Membrane Technologies

Data Sheet

0.2µm *AseptiCap® KSO*

Sterilizing Grade Hydrophilic Polyethersulfone (PES) Membrane Capsule Filters

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

Process managers are continuously looking for microfiltration solutions for upstream, downstream, intermediate processes and final biological preparations. Since biopharma 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 absolute retention, very high protein recoveries, extremely low extractables, high throughputs, wide compatibility and other important characteristics.

With the added advantages of pre-filtration layer built into the device for higher throughputs, wide pH compatibility (1-14), 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® KSO* filters are a universal solution for process filtration.

AseptiCap® KSO

PES Membrane Devices for Biopharmaceuticals

Datasheet

AseptiCap® KSO 0.2 micron capsule filters incorporate **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® KSO* are manufactured in class 10,000 clean rooms and ISO 9001 certified facilities.

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

Applications

Sterile Filtration of

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

Bioburden Reduction/ Particulate Removal

- Buffers
- Centrifuge supernatants
- Clarified cell lysates

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

Datasheet

mdi's quality management system emphasizes on quality by design rather by 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.

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 *B. diminuta* (ATCC 19146) as per ASTM F838 to establish acceptable integrity test values.

Samples from each lot are subjected to microbial challenge test before final lot release.

100% Integrity Tested

Each *Asepticap KSO* 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 KSO 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 KSO 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, add on and may impact the impurity profile of the desired product.

Asepticap KSO filters are validated to exhibit low extractables under harsh extraction conditions.

Alkali Resistance

Tests were performed to establish that *AseptiCap® KSO* PES membrane capsule filters maintain integrity (with water) and flow rate after a minimum 96–hour soak in 4N NaOH at room temperature.

Bioburden Testing

Device bioburden is tested as per ISO 117 37-1 and assured to be <1000 cfu/device.

Endotoxin Testing

Aqueous extracts exhibit <0.25 EU/ml as established by Lumulus Amebocyte Lysate (LAL) test as per USP <85>.

Total Traceability

Asepticap KSO 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 are also printed on the labels of the box in which individual filter is packed.

Packaging Integrity

Asepticap KSO filters are fitted with vent caps and are packed in bags 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

Performance Data

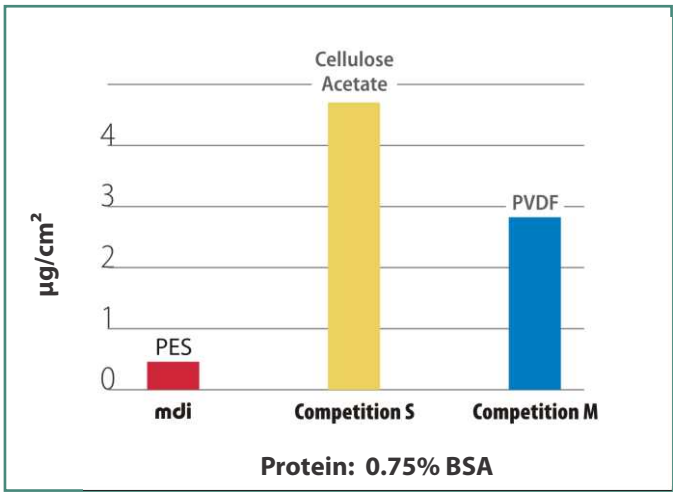
Datasheet

Low Protein Binding

A comparative study on mdi 0.2µm 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.

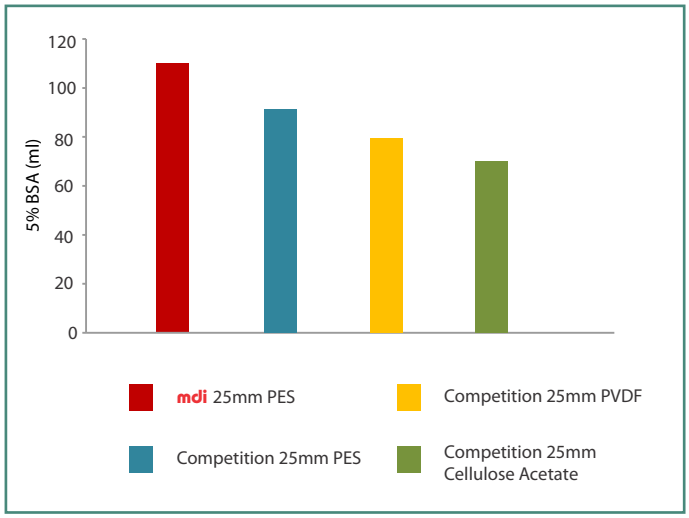
Protein Binding (µg/cm²)



0.2 µm *AseptiCap® KSO* Filters, EFA*	Protein Binding
25 mm, 5 cm²	1.45 µg
50 mm, 20 cm²	6.3 µg
1", 250 cm²	80.5 µg
2", 500 cm²	175 µg
10", 6000 cm²	1925 µg

*EFA: Effective Filtration Area

High Throughputs



mdi 0.2µm PES membrane exhibits higher throughput than either Cellulose Acetate or PVDF membranes.

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

Very Low Hold-Up Volumes

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

Filter Devices	EFA* (Nominal)	Hold up Volume
AseptiCap® KSO 25mm	5cm²	< 50µl
AseptiCap® KSO 50mm	20cm²	< 200µl
AseptiCap® KSO 1"	250cm²	< 5ml
AseptiCap® KSO 2"	500cm²	< 25ml
AseptiCap® KSO 5"	1000cm²	< 45ml
AseptiCap® KSO 8"	2000cm²	< 60ml

*EFA: Effective Filtration Area

Performance Data

Extractables

It is useful to evaluate extractables that may leach 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	
	AseptiCap® KSO 1" (250 cm^2)	*AseptiCap® KSO* 10" (6000 cm^2)
Water @ 35 °C	1.6 mg	38.26 mg
Water @ 80 °C	1.8 mg	43.04 mg

Model Solvent	Non Volatile Residue	
	AseptiCap® KSO 1" (250 cm^2)	*AseptiCap® KSO* 10" (6000 cm^2)
100% Ethanol @ 35 °C	13.4 mg	320.43 mg

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

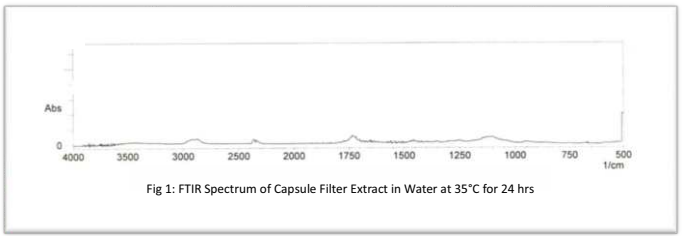


Fig 1: FTIR Spectrum of Capsule Filter Extract in Water at 35°C for 24 hrs

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

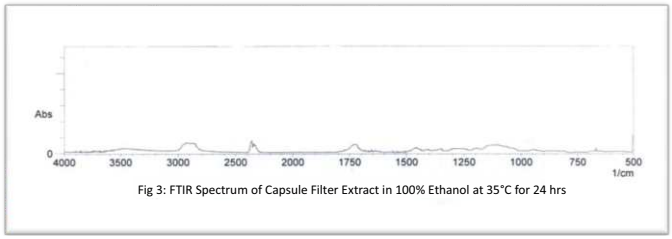


Fig 3: FTIR Spectrum of Capsule Filter Extract in 100% Ethanol at 35°C for 24 hrs

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

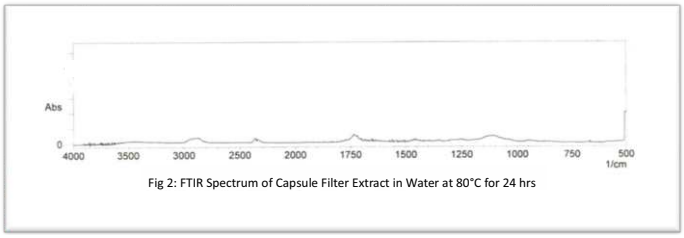


Fig 2: FTIR Spectrum of Capsule Filter Extract in Water at 80°C for 24 hrs

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

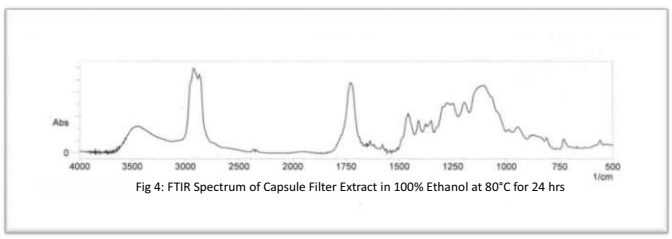


Fig 4: FTIR Spectrum of Capsule Filter Extract in 100% Ethanol at 80°C for 24 hrs

The spectrum of extracts from *AseptiCap® KSO* 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

Datasheet

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® KSO* 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.

¾" Sanitary Flange

1½" Sanitary Flange

½" HB

½" Single Stepped HB

¼" SHB

Quick Connector

Some end connections available with *AseptiCap® KSO*

Customized Connectivity

mdi *AseptiCap® KSO* 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. 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.

1½" Sanitary Flange to ½" Hose Barb

1½" Sanitary Flange to ¾" Sanitary Flange

***AseptiCap® KSO* with HighSecurity Single step ½" 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® KSO* 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^2 to 18000 cm^2 hence process scaling can be facilitated without triggering additional validation studies for given process conditions. **mdi** provides complete documentation for each of the *AseptiCap® KSO* filters thereby reducing the additional validation cost and time.

AseptiCap® KSO
25mm, 5cm^2

AseptiCap® KSO
50mm, 20cm^2

AseptiCap® KSO
1", 250cm^2

AseptiCap® KSO
2", 500cm^2

AseptiCap® KSO
5", 1000cm^2

AseptiCap® KSO
8", 2000cm^2

Filter Devices	EFA* (Nominal)	Hold up Volume
AseptiCap® KSO 25 mm	5cm^2	< 50µl
AseptiCap® KSO 50 mm	20cm^2	< 200µl
AseptiCap® KSO 1"	250cm^2	< 5ml
AseptiCap® KSO 2"	500cm^2	< 25ml
AseptiCap® KSO 5"	1000cm^2	< 45ml
AseptiCap® KSO 8"	2000cm^2	< 60ml
AseptiCap® KSO 10"	6000cm^2	–
AseptiCap® KSO 20"	12000cm^2	–
AseptiCap® KSO 30"	18000cm^2	–

***EFA: Effective Filtration Area**

AseptiCap® KSO
10", 6000cm^2

Specifications

Datasheet

0.2 µm *AseptiCap® KSO* (25 mm and 50 mm)

Construction			
Membrane		0.2 µm Hydrophilic PES	
Upstream Membrane		0.8 µm or 0.45 µm Hydrophilic PES	
Plastic parts		Polypropylene	
Integrity Testing/ Retention			
Bubble Point		≥ 50 psi (3.52 Kg/cm^2) with Water	
Microbial Retention		LRV >7 for *Brevundimonas diminuta* (ATCC 19146) per cm^2	
Size			
Size		25mm	50mm
Effective Filtration Area (Nominal)		5 cm^2	20 cm^2
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^2) @ 25 °C	42 psi (3 Kg/cm^2) @ 30 °C
Sterilization	By Gas	Sterilizable by Ethylene Oxide	
	By Autoclave	Autoclavable at 125 °C for 30 minutes, 25 Cycles. Cannot be in-line steam sterilized.	
Shelf Life		3 years after EO sterilization	
Assurance			
Toxicity		Passes Biological Reactivity Tests, In vivo, as per USP <88> for Class VI plastics	
Cytotoxicity		Passes Biological Reactivity Tests, In vitro, as per USP <87> for Cytotoxicity	
Bacterial Retention		LRV> 7 for *B. diminuta* (ATCC 19146) per cm^2 of filter area as per ASTM F 838	
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 500 ml flush	
pH Compatibility		Compatible with pH range of 1 - 14	
Extractables with WFI		Passes NVR test as per USP <661>	
Indirect Food Additives		Comply with USFDA 21 CFR Part 177.1520	
Oxidizable Substances		Within limits as specified in USP <1231>	
Quality Management System		ISO-9001 Certified	
USFDA		DMF No. 015554	

Specifications

Datasheet

0.2 µm *AseptiCap® KSO*

Construction					
Membrane		0.2 µm Hydrophilic PES			
Upstream Membrane		0.8 µm or 0.45 µm Hydrophilic PES			
Support Layers		Polypropylene			
Plastic parts		Polypropylene			
Integrity Testing/ Retention					
Bubble Point		≥ 50psi (3.52Kg/cm^2) with Water			
Microbial Retention		LRV > 7 for *Brevundimonas diminuta* (ATCC 19146) per cm^2			
Size					
Size		1″	2″	5″	8″
Effective Filtration Area (Nominal)		250cm^2	500cm^2	1000cm^2	2000 cm^2
Operational Radius (with Vent/ Drain)		40 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^2)			
Max. Differential Pressure		60 psi (4 Kg/cm^2) @ 30 °C			
Sterilization	By Gas	Sterilizable by Ethylene Oxide			
	By Autoclave	Autoclavable at 125 °C for 30minutes, 25 Cycles. Cannot be in-line steam sterilized.			
Shelf Life		3 Years after EO Sterilization			
Assurance					
Toxicity		Passes Biological Reactivity Tests, In vivo, as per USP <88> for Class VI plastics			
Cytotoxicity		Passes Biological Reactivity Tests, In vitro, as per USP <87> for Cytotoxicity			
Bacterial Retention		LRV> 7 for *B. diminuta* (ATCC 19148) per cm^2 of filter area as per ASTM F 838			
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 - 14			
Extractables with WFI		Passes NVR test as per USP <661>			
Indirect Food Additives		Comply with USFDA 21 CFR Part 177.1520			
Oxidizable Substances		Within limits as specified in USP <1231>			
Quality Management System		ISO-9001 Certified			
USFDA		DMF No. 015554			

Specifications

Datasheet

0.2 µm *AseptiCap® KSO*

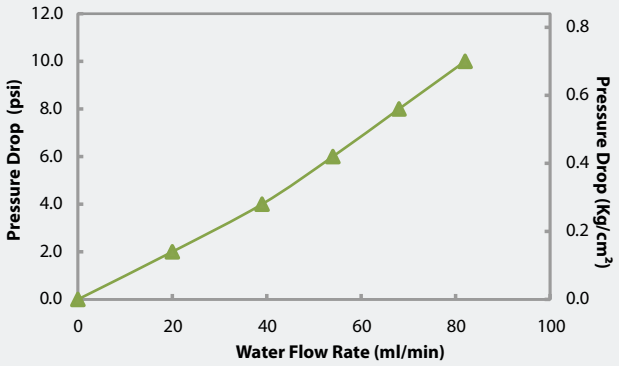
Construction					
Membrane		0.2 µm Hydrophilic PES			
Upstream Membrane		0.8 µm or 0.45 µm Hydrophilic PES			
Support Layers		Polypropylene			
Plastic parts		Polypropylene			
Integrity Testing/ Retention					
Bubble Point		≥ 50psi (3.52Kg/cm^2) with Water			
Max. Air Diffusion Flows Per 10″ Capsule Filter		≤ 30ml/min @ 37psi (2.6Kg/cm^2) with water			
Microbial Retention		LRV >7 for *Brevundimonas diminuta* (ATCC 19146) per cm^2			
Size					
Size		5″	10″	20″	30″
Effective Filtration Area (Nominal)		3000cm^2	6000cm^2	12000cm^2	18000cm^2
Operational Radius (with Vent/ Drain)		80 mm	80 mm	80 mm	80 mm
Vent and Drain		1/4″ Hose Barb with Silicone "O" rings			
Operational					
Max. Operating Temperature		80 °C @ < 30 psi (2 Kg/cm^2)			
Max. Differential Pressure		60 psi (4 Kg/cm^2) @ 30 °C			
Sterilization	By Gas	Sterilizable by Ethylene Oxide			
	By Autoclave	Autoclavable at 125 °C for 30minutes, 25 Cycles. Cannot be in-line steam sterilized.			
Shelf Life		3 Years after EO Sterilization			
Assurance					
Toxicity		Passes Biological Reactivity Tests, In vivo, as per USP <88> for Class VI plastics			
Cytotoxicity		Passes Biological Reactivity Tests, In vitro, as per USP <87> for Cytotoxicity			
Bacterial Retention		LRV> 7 for *B. diminuta* (ATCC 19146) per cm^2 of filter area as per ASTM F 838			
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 10 liter flush for 5″ capsule filters and 20 liter flush for 10″ capsule filters			
pH Compatibility		Compatible with pH range of 1 - 14			
Extractables with WFI		Passes NVR test as per USP <661>			
Indirect Food Additives		Comply with USFDA 21 CFR Part 177.1520			
Oxidizable Substances		Within limits as specified in USP <1231>			
Quality Management System		ISO-9001 Certified			
USFDA		DMF No. 015554			

Typical Water Flow Rates

0.2 µm *AseptiCap® KSO* (with Prefilter)

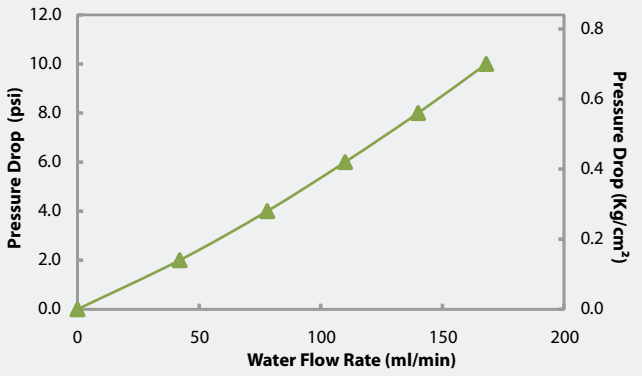
Datasheet

25mm Capsule Filters



End Connections: MN

50mm Capsule Filters



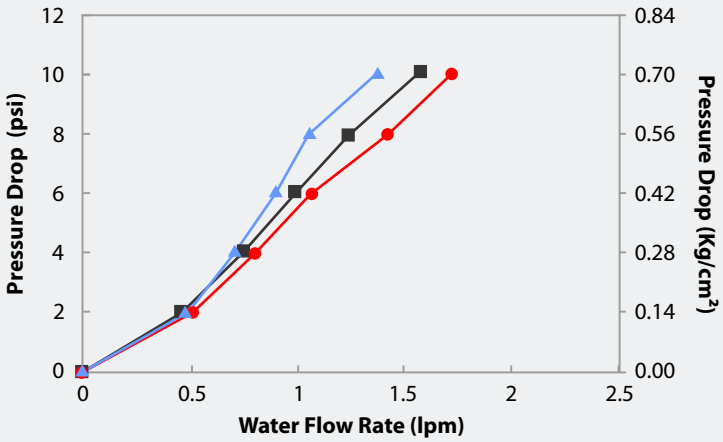
End Connections: BB

End Connection Type:

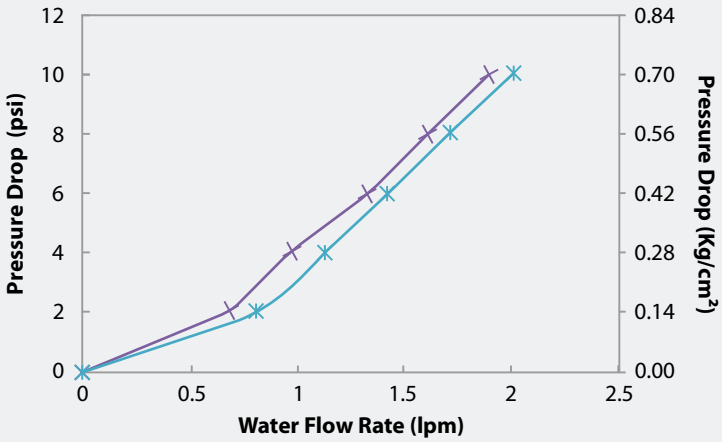
B: ¼" Stepped Hose Barb (for 50mm only)

MN: End Connections: Female Luer Lock Inlet/Male Luer Slip Out let

1" Capsule Filters



End Connections AA JJ UU



End Connections EE SS

End Connection Type:

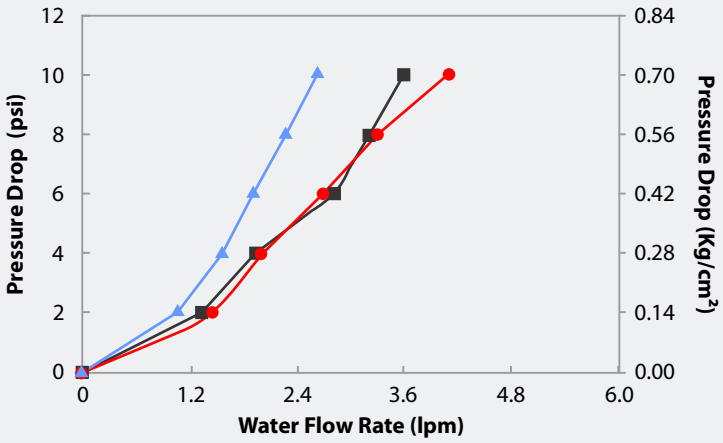
A: ¼" Stepped Hose Barb E: 1½" Sanitary Flange J: Quick Connector S: ¾" Sanitary Flange U: Female Luer Lock

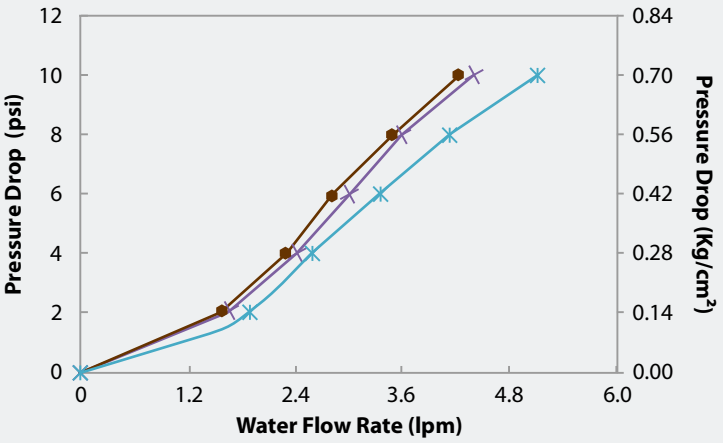
Water Flow Rates

0.2 µm *AseptiCap® KSO* (with Prefilter)

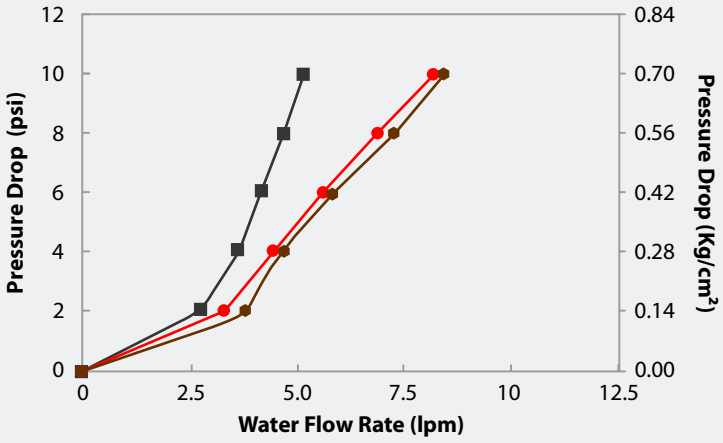
Datasheet

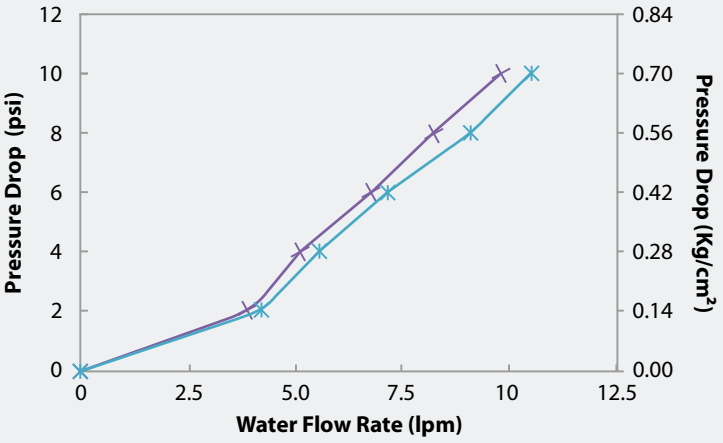
2" Capsule Filters





5" Capsule Filters





End Connection Type:

A: ¼" Stepped Hose Barb Q: ½" Single Step Hose Barb E: 1½" Sanitary Flange J: Quick Connector S: ¾" Sanitary Flange

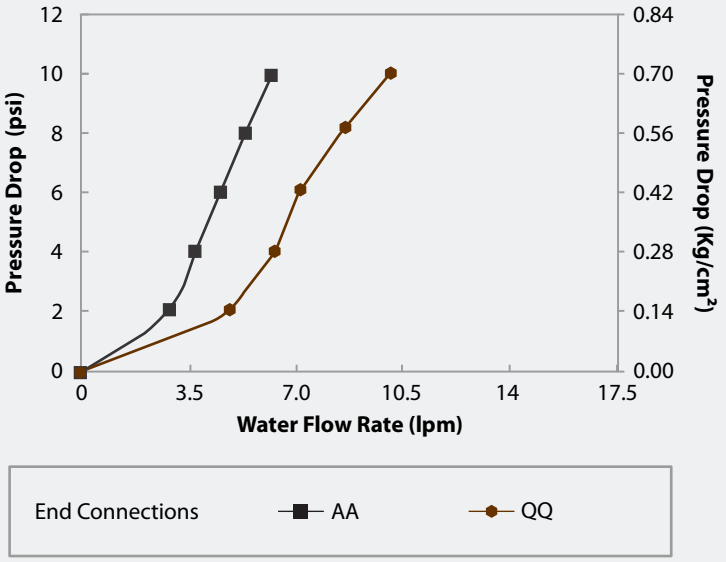
U: Female Luer Lock

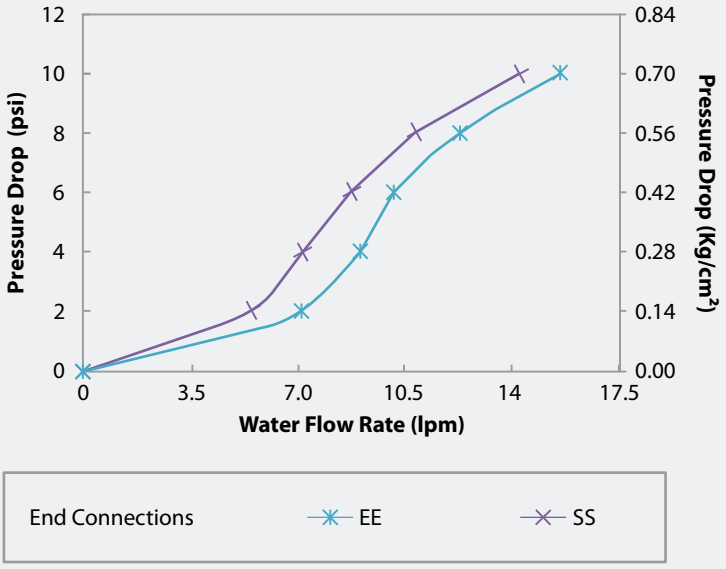
Water Flow Rates

0.2 µm *AseptiCap® KSO* (with Prefilter)

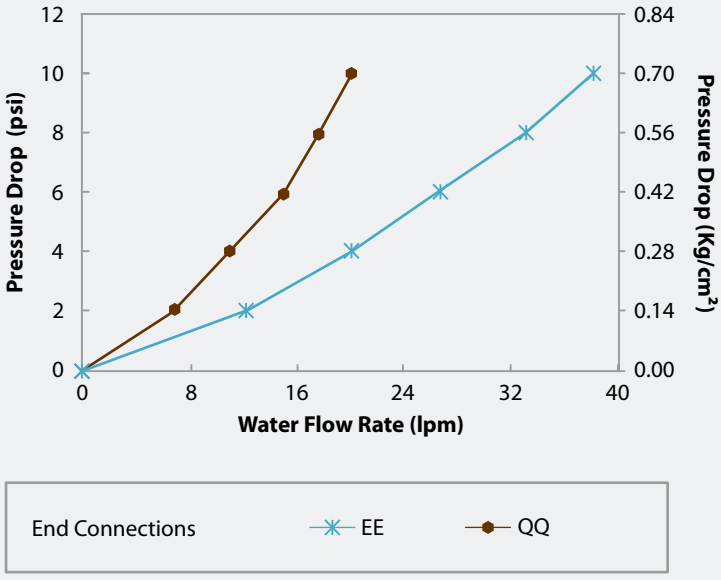
Datasheet

8" Capsule Filters





10" Capsule Filters



End Connection Type:

A: ¼" Stepped Hose Barb Q: ½" Single Step Hose Barb E: 1½" Sanitary Flange J: Quick Connector S: ¾" Sanitary Flange

Ordering Information

Datasheet

0.2 µm *AseptiCap® KSO* 25mm PES Membrane Capsule filter

Type	Code
IKSO (0.45 µm Upstream)	IKOX
IKSO (0.8 µm Upstream)	IKO5

Size	Code
25mm	06

Pore Size	Code
0.2µm	01

Inlet/Outlet	Code
Female Luer Lock	M
Male Luer Slip	N
⅛" Hose Barb	H
Male Luer Lock	L
¼" Hose Barb	B

X

X

Sterility	Code
Non Sterile	1
EO Sterile	2

Pack Size	Code
100	04

Example:

IKOX	06	01	MN	X	X	1	04

0.2 µm *AseptiCap® KSO* 50mm PES Membrane Capsule filter

Type	Code
IKSO (without Vent) (0.45 µm Upstream)	IKOX
IKSO (without Vent) (0.8 µm Upstream)	IKO5
VKSO (with Vent) (0.45 µm Upstream)	VKOX
VKSO (with Vent) (0.8 µm Upstream)	VKO5

Size	Code
50mm	10

Pore Size	Code
0.2µm	01

Inlet/Outlet	Code
¼" SHB	B
¾" Sanitary Flange	S
Female Luer Lock	M
¼" Single Step Hose Barb	A

X

X

Sterility	Code
Non Sterile	1
EO Sterile	2

Pack Size	Code
10	02

Example:

VKOX	10	01	BB	X	X	1	02

Inlet/Outlet Connections Available

Inlet/Outlet	25mm	50mm	
		with Vent	without Vent
¼" - ¾" Stepped Hose Barb	X	√	X
¾" Sanitary Flange	X	√	X
Female Luer Lock	Inlet Only	X	√
Male Luer Slip	Outlet Only	X	X
⅛" Hose Barb	√	X	X
Male Luer Lock	Outlet Only	X	X
¼" Hose Barb	√	X	X
¼" Single Step Hose Barb	X	X	√

Dimension (Length) (in mm)

Inlet/ Outlet	25mm	50mm
¼" - ⅜" Stepped Hose Barb I/O	-	79
¼" Hose Barb I/O	38	-
¼" Single Step Hose Barb I/O	-	62
¾" Sanitary Flange I/O	-	51
Female Luer Lock Inlet/ Male Luer Slip Outlet	23	-
⅛" Hose Barb I/O	36	-

Operational Radius	15	28

Ordering Information

0.2 µm *AseptiCap® KSO* PES Membrane Capsule filter

Type		Size		Pore Size		Inlet/Outlet		X	Bell		Sterility		Pack Size	
			Code		Code		Code			Code		Code		Code
AseptiCap® KSO (0.45µm Upstream)	DKOX	1″	51	0.2µm	01	¼″ SHB	A		Yes	B	Non Sterile	1	1	01
AseptiCap® KSO (0.8µm Upstream)	DKO5	2″	52			¼″ MNPT (18 TPI)	B		No Bell	X	EO Sterile	2		
		5″	53			¼″ BSP (19 TPI)	M		Bell with cover	C				
		8″	57			¼″ BSP (19 TPI) with O-ring	P							
						¼″ BSP	F							
						½″ MNPT	C							
						½″ Hose Barb	D							
						1½″ Sanitary Flange	E							
						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							
						¼″ Single Step Hose Barb	R							

Example:

DKOX	57	01	DD	X	X	1	01

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

Inlet/Outlet	Size/Length			
	1″	2″	5″	8″
¼″ Stepped Hose Barb	√	√	√	√
½″ Single Step Hose Barb	X	√	√	√
½″Hose Barb	√	√	√	√
1½″ Sanitary Flange	√	√	√	√
¾″ Sanitary Flange	√	√	√	√
Quick Connector	√	√	√	√
½″ MNPT	X	√	√	√
¼″ MNPT (18TPI)	√	√	√	√
¼″ BSP (19 TPI)	Inlet Only	X	X	X
¼″ BSP (19 TPI) with O-ring	Inlet Only	X	X	X
¼″ BSP	Inlet Only	√	√	√
Female Luer Lock	√	√	√	√
Male Luer Slip	Outlet Only	X	X	X
3/16″ Hose Barb	√	√	Outlet Only	X
3/8″ Hose Barb	√	√	√	√
¼″ Single Step Hose Barb	√	√	√	√

Bell at outlet Available with (Size/outlet)
1″/ ¼″ SHB
1″, 2″, 5″, 8″/ ½″ HB

Dimensions (in mm)	Small Capsule Filters			
End Connections	**1″**	**2″**	**5″**	**8″**
¼″ SHB I/O	94	122	172	223
¾″ Sanitary Flange Inlet I/O	85	104	155	206
Quick Connector	100	113	164	218
1½″ Sanitary Flange I/O	92	112	164	216
½″ Hose Barb I/O	90	112	162	214
½″ Single Step Hose Barb I/O	-	115	165	218
1½″ Sanitary Flange Inlet ½″ Single Step Hose Barb Outlet	-	112	165	216
3/8″ Hose Barb I/O	-	115	167	217
¼″ Single Step Hose Barb I/O	90	106	160	212
Operational Radius	40	65	65	65

Ordering Information

Datasheet

0.2 µm *AseptiCap® KSO* 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® KSO (0.45 µm Upstream)	LKOX	5″	53	0.2µm	01	½″ Single Step Hose Barb	Q		Inline	X	Non Sterile	1	1	01
AseptiCap® KSO (0.8 µm Upstream)	LKO5	10″	54			1½″ Sanitary Flange	E		T-Line*	T	EO Sterile	2		
		20″	55			¾″ Sanitary Flange	S							
		30″	56			3/8″ Hose Barb	I							
						1″ Hose Barb	Z							

Example:

LKOX	54	01	EE	X	T	1	01

***T-line is not available in 5" Capsule filter**

***T-line Capsule Filter are available with 1½″ Sanitary Flange I/O Connections 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	√	√	√	√	√	√	√
¾″ Sanitary Flange	√	√	X	X	X	X	X
⅜″ Hose Barb	√	√	√	√	X	X	X
1″ Hose Barb	X	√	√	√	X	X	X

Dimensions (in mm)	Inline Capsule Filters				T-line Capsule Filters		
End Connections	5″	10″	20″	30″	10″	20″	30″
1½″ Sanitary Flange I/O	205	330	600	855	340	580	840
¾″ Sanitary Flange I/O	214	335	x	x	x	x	x
½″ Single Step Hose Barb I/O	218	336	630	890	x	x	x
1½″ Sanitary Flange Inlet ½″ Hose Barb Outlet	212	334	620	870	x	x	x
⅜″ Hose Barb I/O	211	332	634	885	x	x	x
1″ Hose Barb I/O	x	405	635	895	x	x	x
Operational Radius	80	80	80	80	80	80	80

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