>®</sup> RESEARCH Mycoplasma detection kits for your different needs and levels of security.

## ■ Microsart® AMP Mycoplasma

### Rapid Real-time PCR Mycoplasma Detection Kit



Real-time PCR kit for the specific and sensitive detection of Mycoplasma DNA



Rapid methods for the detection of Mycoplasma contamination are essential for improving monitoring of the production process of biologicals. The first member of the product line qPCR kits for Mycoplasma detection is the Microsart® AMP Mycoplasma. The Microsart® AMP can be easily implemented into your process because no specific hardware is needed. The test procedure takes only 3 hours and is successfully validated for sensitivity, specificity and robustness according to EP 2.6.7. and also complies with many other international guidelines like USP <63> and JP. Carefully selected primer | probe combinations are highly specific for a region within the 16S rRNA gene for more than 110 Mycoplasma species.

Due to the prior enrichment step using the Sartorius Vivaspin 6 and | or Vivaspin 20, you have the possibility to be flexible in the testing volume for the DNA extraction. With this concentration step you have the option to analyze a testing volume from 200 µl up to 18 ml ensuring to reach the highest possible sensitivity. The kit contains all essential components in a function-tested ready-to-use master mix including the polymerase.

The use of TaqMan® probes adds specificity to the PCR detection system. The analysis is performed during the cycling process – no melting curve analysis is needed.

A detection limit of less than 10 CFU/ml for all Mycoplasma species mentioned in the European Pharmacopoeia fulfills the requirements for the needed sensitivity.

#### Features and Benefits

##### Flexible sample volume from 200 µl to 18 ml

The level of security can be adapted to specific needs.

##### Microsart® AMP Mycoplasma is based on Real-time PCR technology

Easy-to-use and Fast: Results within hours, not days!

##### Microsart® AMP Mycoplasma is validated according to EP guidelines

Easy implementation for regulated in-process and lot release testing.

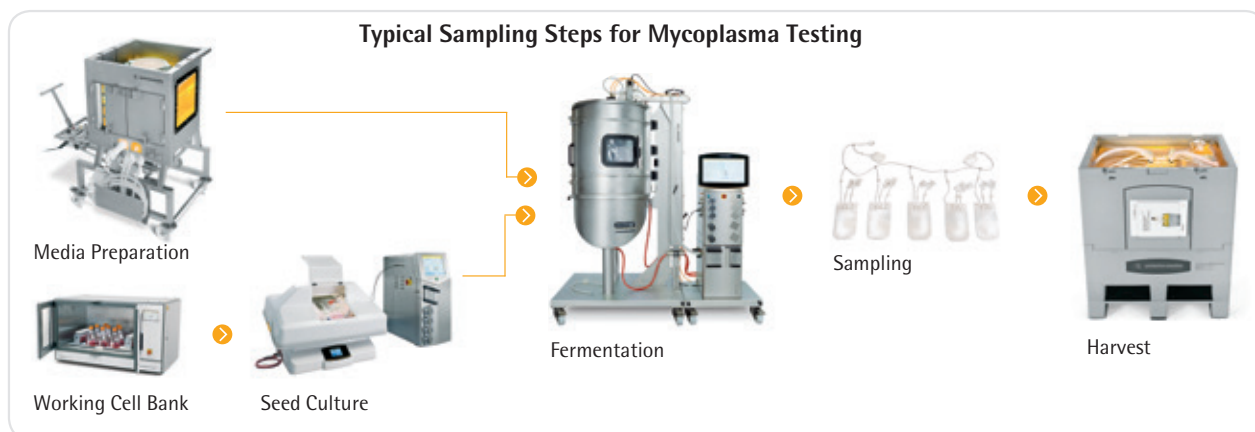
#### Applications

The Microsart® AMP Mycoplasma kit is specifically designed for microbiological QC labs in the bio-pharmaceutical industry or contract labs performing Mycoplasma contamination in-process controls and | or lot release testing according to EP 2.6.7. and also complies with many other international guidelines like USP <63> and JP.

It is used for direct detection of Mollicutes (Mycoplasma, Acholeplasma, Spiroplasma) in cell cultures, cell culture media components and derived biologicals.

#### Sample types:

- Master cell banks
- Working cell banks
- Virus seed lots
- Virus harvests
- Final lots of biologicals produced by cells



### □ Specifications

Each kit contains reagents for 25 or 100 reactions. The expiration date of the unopened package is specified on the package label. The kit components are to be stored until use at +2 to +8°C and must be stored after opening and rehydration below –18°C. The lot-specific Certificate of Analysis can be downloaded from the manufacturer's website ([www.minerva-biolabs.com](http://www.minerva-biolabs.com)).

Kit Component	25 Reactions	100 Reactions
Order No.	SMB95-1001	SMB95-1002
Mycoplasma Mix	1 × lyophilized	4 × lyophilized
Rehydration Buffer	1 × 1.3 ml	4 × 1.3 ml
Positive Control	1 × lyophilized	4 × lyophilized
Internal Control	1 × lyophilized	4 × lyophilized
PCR grade Water	1 × 1.4 ml	4 × 1.4 ml



## □ Ordering Information

### Mycoplasma Kits

Description	Quantity	Order No.
Microsart® AMP Mycoplasma	25 tests	SMB95-1001
Microsart® AMP Mycoplasma	100 tests	SMB95-1002

### Accessories

Microsart® AMP Extraction	50 extractions	SMB95-2003
Vivaspin 6, 100,000 MWCO	25 units	VS0641
Vivaspin 20, 100,000 MWCO	12 units	VS2041
Microsart® AMP Coating Buffer	20 × 2 ml	SMB95-2002
Microsart® Validation Standard <i>Mycoplasma arginini</i>	3 vials	SMB95-2011
Microsart® Validation Standard <i>Mycoplasma orale</i>	3 vials	SMB95-2012
Microsart® Validation Standard <i>Mycoplasma gallisepticum</i>	3 vials	SMB95-2013
Microsart® Validation Standard <i>Mycoplasma pneumoniae</i>	3 vials	SMB95-2014
Microsart® Validation Standard <i>Mycoplasma synoviae</i>	3 vials	SMB95-2015
Microsart® Validation Standard <i>Mycoplasma fermentans</i>	3 vials	SMB95-2016
Microsart® Validation Standard <i>Mycoplasma hyorhinis</i>	3 vials	SMB95-2017
Microsart® Validation Standard <i>Acholeplasma laidlawii</i>	3 vials	SMB95-2018
Microsart® Validation Standard <i>Spiroplasma citri</i>	3 vials	SMB95-2019
Microsart® Calibration Reagent <i>Mycoplasma arginini</i>	1 vial	SMB95-2021
Microsart® Calibration Reagent <i>Mycoplasma orale</i>	1 vial	SMB95-2022
Microsart® Calibration Reagent <i>Mycoplasma gallisepticum</i>	1 vial	SMB95-2023
Microsart® Calibration Reagent <i>Mycoplasma pneumoniae</i>	1 vial	SMB95-2024
Microsart® Calibration Reagent <i>Mycoplasma synoviae</i>	1 vial	SMB95-2025
Microsart® Calibration Reagent <i>Mycoplasma fermentans</i>	1 vial	SMB95-2026
Microsart® Calibration Reagent <i>Mycoplasma hyorhinis</i>	1 vial	SMB95-2027
Microsart® Calibration Reagent <i>Acholeplasma laidlawii</i>	1 vial	SMB95-2028
Microsart® Calibration Reagent <i>Spiroplasma citri</i>	1 vial	SMB95-2029

## ■ Microsart® ATMP Mycoplasma

### Rapid Real-time PCR Mycoplasma Detection Kit for testing ATMPs



The Microsart® ATMP Mycoplasma detection kit is the second member of the new rapid qPCR product line for an easy and fast detection of Mycoplasma. With the use of the Microsart® ATMP Mycoplasma you will reduce your testing time from weeks to 3 hours. The Microsart® ATMP Mycoplasma has been effectively validated according to EP 2.6.7 in combination with EP 2.6.21 with respect to detection limit for all listed Mycoplasma species, specificity and robustness for Advanced Therapy Medicinal Products (Cell Therapy, Gene Therapy, Tissue Engineered Products). Our kit also complies with many other international guidelines like USP<63> and JP.

The use of TaqMan® probes adds specificity to the PCR detection system. The analysis is performed during the cycling process – no melting curve analysis is needed.

#### Feature and Benefits

**Microsart® ATMP Mycoplasma is based on Real-time PCR technology**  
Easy-to-use and Fast: Results within a day!

**Microsart® ATMP Mycoplasma is validated according to EP guidelines for Advanced Therapy Medicinal Products, but is not limited for the use with ATMPs.** Easy implementation for regulated in-process and lot release testing.

#### No specific hardware requirements

Easy implementation and no additional costs for the hardware package. Can be used with any Real-time PCR instrument which is able to detect the dyes FAM and ROX and which can handle total reaction volumes of 25 µl.

In contrast the Microsart AMP Mycoplasma kit requires an instrument which is able to handle total reaction volumes of 100 µl.

#### Applications

The Microsart® ATMP Mycoplasma real-time PCR kit is especially designed for all hospitals, institution and companies which are involved in testing Mycoplasma contamination in ATMPs according to EP2.6.7. or many other international guidelines like USP <63> and JP.

### □ Specifications

Each Kit contains all required reagents for 25 or 100 reactions including polymerase as part of the Mycoplasma Mix. The expiration date of the unopened package is specified on the package label. The kit components are to be stored until use at +2 to +8°C and must be stored after opening and rehydration below -18°C. The lot-specific Certificate of Analysis can be downloaded from the manufacturer's website ([www.minerva-biolabs.com](http://www.minerva-biolabs.com)).

Kit Component	25 Reactions	100 Reactions
Order No.	SMB95-1003	SMB95-1004
Mycoplasma Mix	1 × lyophilized	4 × lyophilized
Rehydration Buffer	1 × 1.0 ml	2 × 1.0 ml
Positive Control	1 × lyophilized	1 × lyophilized
Internal Control	1 × lyophilized	4 × lyophilized
PCR grade Water	1 × 1.5 ml	4 × 1.5 ml

## □ Ordering Information

### Mycoplasma Kits

Description	Quantity	Order No.
Microsart® ATMP Mycoplasma	25	SMB95-1003
Microsart® ATMP Mycoplasma	100	SMB95-1004

### Accessories

Microsart® AMP Extraction	50 extractions	SMB95-2003
Vivaspin 6, 100,000 MWCO	25 units	VS0641
Vivaspin 20, 100,000 MWCO	12 units	VS2041
Microsart® AMP Coating Buffer	20 × 2 ml	SMB95-2002
Microsart® Validation Standard <i>Mycoplasma arginini</i>	3 vials	SMB95-2011
Microsart® Validation Standard <i>Mycoplasma orale</i>	3 vials	SMB95-2012
Microsart® Validation Standard <i>Mycoplasma gallisepticum</i>	3 vials	SMB95-2013
Microsart® Validation Standard <i>Mycoplasma pneumoniae</i>	3 vials	SMB95-2014
Microsart® Validation Standard <i>Mycoplasma synoviae</i>	3 vials	SMB95-2015
Microsart® Validation Standard <i>Mycoplasma fermentans</i>	3 vials	SMB95-2016
Microsart® Validation Standard <i>Mycoplasma hyorhinis</i>	3 vials	SMB95-2017
Microsart® Validation Standard <i>Acholeplasma laidlawii</i>	3 vials	SMB95-2018
Microsart® Validation Standard <i>Spiroplasma citri</i>	3 vials	SMB95-2019
Microsart® Calibration Reagent <i>Mycoplasma arginini</i>	1 vial	SMB95-2021
Microsart® Calibration Reagent <i>Mycoplasma orale</i>	1 vial	SMB95-2022
Microsart® Calibration Reagent <i>Mycoplasma gallisepticum</i>	1 vial	SMB95-2023
Microsart® Calibration Reagent <i>Mycoplasma pneumoniae</i>	1 vial	SMB95-2024
Microsart® Calibration Reagent <i>Mycoplasma synoviae</i>	1 vial	SMB95-2025
Microsart® Calibration Reagent <i>Mycoplasma fermentans</i>	1 vial	SMB95-2026
Microsart® Calibration Reagent <i>Mycoplasma hyorhinis</i>	1 vial	SMB95-2027
Microsart® Calibration Reagent <i>Acholeplasma laidlawii</i>	1 vial	SMB95-2028
Microsart® Calibration Reagent <i>Spiroplasma citri</i>	1 vial	SMB95-2029

## ■ Microsart® RESEARCH Mycoplasma Rapid Real-time PCR Mycoplasma Detection Kit



Microsart® RESEARCH Mycoplasma enables a fast and reliable detection of Mycoplasma DNA in cell culture supernatants most applicable in research and development. Carefully selected primer | probe combinations are highly specific for a region within the 16 S rRNA gene of at least 110 Mycoplasma species. The detection procedure can be performed within 3 hours.

The use of TaqMan® probes adds specificity to the PCR detection system.

2 µl of sample material, e.g. cell culture supernatant, can be added directly to the PCR reaction tube. For the detection of Mycoplasma DNA a TaqMan® real-time qPCR is used. Optional, depending on the sample matrix a standard spin-column based DNA preparation can be done prior to PCR analysis to increase sensitivity or prevent inhibition. 200 µl sample volume can be used as starting material for DNA preparation if using the Microsart® AMP Extraction kit. 2 µl of isolated DNA extract is amplified in a qPCR cyclor and the evaluation can be performed with the standard cyclor software.

### Feature and Benefits

**Microsart® RESEARCH Mycoplasma is based on Real-time PCR technology**  
Easy-to-use and Fast: Results in hours, not days!

**Primers and probes detect a highly conserved region of the 16S rRNA gene of numerous Mycoplasma species**  
High specificity and easy result interpretation.

### No specific hardware requirements

Easy implementation and no additional costs for hardware package. Can be used with any Real-time PCR instrument which detects the dyes FAM and ROX.

### Applications

The Microsart® RESEARCH Mycoplasma real-time PCR protocol is especially designed for fast and reliable screening of cell culture supernatants most applicable in research and development, e.g. biotech and biopharmaceutical research and development, university and governmental research groups.

It is used for direct detection of Mollicutes (Mycoplasma, Acholeplasma, Spiroplasma) in cell culture, cell culture media components and derived biologicals.

## □ Specifications

Each kit contains reagents for 25 or 100 reactions. The expiration date of the unopened package is specified on the package label. The kit components are to be stored until use at +2 to +8°C, and must be stored after opening and rehydration below –18°C. The lot-specific Certificate of Analysis can be downloaded from the manufacturer's website ([www.minerva-biolabs.com](http://www.minerva-biolabs.com)).

Kit Component	25 Reactions	100 Reactions
Order No.	SMB95-1005	SMB95-1006
Mycoplasma Mix	1 × lyophilized	4 × lyophilized
Rehydration Buffer	1 × 1.0 ml	3 × 1.0 ml
Positive Control	1 × lyophilized	1 × lyophilized
PCR grade Water	1 × 1.0 ml	1 × 1.0 ml

## □ Ordering Information

### Mycoplasma Kits

Description	Quantity	Order No.
Microsart® RESEARCH Mycoplasma	25	SMB95-1005
Microsart® RESEARCH Mycoplasma	100	SMB95-1006

### Accessories

Microsart® AMP Extraktion	50 extractions	SMB95-2003
Microsart® Calibration Reagent <i>Mycoplasma arginini</i>	1 vial	SMB95-2021
Microsart® Calibration Reagent <i>Mycoplasma orale</i>	1 vial	SMB95-2022
Microsart® Calibration Reagent <i>Mycoplasma gallisepticum</i>	1 vial	SMB95-2023
Microsart® Calibration Reagent <i>Mycoplasma pneumoniae</i>	1 vial	SMB95-2024
Microsart® Calibration Reagent <i>Mycoplasma synoviae</i>	1 vial	SMB95-2025
Microsart® Calibration Reagent <i>Mycoplasma fermentans</i>	1 vial	SMB95-2026
Microsart® Calibration Reagent <i>Mycoplasma hyorhinis</i>	1 vial	SMB95-2027
Microsart® Calibration Reagent <i>Acholeplasma laidlawii</i>	1 vial	SMB95-2028
Microsart® Calibration Reagent <i>Spiroplasma citri</i>	1 vial	SMB95-2029

## ■ Microsart® AMP Extraction

The Microsart® AMP Extraction kit can be used for the isolation of genomic DNA from different types of sample material, most preferably cell culture supernatants. The kit was especially designed to fit the Microsart® AMP Mycoplasma, Microsart® ATMP Mycoplasma and Microsart® RESEARCH Mycoplasma qPCR kits and to provide best performance in means of sensitivity and robustness for the detection of Mycoplasma within the test sample.

### Principle

Cells are lysed by a combination of detergents and chaotropic salt. The lysate is directly applied onto the spin columns. The DNA is selectively bound to the highly specified silica membrane. Two subsequent washes remove residual contaminants, like proteins, metabolites, dyes, detergents etc. The purified DNA is eluted in Tris buffer. The procedure is completed in 30 min. The DNA is ready-to-use for PCR.

### □ Specifications

Kit Component	Quantity	Required Supplements
Spin columns	50	
Collection Tubes	3 × 50	
Sample Storage Tubes	50	
Buffer A1	15 ml	
Buffer A2	25 ml	
Buffer B	15 ml	15 ml Ethanol
Buffer C	12 ml	48 ml Ethanol
Buffer D	2 × 2 ml	

### □ Ordering Information

Description	Quantity	Order No.
Microsart® AMP Extraction	50	SMB95-2003

## ■ Microsart® Coating Buffer

The Microsart® AMP Coating Buffer is used in combination with the Vivaspin units and offers the possibility to perform a test for Mycoplasma according to European Pharmacopoeia 2.6.7 with volumes from 0.2 to 18 ml. Mycoplasma particles which might be present in the sample are concentrated with Vivaspin 6 or 20 prior DNA extraction as part of the sample preparation procedure. The Microsart® AMP Coating Buffer is required to increase recovery of Mycoplasma cells from the filtration membrane of the Vivaspin units which results in higher detection sensitivity.

### Principle

The Microsart AMP Coating Buffer contains high molecular weight components in a physiological matrix to prevent unspecific binding of Mycoplasma cells to the Vivaspin filtration membranes. This leads to higher recovery yields and improved sensitivity of the final results.

### Reagent

Each kit contains 20 × 2 ml sufficient for 40 sample concentrations (1 ml each) using Vivaspin 6 units with sample volumes from 0.2 to 5 ml or sufficient for 20 filtrations (2 ml each) using Vivaspin 20 units with sample volumes from 5 to 18 ml.

## □ Ordering Information

Description	Quantity	Order No.
Microsart® Coating Buffer	20 × 2 ml	SMB95-2002

## ■ Microsart® Validation Standard

Microsart® Validation Standard is used for validating robustness and sensitivity of NAT-based Mycoplasma detection methods in combination with cell cultures, cell culture media components and cell culture derived biologicals according to European Pharmacopoeia (EP) 2.6.7 Mycoplasmas.

The European Pharmacopoeia 2.6.7 Mycoplasmas requires validation of sensitivity and robustness with respect to sample matrix and lab precision. In addition, the method shall show a performance equal or better to the classical cultivation procedure. As most test and cell culture labs are not allowed to cultivate Mycoplasma, such comparison is not easy

to realize. Microsart® Validation Standards are not infectious, and therefore safe in use. They are titrated to 10 CFU/ml, the sensitivity limit for NAT-based methods like PCR to replace the traditional culture method. The Mycoplasma used for the manufacture of Microsart® Validation Standard are low passage reference strains cultivated in culture broth described in EP 2.6.7. The cultures are harvested in the early logarithmic phase of the growth to avoid an atypical high ratio of dead Mycoplasma particles, titrated immediately in culture broth and plated on Hayflick and Frey medium for quantification based on colony forming units (CFU).

### □ Specifications

Kit Component	Quantity	Cap Colour
1 Mycoplasma species or 1 Acholeplasma species or 1 Spiroplasma species	3 tubes with 10 CFU each, lyophilized	green
Negative Control	2 tubes with lyophilization matrix as negative control, lyophilized	white

### □ Ordering Information

Description	Order No.
Microsart® Validation Standard <i>Mycoplasma arginini</i>	SMB95-2011
Microsart® Validation Standard <i>Mycoplasma orale</i>	SMB95-2012
Microsart® Validation Standard <i>Mycoplasma gallisepticum</i>	SMB95-2013
Microsart® Validation Standard <i>Mycoplasma pneumoniae</i>	SMB95-2014
Microsart® Validation Standard <i>Mycoplasma synoviae</i>	SMB95-2015
Microsart® Validation Standard <i>Mycoplasma fermentans</i>	SMB95-2016
Microsart® Validation Standard <i>Mycoplasma hyorhinis</i>	SMB95-2017
Microsart® Validation Standard <i>Acholeplasma laidlawii</i>	SMB95-2018
Microsart® Validation Standard <i>Spiroplasma citri</i>	SMB95-2019



## ■ Microsart® Calibration Reagent

For quantitative PCR titrated genomic DNA can serve for creating standard curves by using dilution series of the Microsart Calibrations Reagents as sample in the PCR. The cyclor specific software can then be used to determine unknown DNA concentrations.

This product provides isolated genomic DNA of a specific Mycoplasma species. To obtain these highly purified genomic DNA standards, a special liquid culture medium was inoculated with early passage strains and harvested at the end of the logarithmic growth phase by repeated washing and centrifugation. The DNA was

extracted with a classic phenol-chloroform protocol and further purified with adsorption chromatography. The concentration of the DNA was quantified photometrically (OD260/280) and with an ultrasensitive fluorescent nucleic acid stain for quantitating double-stranded DNA (dsDNA) calibrated to weight reference standards and controlled by qPCR (compared against exactly quantified calibrator plasmids). The DNA concentration was adjusted with regular TE80 buffer prior to the lyophilization.

### □ Specifications

Kit Component	Quantity	Cap Colour
1 Mycoplasma species or 1 Acholeplasma species or 1 Spiroplasma species	1 tube with 10 <sup>8</sup> genome copies, lyophilized	green
Buffer	3 × 2 ml tubes	white

### □ Ordering Information

Description	Order nr.
Microsart® Calibration Reagent <i>Mycoplasma arginini</i>	SMB95-2021
Microsart® Calibration Reagent <i>Mycoplasma orale</i>	SMB95-2022
Microsart® Calibration Reagent <i>Mycoplasma gallisepticum</i>	SMB95-2023
Microsart® Calibration Reagent <i>Mycoplasma pneumoniae</i>	SMB95-2024
Microsart® Calibration Reagent <i>Mycoplasma synoviae</i>	SMB95-2025
Microsart® Calibration Reagent <i>Mycoplasma fermentans</i>	SMB95-2026
Microsart® Calibration Reagent <i>Mycoplasma hyorhinis</i>	SMB95-2027
Microsart® Calibration Reagent <i>Acholeplasma laidlawii</i>	SMB95-2028
Microsart® Calibration Reagent <i>Spiroplasma citri</i>	SMB95-2029



## ■ Air Monitoring

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Active Air Monitoring is the quantitative determination of microbes present in a given environment. To assure the quality of a manufacturing process, a valid method that eliminates adverse effects on the test area is mandatory.

Microbes are a potential threat of contamination for (final) products and raw materials, therefore potentially endangering the health of humans and animals. Sampling of air with active devices is a commonly used method for evaluation of particles, microorganisms and even viruses and bacteriophages.

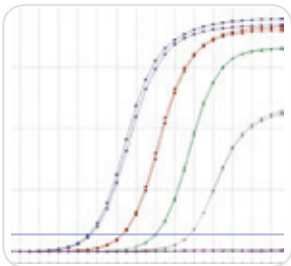
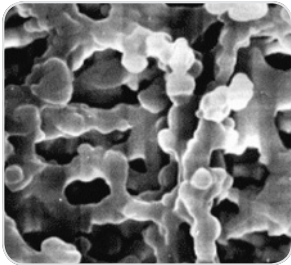
Whether its about testing the environment in most critical areas such as Isolators, filling lines and class B rooms, or evaluation of microbiological contamination in laboratories and warehouses, it's essential to be able to rely on the quality of the results.

Active sampling of a defined volume of air in a defined time can be performed with two physically different methods: Filtration with Gelatine Membrane Filters (GMF) or Impaction on agarplates with BACTair™. Sartorius offers both solutions, depending on your application. Quantitative and qualitative results can be obtained by use of defined growth media.

Find out more about our Air Sampling solution and our extensive service package:

- Unique Gelatine Membrane Filter (GMF) for sampling of microorganisms, viruses and bacteriophages
- Portable, battery powered AirPort MD8
- BACTair™ Media plates for direct sampling and incubation
- EXTEND Instrument Services

## ■ Gelatine Membrane Filters (GMF), also DNA-free



Gelatine filters in conjunction with the MD8 air samplers (gelatine filter method) are used for the collection of airborne microbes and viruses. Gelatine filter disposables are individually packed, pre-sterilized and ready-to-connect units, each consisting of a gelatine membrane filter and a holder.

Gelatine membrane filters are still available as filter discs, suitable for the filter holder 17655 (80 mm diameter) supplied with the MD8 airscan® air samplers, as well as in smaller diameters. For DNA-based applications such as detecting viruses, dissolvable DNA-free gelatine membranes are available on request ([pcr@sartorius.com](mailto:pcr@sartorius.com)).

Gelatine filters in conjunction with the MD8 air samplers offer the following features and benefits:

- "Absolute" retention rate (99.9995% for Bac. sub. niger spores, 99.94% for T3 phages)
- The filter maintains the viability of collected microorganisms for a relevant and meaningful sampling time
- Gelatine filters are completely water-soluble. Therefore, microbes in one sample can be cultivated in | on different nutrient media or low and high bacteria counts can be measured. The sample is not affected by inhibitors
- The solubility of the gelatine filter is a prerequisite for virus sampling

### □ Specifications

Gelatine filters	Water soluble, pore size 3 µm, 80 mm diameter, thickness approx. 250 µm
Thermal resistance	Max. 60°C
Air flow rate	Approx. 2.7 l/min./cm <sup>2</sup> at ΔP = 0.05 bar
Retention rates	1. Bac. subtilis niger spores 99.9995% at 0.25 m/s inlet velocity. 2. Coli phages: phage T1, 99.9% at 0.3 m/s inlet velocity and 50% rel. air humidity. Phage T3, 99.94% at 0.3 m/s inlet velocity and 80% rel. humidity.
Filtration area	38.5 cm <sup>2</sup>
Conditions for use	Room temperature, max. 30°C, max. air humidity 85%
Sterilization	Supplied pre-sterilized by gamma irradiation

### □ Ordering Information

#### Disposable Gelatine Units, Sterile, Pack of 10

Description	Order No.
Individually packed in 1 polyethylene bag each	17528--80----ACD
Individually packed in 3 polyethylene bags each	17528--80----BZD
Individually packed in 3 polyethylene bags each, but label on innermost bag	17528--80----VPD

#### Gelatine Disc Filter, Sterile, Sealed in Units of Five Each in a Polyethylene Bag

Diameter	Package Size	Order No.
80 mm	50	12602--80----ALK
50 mm	100	12602--50----ALN
50 mm	50	12602--50----ALK
47 mm	100	12602--47----ALN
47 mm	50	12602--47----ALK
37 mm	50	12602--37----ALK

Special brochure available on request. Order no. SM-3011-e

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.

## ■ BACTair™ – Big Impact

### Microbiological Air Monitoring by the Impaction Method



A new developed system for sampling airborne organisms that allows impaction onto culture media plates, where the plates function directly as collection heads. This means that the collection properties are integrated right into the culture media plates. Metal sieve plates or metal collection heads with slots, which have to be sterilized for routine samplings on a regular basis, are eliminated. Now, non-sterile sieves or slots have become a thing of the past.

The geometry of the culture medium plate and the 400 holes in the sieve plate yield exceptional sampling efficiency, which is generally higher than that of other impaction samplers.

This new method uses the AirPort MD8 air sampler to draw the air stream over the BACTair™ Culture Media Plates. BACTair™ is ready-to-connect to the AirPort MD8.

BACTair™ offers the following benefits:

- Individually, sterile packaged
- Integrated disposable sieve
- Pre-filled with agar media
- Samples 1 m<sup>3</sup> in just 8 min
- Optimized geometry

### □ Specifications

Material	Polystyrene
Dimensions	116×24 mm
Number of impaction holes	400 holes, Ø 0.47 mm each
High retention of particles	> 0.65 µm
Sterilization	Gamma irradiation

### □ Ordering Information

#### **BACTair™ Culture Media Plates with Agar, 110 mm, Individually, Sterile Packaged, 10 Units**

Determination of	Medium Type	Order No.
Total Count	Tryptic Soy Agar (TSA)	14320-110----ACD
Yeasts and molds	Sabouraud Agar (acc. USP)	14321-110----ACD

#### **Air Sampler**

Description	Order No.
AirPort MD8 Air Sampler for BACTair™ incl. charger	16757

#### **Accessories**

	Order No.
Adapter for BACTair™ on the AirPort MD8 air sampler	17803
Covers for BACTair™ Culture Media Plates, 10×2 units individually, sterile packaged	1ZPX-D0002
BACTair™ Plates, sterile, without media, 50 units	14301-110-----K

Special brochures are available on request. Order no. SM-4023-e and SL-2047-e

## ■ MD8 airscan®

### Air Sampler for Critical Applications



The system consists of the MD8 airscan® air sampler and disposable gelatine filter units. The system is routinely used for the quantitative detection of air-borne organisms, mainly at filling lines in sterile areas of class A (classification according to "EU Guide for GMP"), isolators, or blow-fill-seal machines.

The exceptionally high air flow rate of 8 m<sup>3</sup>/h enables isokinetic sampling at flow rates that are usual in laminar flow as well as filtration of 1 m<sup>3</sup> air very quickly (less than 8 minutes). The filter unit can be placed separately from the air sampler for remote sampling.

The MD8 airscan® air sampler allows the user to make selective adjustments and easily sample air flow rate and removal speed? By means of a specially developed calibration unit (see accessories), the user can calibrate the MD8 airscan® locally, e.g. within the scope of validation steps.

After removing the sample, the gelatine filter can be placed directly on the agar culture medium for incubation and colony growth.

### □ Specifications

#### MD8 airscan® Air Sampler

Air flow rate	2.0 m <sup>3</sup> /h – 8 m <sup>3</sup> /h adjustable in 100-liter steps
Timer	1–99 minutes, adjustable in 1-minute steps
Max. deviation	±5% in a temperature range of 15°–35°C
Noise level	For gelatine membrane filters, max. 62 dB (A)
Weight	Approx. 6.5 kg
Dimensions (L×W×H)	375×242×228 mm
Correction of the air flow	When the entered air flow rate cannot be attained, rate setting the display shows the max. attainable flow rate for a corresponding new setting below this value.
Included filter holder	17655 (Gelatine disc filters)

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.

### Ordering Information

#### MD8 airscan® Air Sampler

Description	Order No.
MD8 airscan® air sampler, 230 V, 50 Hz	16746
MD8 airscan® air sampler, 115 V, 60 Hz	16747

Each version can be switched from 50 to 60 Hz and back.

Accessories	Order No.
Holder for disposable gelatine filter units	17801

#### Consumables

Description	Order No.
Disposable gelatine units, sterile, pack of 10	
Individually packed in 1 polyethylene bag each	17528--80----ACD
Individually packed in 3 polyethylene bags each	17528--80----BZD
Individually packed in 3 polyethylene bags each, but label on innermost bag	17528--80----VPD

Special brochures available on request. Order no. SMI2001-e | SM-3011-e

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.



## ■ AirPort MD8



AirPort MD8 is an air sampler for the pharmaceutical, biotechnology, and food and beverage industries, and for hospitals' environmental care and for work safety.

### AirPort MD8 Offers the Following Benefits

- Battery powered and portable for universal use
- Battery power level clearly indicated so constant performance during sampling is guaranteed
- Ergonomic design and easy to clean

- Flexible adjustment possibilities of the volume flow and the sample volume
- User-friendly prompting with the option of four languages; English, French, German and Spanish
- Parameters last used stored even after automatic shut-off
- The device can be calibrated locally

For guaranteeing reliable and exact measurement results, AirPort MD8 uses the gelatine membrane filter method or the impaction method with BACTair™.

### □ Specifications

#### AirPort MD8

Volume flow regulation	By an integrated impeller wheel.
Volume flow adjustable	30 l/min., 40 l/min., 50 l/min. and 125 l/min.
Fixed given sample volumes	25, 50, 100, 250, 500, 750 and 1000 liters. In addition, the sample volume can be chosen manually in 5-liter steps.
Operational life with one battery	Approx. 4.5 hours for 50 l/min battery charge
Noise level	For gelatine membrane filters 48 dB (A)
Weight	Approx. 2.5 kg
Dimensions (L×W×H)	300×135×165 mm
Inclusive adapter	17801 (for disposable gelatine filter units)

#### Power Supply

Battery	NiMH 16.8 Volt/3800 mAh
Battery charger input	100–240 V/47–63 Hz/600 mA
Battery charger output	24 V/1000 mA
Charging time	Approx. 4.5 hours for empty battery

### □ Ordering Information

#### AirPort MD8

Description	Order No.
AirPort MD8, complete with two adapters (17801 and 17803) and battery charger (69898525).	16757

#### Accessories and Replacement Parts

	Order No.
Adapter for BACTair™ on the AirPort MD8 air sampler	17803
Holder for disposable gelatine filter units	17801
Battery charger	69898525

#### Ordering Information for Consumables

Please refer to the following pages.

Special brochures available on request. Order no. SM-1502-e and SM-4023-e

## ■ Accessories

### For the MD8 Air Samplers



### ■ Calibration Unit

The user can calibrate the MD8 airscan® and AirPort MD8 directly on the job by means of the calibration unit\*.

This is absolutely necessary above all within the scope of validation steps, for which it is important that the shown air flow rate (desired value at the MD8) corresponds to the actual air amount (actual value at the calibration device). The calibration unit is

supplied complete with battery charger | power supply unit (specific for the country in which it is used), filter holder, connectors set and connection tube (PVC, 2 m).

\* Alternatively, a maintenance agreement can be signed. Within the scope of the contractual services, Sartorius technicians will carry out a calibration of the MD8 at regular intervals.

### □ Specifications

#### Calibration Unit

Dimensions	Length, 300 mm (without filter holder), Width, 390 mm with handles Height, 182 mm min., 200 mm max. (adjustable feet)
Connectors	Quick locks (bayonet principle)
Operational life with full battery	Approx. 4 hours
Charge time for empty battery	Approx. 10 hours
Measuring range	1–16 m <sup>3</sup> /h
Max. error	1–16 m <sup>3</sup> /h, ±2%
Type of protection	IP 40
Allowable ambient temperature	Min. 0°C, max. 40°C
Weight	Approx. 11 kg

Special brochure available on request.  
Order no. SL-2028-e

### □ Ordering Information

Description	Order No.
Calibration unit for the MD8 air samplers	16756

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)," and therefore its (spare part) availability is restricted for exchange and maintenance only.

## ■ Tubing and Connectors Set

If the disposable gelatine filter unit is not placed directly at the MD8 airscan®, but at a distance from it, a flexible plastic hose (2 m or 5 m), a connectors set and, if not available, a holder (tripod 16970, double socket 16976, clamp 17037), are necessary for the connection between filter and MD8

airscan®. The autoclavable silicone hose is used instead of the flexible plastic hose, if the MD8 airscan® has to be used in sterile rooms, operating rooms, isolators, blow-fill-seal machines, etc. With this hose attached to the air outlet connector (exhaust), the waste air can be led off into another room.

## □ Ordering Information

Description	Order No.
Flexible PVC hose with reinforced ends (2 m)	17085
Flexible PVC hose with reinforced ends (5 m)	17088
Silicone tubing, sterilizable (1 m, state length required)	17662
Set of connectors (consisting of 17658 and 17659), aluminum	17657
Connector (air sampler inlet to flexible hose), aluminum	17658
Connector (flexible hose to filter holder   adapter), aluminum	17659

## ■ Case

A stable case for the transport and storage of a MD8 airscan®, incl. accessories.

## □ Ordering Information

Description	Order No.
Case for MD8 airscan®	17208

## ■ Aluminum Stack

It consists of a middle part, 10 numbered filter holders and 2 end caps. The stack is first sterilized (by 180°C dry heat, 2 h), and then equipped with the filters under sterile conditions (LF cleanbench). The prepared filter holders are put on one side of the

middle part. After removing the sample, the inserted filter holders are put on the other side of the middle part, so that used and unused filter holders are separated from each other.

## □ Ordering Information

### Aluminium Stack

Description	Order No.
Aluminum stack for MD8 air samplers	17656

### Replacement Parts

Description	Order No.
Individual filter holders for gelatine filter type 12602--80---ALK	17655
Middle part	17660
End cap	17661

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.

## ■ Accessories for Isolator Application

For the monitoring of isolators with MD8 airscan<sup>®</sup>, we recommend using stainless-steel accessories such as adapters 17016 (DN25) or 17030 (DN30), clamps 17033 for sanitary flanges, connector 17659---001 or 17659---003 (for tri clamp) and the filter holder for gelatine filter disposables 17801---001 as well as a Sartofluor<sup>®</sup>

capsule with PTFE membrane and sanitary flange inlet and outlet, for sterile air filtration inserted between the MD8 airscan<sup>®</sup> and isolator. This construction makes it possible that the MD8 air sampler remains outside the critical work area (the barrier function between different clean-room classes is maintained).

## □ Ordering Information

Description	Order No.
Adapter (DN 25 hose barb to 1"-1 1/2" sanitary flange) to connect MD8 airscan <sup>®</sup> to an isolator via silicone tubing and a filter capsule, stainless-steel	17016
Adapter (DN 30 hose barb to 1"-1 1/2" sanitary flange) to connect MD8 airscan <sup>®</sup> to an isolator via flexible PVC hose and filter capsule, stainless-steel	17030
Clamp for 1"-1 1/2" sanitary flanges, stainless-steel Clamp for 1"-1 1/2" sanitary flanges, stainless-steel	17033
Connector (flexible hose to filter holder   adapter), hose nipple, stainless-steel	17659---001
Connector (flexible hose to filter holder   adapter), tri clamp, stainless-steel	17659---003
Adapter for gelatine filter disposables, stainless-steel	17801---001
Sartofluor <sup>®</sup> MidiCap Capsule with PTFE membrane and sanitary flange inlet and outlet, for sterile air filtration inserted between the MD8 airscan <sup>®</sup> and isolator	5185307TS-----SS

## ■ Accessories for Remote Control Function

Users of the MD8 airscan<sup>®</sup> now have the possibility of operating this air sampler from a distance, using either of two remote control configurations:

1. Via a PC (with Microsoft 95/98 or higher) with MD8 airscan<sup>®</sup> dialog system and cable connection to the MD8 airscan<sup>®</sup> (1ZE---0004).
2. Via a PLC interface unit (1ZE---0003).

## □ Ordering Information

Description	Order No.
Remote control (Interface) for MD8 airscan <sup>®</sup> designed for PLC units	1ZE---0003
Remote control for MD8 airscan <sup>®</sup> for use with PC (dialog system software)	1ZE---0004

The MD8 airscan<sup>®</sup> (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.

### ■ Gelatine Membrane Filter, 80 mm, Sterile, Pack of 50 for Use with Stack

Gelatine membrane filters are still available as 80 mm filter discs, suitable for the filter holder supplied with the MD8 airscan®. The filters are sterile-supplied, but the filter holders have to be sterilized by dry heat (180°C, 2h) and then equipped with the filters under sterile conditions. For performing routine check-ups a stack is recommended.

#### □ Ordering Information

##### Gelatine Disc Filters, 3 µm Pore Size, 80 mm, 50 Pieces/Pack

Description	Order No.
Gelatine disc filter, sterile, sealed in units of five each in a polyethylene bag	12602-080 ALK

### ■ Further Consumables for Air Monitoring

If gelatine filters cannot be used (high humidity, high temperature), it is recommended to use cellulose nitrate filters.

#### □ Ordering Information

##### Cellulose Nitrate Membrane Filters, 80 mm Diameter, 100 Pieces/Pack

Description	Order No.
Cellulose nitrate membrane filters, 0.8 µm, white with black grid, pre-sterilized in bags of 5	11404--80----ALN
Cellulose nitrate membrane filters, 0.8 µm, grey with white grid, pre-sterilized in bags of 5	13004--80----ALN
Cellulose nitrate membrane filters, 8 µm, white no grid, pre-sterilized in bags of 5	11301--80----ALN

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.

## ■ Preventive Maintenance

AirPort MD8 | MD8 airscan®



The objective of preventive maintenance is a continuous, precise operation of your equipment, to secure your investments for the long term and to guarantee correct and proper function.

Preventive maintenance will be performed in accordance with Sartorius' fixed standards and in between the contractually stipulated time intervals between the customer and Sartorius.

### Prerequisites Required by the Customer

- Device is standing at the maintenance-location
- Unobstructed access to the equipment
- When ordering, a responsible person has to be appointed
- Access by automobile is possible | parking lot is available

Repairs, spare parts as well as shipping costs, travel costs and expenses are not covered in scope of services and will be invoiced separately.

### □ Specifications

- Inspection visit at fixed intervals or as needed
- Visual inspection
- Maintenance check according to maintenance checklist
- Calibration of flow rate sensor
- Start-up test

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.



## ■ Installation and Commissioning

AirPort MD8 | MD8 airscan®



The reliability and the service life of your equipment significantly depend on its installation and configuration according to the specifications.

Installation and commissioning by our service professionals will ensure that your MD8 successfully operates right from the start.

Sartorius Service installs and configures according to regulatory requirements and quality standards.

### Prerequisites Required by the Customer

- System is standing at the installation location
- Unobstructed access to the system
- Power is available at the installation location
- When ordering, a responsible person has to be appointed

### □ Specifications

- Check of scope of delivery
- Check of device for transport damage
- Manufacturer's ID label check
- Initial start-up
- Brief instructions to operating personnel (not application training)
- General maintenance discussion

### □ Ordering Information

Description	Order No.
Installation and Commissioning AirPort MD8   MD8 airscan®	S8739INST

The MD8 airscan® (16746; 16747) is not in compliance with the "Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU)" and therefore its (spare part) availability is restricted for exchange and maintenance only.





## ■ Chemical Compatibility

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## 1. Filter Materials

Solvents	Cellulose Acetate 111	Cellulose Nitrate 113	Reg. Cellulose 184	PTFE 118	Polyamide 250	Glass Fiber 134	Polycarbonate 230	Polyether-sulfone 154
Acetone	–	–	•	•	–	•	○	–
Acetonitrile	?	?	•	•	–	?	?	•
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	?	?	?	•	?	•	–	?
Glycerine	•	•	•	•	•	•	•	•
n-Heptane	•	•	•	•	?	•	?	?
n-Hexane	•	•	•	•	•	•	•	?
Isobutanol	○	○	•	•	•	•	•	?
Isopropanol	•	○	•	•	•	•	•	•
Isopropyl acetate	○	–	•	•	?	•	?	•
Methanol, 98%	•	–	•	•	?	•	•	•
Methyl acetate	–	–	•	•	•	•	?	–
Methylene chloride	–	○	•	•	•	•	–	–
Methyl ethyl ketone	–	–	•	•	•	•	?	–
Methyl isobutyl ketone	•	–	•	•	•	•	?	?
Monochlorobenzene	•	•	•	•	•	•	–	?
Nitrobenzene	•	○	•	•	•	•	–	?
n-Pentane	•	•	•	•	•	•	•	?
Perchloroethylene	•	•	•	•	•	•	•	?
Pyridine	–	–	•	•	•	•	–	–
Carbon tetrachloride	○	•	•	•	•	•	?	•
Tetrahydrofuran	–	–	•	•	•	•	–	–
Toluene	•	•	•	•	•	•	?	•

Key to symbols see next page.

	Cellulose Acetate	Cellulose Nitrate	Reg. Cellulose	PTFE	Polyamide	Glass Fiber	Polycarbonate	Polyether-sulfone
Solvents	111	113	184	118	250	134	230	154
Trichloroethane	○	●	●	●	?	●	?	?
Trichloroethylene	●	●	●	●	●	●	–	●
Xylene	●	●	●	●	●	●	●	●
<b>Acids</b>								
Acetic acid, 25%	●	●	●	●	○	?	○	●
Acetic acid, 96%	–	–	●	●	–	?	?	●
Hydrofluoric acid, 25%	●	○	○	●	–	?	●	?
Hydrofluoric acid, 50%	●	○	–	●	–	?	●	?
Perchloric acid, 25%	–	○	○	●	–	?	?	?
Phosphoric acid, 25%	●	○	○	●	–	?	?	?
Phosphoric acid, 85%	○	○	○	●	–	?	–	?
Nitric acid, 25%	–	○	–	●	–	?	●	●
Nitric acid, 65%	–	–	–	●	–	?	●	●
Hydrochloric acid, 25%	–	○	–	●	–	?	●	●
Hydrochloric acid, 37%	–	–	–	●	–	?	●	●
Sulfuric acid, 25%	–	○	○	●	–	●	?	●
Sulfuric acid, 98%	–	–	–	●	–	?	–	?
Trichloroacetic acid, 25%	–	○	●	●	–	?	?	?
<b>Bases</b>								
Ammonium, 1N	●	●	○	●	●	●	–	●
Ammonium hydroxide, 25%	–	○	–	○	●	○	–	●
Potassium hydroxide, 32%	–	–	○	●	○	○	–	●
Sodium hydroxide, 32%	–	–	○	●	○	○	–	●
Sodium, 1N	○	–	○	●	●	●	–	●
<b>Aqueous Solutions</b>								
Formaline, 30%	○	●	○	●	○	●	●	●
Sodium hypochlorite, 5%	●	○	●	●	○	●	?	?
Hydrogen peroxide, 35%	●	●	○	●	○	?	?	?

**Key to Symbols**

- = compatible
- = limited compatibility
- = not compatible
- ? = not tested

E = compatible after replacing silicone O-ring with an EPDM O-ring

V = compatible after replacing the silicone O-ring with a Fluoroelastomer O-ring

Contact time: 24 hours at 20°C

Chemical compatibilities can be influenced by various factors.

Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with actual filtration.

## 2. Filter Holder | O-ring Materials

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless-Steel	EPDM O-ring	PTFE O-ring	Silicone O-ring	Fluoro-elastomer O-ring
<b>Solvents</b>									
Acetone	•	○	•	•	•	•	•	–	–
Acetonitrile	•	?	•	•	•	○	•	–	•
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	•	–	•	•	•	•	•	–	○
Glycerine	•	○	•	•	•	•	•	•	•
n-Heptane	•	•	•	•	•	–	•	•	•
n-Hexane	•	•	•	•	•	–	•	–	•
Isobutanol	•	•	•	•	•	•	•	•	•
Isopropanol	•	○	•	•	•	•	•	•	•
Isopropyl acetate	•	•	•	•	•	•	•	–	–
Methanol, 98%	•	–	•	•	•	•	•	•	•
Methyl acetate	•	?	•	•	•	•	•	–	–
Methylene chloride	•	–	–	•	•	–	•	–	○
Methyl ethyl ketone	•	–	•	•	•	•	•	–	–
Methyl isobutyl ketone	•	–	?	•	•	–	•	–	–
Monochlorobenzene	•	–	•	•	•	–	•	–	•
Nitrobenzene	•	–	○	•	•	–	•	–	–
n-Pentane	•	•	•	•	•	–	•	–	•
Perchloroethylene	•	–	○	•	•	–	•	–	•
Pyridine	•	–	○	•	•	–	•	–	–
Carbon tetrachloride	•	–	○	•	•	–	•	–	•
Tetrahydrofuran	•	–	○	•	•	–	•	–	–
Toluene	•	–	•	•	•	–	•	–	○

Key to symbols see next page.

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless-Steel	EPDM O-ring	PTFE O-ring	Silicone O-ring	Fluoro-elastomer O-ring
<b>Solvents</b>									
Trichloroethane	•	–	?	•	•	–	•	–	•
Trichloroethylene	•	–	–	•	•	–	•	–	•
Xylene	•	–	○	•	•	–	•	–	○
<b>Acids</b>									
Acetic acid, 25%	•	•	•	•	•	•	•	•	–
Acetic acid, 96%	•	–	•	•	•	•	•	?	–
Hydrofluoric acid, 25%	–	–	•	•	–	○	•	–	○
Hydrofluoric acid, 50%	–	–	•	•	–	○	•	–	○
Perchloric acid, 25%	•	○	•	•	–	•	•	–	•
Phosphoric acid, 25%	•	○	•	•	○	•	•	–	•
Phosphoric acid, 85%	•	○	•	•	○	•	•	–	•
Nitric acid, 25%	•	–	•	•	–	○	•	–	•
Nitric acid, 65%	•	–	–	•	–	–	•	–	•
Hydrochloric acid, 25%	•	○	•	•	–	○	•	–	•
Hydrochloric acid, 37%	•	–	•	•	–	•	•	–	•
Sulfuric acid, 25%	•	•	•	•	○	•	•	–	•
Sulfuric acid, 98%	•	–	–	•	–	–	•	–	•
Trichloroacetic acid, 25%	•	○	•	•	–	•	•	–	–
<b>Bases</b>									
Ammonium, 1N	•	–	•	•	•	•	•	–	–
Ammonium hydroxide, 25%	•	–	•	•	•	•	•	•	–
Potassium hydroxide, 32%	•	–	•	•	•	•	•	○	○
Sodium hydroxide, 32%	•	–	•	•	•	•	•	○	•
Sodium, 1N	•	–	•	•	•	•	•	•	•
<b>Aqueous Solutions</b>									
Formaline, 30%	•	•	•	•	•	•	•	○	•
Sodium hypochlorite, 5%	•	•	•	•	•	•	•	•	•
Hydrogen peroxide, 35%	•	•	•	•	•	•	•	•	•

**Key to Symbols**

- = compatible
- = not compatible
- = limited compatibility
- ? = not tested

Contact time: 24 hours at 20°C

Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with actual filtration.

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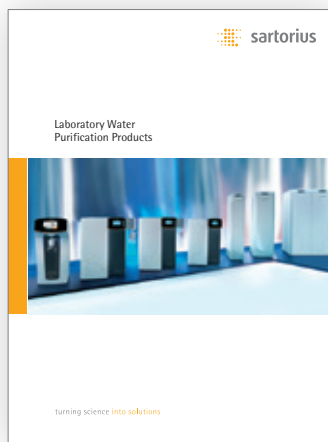
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