



## 0.1 $\mu\text{m}$ *AseptiCap* KS

### **Sterilization Grade Hydrophilic Polyethersulfone (PES) Membrane Devices for Liquid Streams in Biopharmaceuticals**

#### Data Sheet

Biopharmaceutical processing requires sterilizing grade microfiltration at multiple stages to meet specific process requirements.

Processes managers are continuously looking for microfiltration solutions to upstream, downstream, intermediate processes and final biological preparations. Since bio manufacturing is a multi stage process and bio molecules by nature are extremely sensitive, they are looking for:

- Minimizing protein losses due to adsorption to improve over all product yields
- Minimizing filter extracts which add up due to multiple points of use in a process
- High throughputs to achieve process economy
- Choice of filter end connections for easy and reliable quick connections
- Absolute retentions for higher sterility assurance

**mdi** produces a wide range of Sterilizing grade PES membrane devices to meet filtration requirements of biopharmaceutical processing. These filter devices are validated to meet compendia and regulatory requirements and are well characterized. They meet key process requirements such as high retention efficiency, very high protein recoveries, extremely low extractables, high throughputs, wide chemical compatibility and other important characteristics.

With the advantages of pre filtration layer built into the device for higher throughputs, linear scalability of filter area for smooth transitions from lab scale to pilot to process scale and widest range of end connections for quick and reliable connections to the existing fittings, **mdi** *AseptiCap* KS filters are a universal solution for process filtration.

# AseptiCap KS

## PES Membrane Devices for Biopharmaceuticals

# Datasheet

*AseptiCap KS* 0.1 micron capsule filters uses **mdi** PES membrane in Polypropylene housing. No adhesives or glue are used in the manufacturing process and all bonding is done by heat welding.

The products are deeply validated for use in Biopharmaceutical applications and specially recommended for single use systems. *AseptiCap KS* are manufactured in class 10,000 clean rooms and ISO 9001 certified facilities.

### Applications

#### Sterile Filtration of

- Cell culture media
- Cell culture media containing serum
- Media additives
- pH adjusters
- Final product concentrates

### Key Features

- Absolute retention
- 100% integrity tested
- Low protein binding
- Very low hold up volume in filters
- High flow rates
- Serial construction with prefilter for higher throughput with fouling streams
- Bioburden maintained below 1000 cfu/device
- Endotoxin level certified to be <0.25 EU/ml
- Widest range of end connections
- Products available for total scalability from a few ml to thousands of liters
- Total traceability through unique serial number for each filter
- Individual certificate of quality for each device
- Sterilizable by EO gas or autoclaving

### Validation Services

The regulatory requirements emphasize on the need to validate the efficacy of the 'Sterilizing Filter' with drug product under simulated worst-case conditions of use.

**mdi** provides validation services supported by customized validation protocols and world class test facilities to assist you in filter validations with your specific drug product.

## Quality Assurance

**mdi's** quality management system emphasizes on quality by design rather than end product testing. Robust processes are developed for product manufacturing and are continuously monitored to ensure that the products meet their predetermined specifications and lot to lot reproducibility is ensured.

### Certificate of Quality

Each capsule filter is accompanied by individual certificate of quality to ensure traceable documentation at user's end.

It certifies the product compliance to various regulatory as well as user requirements.

### Validated for Microbial Retention

Integrity test data have been correlated to actual microbial retention with *Acholeplasma laidlawii* ATCC 23206 at a challenge level  $\geq 10^7$  organisms per  $\text{cm}^2$  to establish acceptable integrity test values. Also validated for retention of *B. diminuta* ATCC 19146 as per ASTM F838-05.

### 100% Integrity Tested

Each *AseptiCap KS* is tested for integrity to comply with validated Acceptable Integrity Test Specifications.

### Flow Rate

Each lot is tested for clean water flow rates to ensure that flow rates are within the specifications.

### Adsorption

*AseptiCap KS* filters are validated for low protein binding to ensure minimal active ingredient losses when used for filtration of high value proteins.

### Pressure, Temperature Endurance

*AseptiCap KS* filters are validated to endure high operating pressure and temperature conditions which may be encountered during use.

These filters are also validated for high burst pressure to ensure user safety in case of inadvertent pressure build-up.

### Extractables

Extractables/leachables from sterilizing filters, used at various stages of a biopharmaceutical manufacturing process, will add on and may impact the impurity profile of the desired product.

*AseptiCap KS* filters are validated to exhibit low extractables under harsh extraction conditions.

### Bioburden Testing

Device bioburden is tested as per ISO 11737-1 and assured to be  $< 1000$  cfu/device.

### Endotoxin Testing

Aqueous extracts exhibit  $< 0.25$  EU/ml as established by Limulus Amebocyte Lysate (LAL) Test

### Total Traceability

*AseptiCap KS* filters come with completely traceable lot numbers and unique identification number to facilitate easy and fast retrieval of manufacturing and quality control data.

These unique lot and identification numbers are laser etched on each filter device and also printed on the labels of the box in which individual filter is packed.

### Packaging Integrity

*AseptiCap KS* filters are fitted with vent caps and are packed in pouch to ensure package integrity during transit as well as to prevent particulate contamination while transferring to clean room assembly or process areas.

### Other Regulatory Compliance

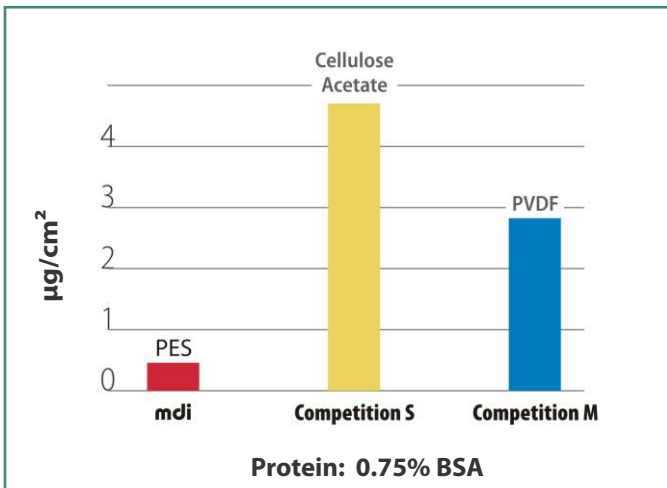
- Complies with USFDA 21 CFR 210.3(b)(6) for fiber release
- Complies with USFDA 21 CFR 177.1520 for fractional dissolution
- Materials of construction tested for toxicity as per Biological Reactivity Tests, In vivo, USP <88> for class VI Plastics
- Complete filter devices tested for cytotoxicity as per Biological Reactivity Tests, In vitro, USP <87>

## Low Protein Binding

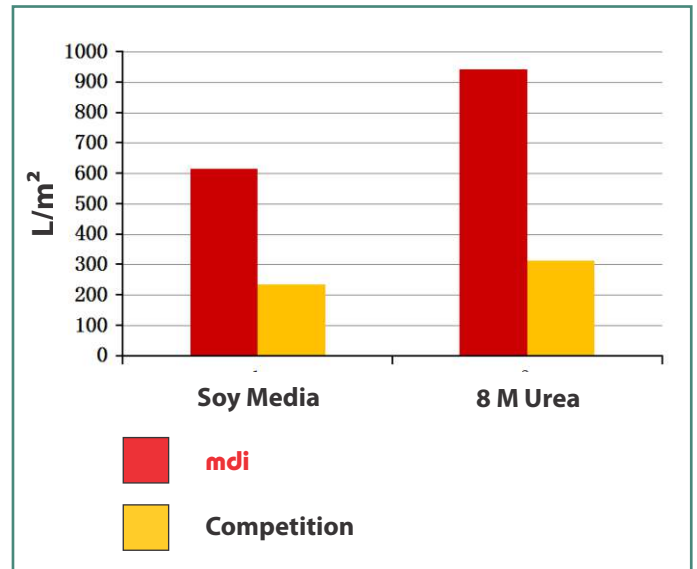
A comparative study on **mdi** PES membrane exhibits much lower protein adsorption than other competing membranes of Cellulose Acetate and PVDF.

The low protein binding results in increased overall product yield and higher throughputs with biological streams.

### Protein Binding ( $\mu\text{g}/\text{cm}^2$ )



## High Throughputs



The high throughput translates to lower filtration costs, less number of filter changes and overall economy of operations.

## Very Low Hold-Up Volumes

**mdi** PES membrane capsule filters are designed to offer very low hold-up volumes to minimize filtration losses and maximize product recovery.

0.1 $\mu\text{m}$ AseptiCap Filters	Protein Binding
25 mm, 5 $\text{cm}^2$	1.7 $\mu\text{g}$
50 mm, 20 $\text{cm}^2$	7 $\mu\text{g}$
1", 250 $\text{cm}^2$	88 $\mu\text{g}$
2", 500 $\text{cm}^2$	187 $\mu\text{g}$
10", 6000 $\text{cm}^2$	2275 $\mu\text{g}$

Filter Devices	EFA* (Nominal)	Hold up Volume
AseptiCap KS, 25mm	5 $\text{cm}^2$	< 50 $\mu\text{l}$
AseptiCap KS, 50mm	20 $\text{cm}^2$	< 200 $\mu\text{l}$
AseptiCap KS, 1"	250 $\text{cm}^2$	< 5ml
AseptiCap KS, 2"	500 $\text{cm}^2$	< 25ml
AseptiCap KS, 5"	1000 $\text{cm}^2$	< 45ml
AseptiCap KS, 8"	2000 $\text{cm}^2$	< 60ml

\*EFA: Effective Filtration Area

## Extractables

It is useful to evaluate extractables that may be leached out of the filter and enter the process stream. **mdi** filters give low extractables under harsh preconditioning and extraction conditions.

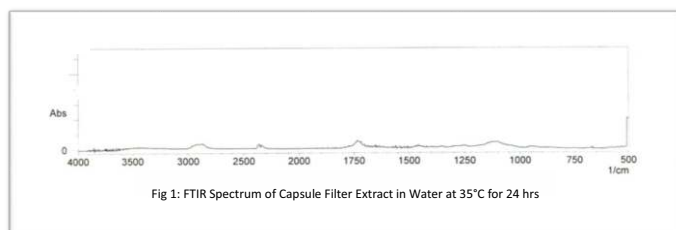
**Low extractables mean less addition to impurity profile of the biological product from the filters.**

**Extraction Time:** 24 hours

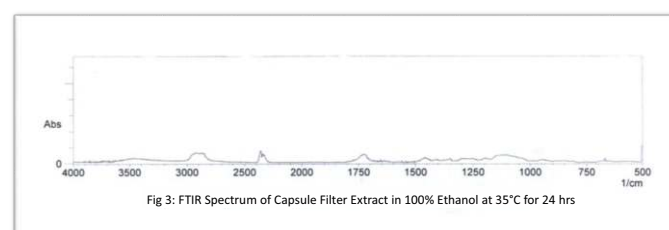
Model Solvent	Non Volatile Residue	
	<i>AseptiCap KS 1"</i> (250 cm <sup>2</sup> )	<i>AseptiCap KS 10"</i> (6000 cm <sup>2</sup> )
Water @ 35 °C	1.6 mg	38.26 mg
Water @ 80 °C	1.8 mg	43.04 mg

Model Solvent	Non Volatile Residue	
	<i>AseptiCap KS 1"</i> (250 cm <sup>2</sup> )	<i>AseptiCap KS 10"</i> (6000 cm <sup>2</sup> )
100% Ethanol @ 35 °C	13.4 mg	320.43 mg

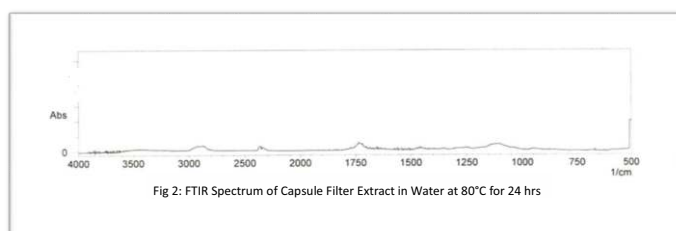
### FTIR Analysis of Extractables From *AseptiCap KS 1"* Capsule Filter with Water @ 35 °C



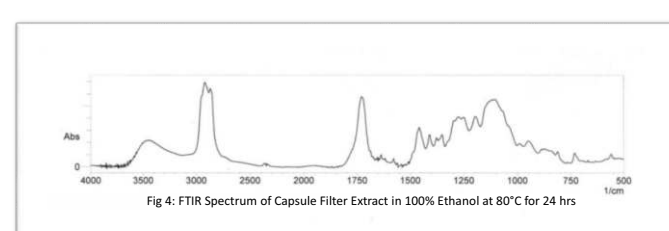
### FTIR Analysis of Extractables From *AseptiCap KS 1"* Capsule Filter with 100% Ethanol @ 35 °C



### FTIR Analysis of Extractables From *AseptiCap KS 1"* Capsule Filter with Water @ 80 °C



### FTIR Analysis of Extractables From *AseptiCap KS 1"* Capsule Filter with 100% Ethanol @ 80 °C



The Spectrum of extracts from *AseptiCap KS* capsule filters with 100% ethanol under extreme extraction conditions show presence of various components used in the manufacture of **mdi** PES membrane capsule filters.

## Easy Connect

### Widest Range of End Connections

Biopharmaceutical processes involve transfer of high value fluids through multiple process steps. Making high quality, reliable, flexible and functionally convenient connectivity with filters is of utmost value to the bio-processors.

**mdi** *AseptiCap* KS filters offer a wide range of reliable end connections for functional convenience and customized connectivity.

### Validated for Performance

These end connections are manufactured with tight dimension tolerance and are validated for strength and connection integrity under extreme use conditions as well as for their ability to withstand prevalent sterilization methods including EO sterilization and autoclaving.



**3/4" Sanitary Flange**



**1 1/2" Sanitary Flange**



**1/2" HB**



**1/2" Single Stepped HB**



**1/4" SHB**



**Quick Connector**

Some end connections available with *AseptiCap*

### Customized Connectivity

**mdi** *AseptiCap* KS filters are available in a wide range of end connections and are also customized to offer different inlet-outlet combinations to meet the unique connectivity needs in biopharmaceutical process assemblies where, for example, stainless steel components with sanitary flange connections are sometimes required to be connected to single use disposable systems through quick-connectors or hose barb connections.



**1 1/2" Sanitary Flange to 1/2" Barb Hose**



**1 1/2" Sanitary Flange to 3/4" Sanitary Flange**



***AseptiCap* with HighSecurity 1/2" hose barb connection**

# Linear Upscaling from R&D to Production Process

## Datasheet

Scientists are concerned about filter fluid interaction impacting the stability, purity, strength etc. of the drug product, and they take a keen interest in filter selection at the formulation development stage itself. Although preliminary compatibility data support initial filter selection, for stability studies detailed filter validations are required to provide enough documented evidence to justify specific filter use.

A critical requirement that needs to be addressed at this stage is of scalability from R&D to pilot scale to full scale production processes.

**mdi** offers a wide range of *AseptiCap KS* filters to provide linear scale up from lab scale to production process. While scaling up the process, the appropriate size filter can be selected by increasing the effective filtration area of filter proportionate to the process fluid volumes.

All Materials of construction as well as manufacturing process are identical for all filter devices starting from 5 cm<sup>2</sup> to 18000cm<sup>2</sup> hence process scaling can be facilitated without triggering additional validation studies for given process conditions. **mdi** provides complete documentation for each of the *AseptiCap KS* filters there by reducing the additional validation cost and time.



**AseptiCap KS**  
25mm, 5cm<sup>2</sup>



**AseptiCap KS**  
50mm, 20cm<sup>2</sup>



**AseptiCap KS**  
1", 250cm<sup>2</sup>



**AseptiCap KS**  
2", 500cm<sup>2</sup>



**AseptiCap KS**  
5", 1000cm<sup>2</sup>



**AseptiCap KS**  
8", 2000cm<sup>2</sup>

Filter Devices	EFA* (Nominal)	Hold up Volume
<i>AseptiCap KS</i> , 25 mm	5cm <sup>2</sup>	< 50µl
<i>AseptiCap KS</i> , 50 mm	20cm <sup>2</sup>	< 200µl
<i>AseptiCap KS</i> , 1"	250cm <sup>2</sup>	< 5ml
<i>AseptiCap KS</i> , 2"	500cm <sup>2</sup>	< 25ml
<i>AseptiCap KS</i> , 5"	1000cm <sup>2</sup>	< 45ml
<i>AseptiCap KS</i> , 8"	2000cm <sup>2</sup>	< 60ml
<i>AseptiCap KS</i> , 10"	6000cm <sup>2</sup>	-
<i>AseptiCap KS</i> , 20"	12000cm <sup>2</sup>	-
<i>AseptiCap KS</i> , 30"	18000cm <sup>2</sup>	-



**AseptiCap KS**  
10", 6000cm<sup>2</sup>



## 0.1 µm AseptiCap KS (with Prefilter)

Construction			
Membrane	0.1 µm Hydrophilic PES		
Prefilter Membrane	0.2 µm or 0.45 µm Hydrophilic PES		
Plastic parts	Polypropylene		
Integrity Testing/ Retention			
Bubble Point	≥ 31 psi (2.18 Kg/cm <sup>2</sup> ) with 50% IPA		
Bacterial Retention	LRV> 7 for <i>Acholeplasma laidlawii</i> ATCC 23206 per cm <sup>2</sup> of filter area		
	LRV> 7 for <i>Brevudimonas diminuta</i> ATCC 19146 per cm <sup>2</sup> of filter area as per ASTM F 838-05		
Size			
Size	25mm	50mm	
Effective Filtration Area (Nominal)	5 cm <sup>2</sup>	20 cm <sup>2</sup>	
Dimensions (End to End)	¼" SHB I/O	-	79 mm
	¾" Sanitary Flange Inlet I/O	-	51 mm
	Female Luer Lock Inlet/ Male Luer Slip Outlet	23 mm	-
Operational Radius (with Vent/ Drain)	15 mm	28 mm	
Operational			
Max. Operating Temperature	55 °C	60 °C	
Max. Differential Pressure	75 psi (5 Kg/cm <sup>2</sup> ) @ 25 °C	42 psi (3 Kg/cm <sup>2</sup> ) @ 30 °C	
Sterilization	By Gas	Sterilizable by Ethylene Oxide	
	By Autoclave	Autoclavable at 125 °C for 30 minutes, 25 Cycles. Can not be in-line steam sterilized	
Shelf Life	3 year after EO sterilization		
Assurance			
Toxicity	Passes Bioreactivity test, In Vivo, as per USP <88> for Class VI plastics		
Cytotoxicity	Passes Biological Reactivity Tests, In vitro, USP <87> for cytotoxicity		
Bacterial Endotoxin	Aqueous extracts exhibit < 0.25 EU/ml as established by Limulus Amebocyte Lysate (LAL) Test as per USP <85>		
Non Fiber Releasing	Passes test as per USP and comply with USFDA 21 CFR Part 210.3(b)(6) for fiber release		
TOC and Conductivity	Meets the WFI requirements of USP for TOC <643> and Conductivity <645> after a specified minimal flush		
pH Compatibility	Compatible with pH range of 1 - 10		
Extractables with WFI	Passes NVR test as per USP <661>		
Indirect Food Additives	Comply with USFDA 21 CFR Part 177.1520		
Oxidizable Substances	Passes test as per USP <1231>		
Quality Management System	ISO-9001 Certified		
USFDA	DMF No. 015554		



## 0.1 µm AseptiCap KS (with Prefilter)

Construction					
Membrane	0.1 µm Hydrophilic PES				
Upstream Membrane (in case of AseptiCap KS-γ)	0.2 µm or 0.45 µm Hydrophilic PES				
Support Layers	Polyester				
Plastic parts	Polypropylene				
Integrity Testing/ Retention					
Bubble Point	≥ 31psi with 50% IPA/ Water solution				
Bacterial Retention	LRV> 7 for <i>Acholeplasma laidlawii</i> ATCC 23206 per cm <sup>2</sup> of filter area				
	LRV> 7 for <i>Brevudimonas diminuta</i> ATCC 19146 per cm <sup>2</sup> of filter area as per ASTM F 838-05				
Size					
Size	1"	2"	5"	8"	
Effective Filtration Area (Nominal)	250cm <sup>2</sup>	500cm <sup>2</sup>	1000cm <sup>2</sup>	2000 cm <sup>2</sup>	
Clean Water Flow Rate @ 10 psi with ½" Hose Barb Connection	1.3 lpm	2.5 lpm	4.8 lpm	6.5 lpm	
Dimensions (End to End)	1½" Sanitary Flange I/O	91 mm	110 mm	161 mm	211 mm
	½" Hose Barb I/O	90 mm	112 mm	164 mm	215 mm
	1½" Sanitary Flange Inlet ½" Single Step Hose Barb Outlet	-	111 mm	162 mm	212 mm
	¾" Sanitary Flange I/O	91 mm	103 mm	155 mm	205 mm
	Operational Radius (with Vent/ Drain)	30 mm	65 mm	65 mm	65 mm
Vent and Drain	1/4" Hose Barb with Silicone "O" rings				
Operational					
Max. Operating Temperature	80 °C @ < 30 psi (2 Kg/cm <sup>2</sup> )				
Max. Differential Pressure	60 psi (4 Kg/cm <sup>2</sup> ) @ 30 °C				
Sterilization	By Gas	Sterilizable by Ethylene Oxide			
	By Autoclave	Autoclavable at 125 °C for 30 minutes, 25 Cycles. Can not be in-line steam sterilized			
Shelf Life	3 year after EO sterilization				
Assurance					
Toxicity	Passes Bioreactivity test, In Vivo, as per USP <88> for Class VI plastics				
Cytotoxicity	Passes Biological Reactivity Tests, In vitro, USP <87> for cytotoxicity				
Bacterial Endotoxin	Aqueous extracts exhibit < 0.25 EU/ml as established by Limulus Amebocyte Lysate (LAL) Test as per USP <85>				
Non Fiber Releasing	Passes test as per USP and comply with USFDA 21 CFR Part 210.3(b)(6) for fiber release				
TOC and Conductivity	Meets the WFI requirements of USP for TOC <643> and Conductivity <645> after a 3 liter flush				
pH Compatibility	Compatible with pH range of 1 - 10				
Extractables with WFI	Passes NVR test as per USP <661>				
Indirect Food Additives	Comply with USFDA 21 CFR Part 177.1520				
Oxidizable Substances	Passes test as per USP <1231>				
Quality Management System	ISO-9001 Certified				
USFDA	DMF No. 015554				

## 0.1 µm AseptiCap KS (with Prefilter)

Construction					
Membrane	0.1 µm Hydrophilic PES				
Upstream Membrane (in case of AseptiCap KS-γ)	0.2 µm or 0.45 µm Hydrophilic PES				
Support Layers	Polyester				
Plastic parts	Polypropylene				
Integrity Testing/ Retention					
Bubble Point	≥ 31psi with 50% IPA/ Water solution				
Bacterial Retention	LRV> 7 for <i>Acholeplasma laidlawii</i> ATCC 23206 per cm <sup>2</sup> of filter area				
	LRV> 7 for <i>Brevudimonas diminuta</i> ATCC 19146 per cm <sup>2</sup> of filter area as per ASTM F 838-05				
Size					
Size	5"	10"	20"	30"	
Effective Filtration Area (Nominal)	3000cm <sup>2</sup>	6000cm <sup>2</sup>	12000cm <sup>2</sup>	18000 cm <sup>2</sup>	
Clean Water Flow Rate @ 10 psi with 1½" Sanitary Flange Connection	8 lpm	17 lpm	29 lpm	45 lpm	
Max. Air Diffusion Flow (@ 50psi (3.51 Kg/cm <sup>2</sup> ) with water)	≤ 15 ml/min	≤ 29 ml/min	≤ 58 ml/min	≤ 87 ml/min	
Dimensions (End to End) Inline Capsule Filters	½" Single Step Hose Barb I/O	217 mm	332 mm	607 mm	882 mm
	1½" Sanitary Flange Inlet	203 mm	332 mm	607 mm	882 mm
	½" Single Step Hose Barb Outlet				
	1½" Sanitary Flange I/O	207 mm	326 mm	601 mm	876 mm
Operational Radius (with Vent/ Drain)	78 mm	78 mm	78 mm	78 mm	
Vent and Drain	1/4" Hose Barb with Silicone "O" rings				
Operational					
Max. Operating Temperature	80 °C @ < 30 psi (2 Kg/cm <sup>2</sup> )				
Max. Differential Pressure	60 psi (4 Kg/cm <sup>2</sup> ) @ 30 °C				
Sterilization	By Gas	Sterilizable by Ethylene Oxide			
	By Autoclave	Autoclavable at 125 °C for 30 minutes, 25 Cycles. Can not be in-line steam sterilized			
Shelf Life	3 year after EO sterilization				
Assurance					
Toxicity	Passes Bioreactivity test, In Vivo, as per USP <88> for Class VI plastics				
Cytotoxicity	Passes Biological Reactivity Tests, In vitro, USP <87> for cytotoxicity				
Bacterial Endotoxin	Aqueous extracts exhibit < 0.25 EU/ml as established by Limulus Amebocyte Lysate (LAL) Test as per USP <85>				
Non Fiber Releasing	Passes test as per USP and comply with USFDA 21 CFR Part 210.3(b)(6) for fiber release				
TOC and Conductivity	Meets the WFI requirements of USP for TOC <643> and Conductivity <645> after a 3 liter flush				
pH Compatibility	Compatible with pH range of 1 - 10				
Extractables with WFI	Passes NVR test as per USP <661>				
Indirect Food Additives	Comply with USFDA 21 CFR Part 177.1520				
Oxidizable Substances	Passes test as per USP <1231>				
Quality Management System	ISO-9001 Certified				
USFDA	DMF No. 015554				

## 0.1 µm AseptiCap KS 25mm PES Membrane Capsule filter

Type		Size		Pore Size		Inlet/Outlet		X	X	Sterility		Pack Size	
	Code		Code		Code		Code				Code		Code
AseptiCap KS (0.45 µm Upstream)	IKSX	25mm	06	0.1µm	36	Female Luer Lock	M			Non Sterile	1	100	04
AseptiCap KS (0.2 µm Upstream)	IKS1					Male Luer Slip	N			EO Sterile	2		
						1/8" Hose Barb	H						
						1/4" Hose Barb	B						
<b>Example:</b>													
IKSX		06		36		MN		X	X	1		04	

## 0.1 µm AseptiCap KS 50mm PES Membrane Capsule filter

Type		Size		Pore Size		Inlet/Outlet		X	X	Sterility		Pack Size	
	Code		Code		Code		Code				Code		Code
AseptiCap KS (0.45 µm Upstream)	VKSX	50mm	10	0.1µm	36	1/4" SHB	B			Non Sterile	1	12	08
AseptiCap KS (0.2 µm Upstream)	VKS1					3/4" Sanitary Flange	S			EO Sterile	2		
<b>Example:</b>													
VKSX		10		36		BB		X	X	1		08	

**Note: Inlet/Outlet Connections and Pack Sizes available with different diameter filters as follows:**

Connections Available		
Inlet/Outlet	25mm	50mm
1/4" - 3/4" Stepped Hose Barb	X	√
3/4" Sanitary Flange	X	√
Female Luer Lock	Inlet Only	X
Male Luer Slip	Outlet Only	X
1/8" Hose Barb	√	X
Male Luer Lock	Outlet Only	X
1/4" Hose Barb	√	X

Pack Size Available		
Pack Size	25mm	50mm
12/Pack	X	√
100/Pack	√	X

## 0.1 µm AseptiCap KS PES Membrane Capsule filter

Type		Size		Pore Size		Inlet/Outlet		X	Bell		Sterility		Pack Size	
	Code		Code		Code		Code			Code		Code		Code
AseptiCap KS (0.45 µm Upstream)	DKSX	1"	51	0.1µm	36	¼" SHB	A		Yes*	B	Non Sterile	1	1	01
AseptiCap KS (0.2 µm Upstream)	DKS1	2"	52			½" Hose Barb	D		No Bell	X	EO Sterile	2		
		5"	53			1½" Sanitary Flange	E		Bell with cover	C				
		8"	57			¾" Sanitary Flange	S							
				Quick Connector	J									
				½" Single Step Hose Barb	Q									
				Female luer lock	U									
				Male luer slip	W									
				3/16" Hose Barb	N									
				3/8" Hose Barb	I									

\*Bell is available with

- ½" HB outlet connections in 1", 2", 5" and 8" capsule filters
- ¼" SHB outlet connection in 1" capsule filters only

Example:

DKSX	57	36	DD	X	X	1	01
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Note: Inlet/Outlet Connections available with different Sizes/Length as follows:

Inlet/Outlet	Size/Length				Bell at Outlet Available with (Size/Outlet)
	1"	2"	5"	8"	
¼" Stepped Hose Barb	√	√	√	√	1" / ¼" SHB
½" Single Step Hose Barb	X	√	√	√	
½" Hose Barb	√	√	√	√	1", 2", 5", 8" / ½" HB
1½" Sanitary Flange	√	√	√	√	
¾" Sanitary Flange	√	√	√	√	
Quick Connector	√	√	√	√	
Female Luer Lock	√	√	√	√	
Male Luer Slip	Outlet Only	X	X	X	
3/16" Hose Barb	√	√	Outlet Only	X	
3/8" Hose Barb	X	√	√	√	

## 0.1 µm AseptiCap KS PES Membrane Large Capsule filter

Type		Size		Pore Size		Inlet/Outlet		X	Inline/T-Line		Sterility		Pack Size	
	Code		Code		Code		Code			Code		Code		Code
AseptiCap KS (0.45 µm Upstream)	LKSX	5"	53	0.1µm	36	½" Single Step Hose Barb	Q		Inline	X	Non Sterile	1	1	01
AseptiCap KS (0.2 µm Upstream)	LKS1	10"	54			1½" Sanitary Flange	E		T-Line*	T	EO Sterile	2		
		20"	55			3/8" Hose Barb	I							
		30"	56			1" Hose Barb	Z							

Example:

LKSX	54	36	EE	X	T	1	01
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\*T-line is not available in 5" Capsule filter

\*T-line Capsule filter are available with 1½" Sanitary Flange I/O connection only

Note: Inlet/Outlet Connections available with different Sizes/Length as follows:

Inlet/Outlet	Inline				T-Line		
	5"	10"	20"	30"	10"	20"	30"
½" Single Step Hose Barb	√	√	√	√	X	X	X
1½" Sanitary Flange	√	√	√	√	√	√	√
3/8" Hose Barb	√	√	√	√	X	X	X
1" Hose Barb	X	√	√	√	X	X	X

**Advanced Microdevices Pvt. Ltd.**

20-21, Industrial Area, Ambala Cantt-133 006, INDIA

Tel : +91-171-2699290, 2699471

E-mail : info@mdimembrane.com

Website : www.mdimembrane.com