Membrane Technologies

AseptiCap® NL/NS
Nylon-66 Membrane Capsule Filters

Data Sheet

mdi Nylon membrane capsule filters are ready to use, disposable, highly retentive filtration devices specially designed for sterilization of aqueous as well as organic solutions. Nylon-66 membrane, and polypropylene body used in these filters provide wide chemical compatibility. These capsule filters are heat resistant, biologically inert, autoclavable, and suitable for filtration and sterilization applications.

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® NL/NS* filters are an ideal solution for pharmaceutical process filtration.

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, extremely low extractables, high throughputs, wide chemical compatibility and other important characteristics.

Types Available

- *AseptiCap®NS:* Double Layer (with Prefilter)
- *AseptiCap®NL*: Single Layer (without Prefilter)

Applications

- Sterilizing filtration of stability batches in formulation development labs
- Sterilization of compatible solvents and chemicals

Key Features

- Absolute retention
- 100% integrity tested
- 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

Quality Assurance

Datasheet

AseptiCap® NL/NS capsule filters use **mdi** Nylon 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 pharmaceutical applications. *AseptiCap® NL/NS* are manufactured in class 10,000 clean rooms and ISO 9001:2015 certified facilities.

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 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 Brevundimonas 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® NL/NS* 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.

Pressure, Temperature Endurance

AseptiCap® NL/NS 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 may impact the impurity profile of the desired product.

AseptiCap® NL/NS filters are validated to exhibit low extractables under harsh extraction conditions.

Bioburden Testing

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

Endotoxin Testing

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

Total Traceability

AseptiCap® NL/NS filters come with completely traceable lot numbers and unique identification number to facilitate easy and fast retrieval of manufacturing and quality control data associated with each filter.

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® NL/NS 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 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 Indirect Food Additives
- Materials of construction tested for toxicity as per Biological Reactivity Tests, invivo, USP <88> for class VI Plastics

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.

Easy Connect

Datasheet

Widest Range of End Connections

mdi *AseptiCap® NL/NS* 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.

½" HB

½" Single Stepped Hose Barb

1/4" MNPT

¼" SHB

Quick Connector

Male Luer Slip

3/8" Hose Barb

Female Luer Lock

1½" Sanitary Flange

¾" Sanitary Flange

½" MNPT

1" Hose Barb

Some end connections available with AseptiCap®.

Customized Connectivity

mdi *AseptiCap® NL/NS* 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 pharmaceutical 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.

1½" Sanitary Flange to ½"Barb Hose

1½" Sanitary Flange to ¾" Sanitary Flange

***AseptiCap® NL/NS* with HighSecurity 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® NL/NS* 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 is identical for all filter devices starting from 5 cm^2 to 18000cm^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® NL/NS* filters there by reducing the additional validation cost and time.

AseptiCap® NL/NS
25mm, 5cm^2

AseptiCap® NL/NS
50mm, 20cm^2

AseptiCap® NL/NS
1", 250cm^2/200cm^2

AseptiCap® NL/NS
2", 900cm^2/700cm^2

AseptiCap® NL/NS
5", 1800cm^2/1400cm^2

AseptiCap® NL/NS
8", 2700cm^2/2100cm^2

Filter Devices	Hold up Volume
AseptiCap® NL/NS 25 mm	< 50µl
AseptiCap® NL/NS 50 mm	< 300µl
AseptiCap® NL/NS 1"	< 5ml
AseptiCap® NL/NS 2"	< 25ml
AseptiCap® NL/NS 5"	< 45ml
AseptiCap® NL/NS 8"	< 60ml
AseptiCap® NS 5"	< 80ml
AseptiCap® NS 10"	< 150ml
AseptiCap® NS 20"	< 250ml
AseptiCap® NS 30"	< 350ml

AseptiCap® NS
10", 6000cm^2

Specifications

AseptiCap® NL/NS

Datasheet

Construction			
Final Filter Pore Size		0.2 µm	0.45 µm
Pre-filter Membrane (in case of *AseptiCap® NS*)		0.8 µm, 0.45µm	0.8 µm
Membrane		Nylon- 66	
Plastic Parts		Polypropylene	
Integrity Testing / Retention			
Bubble Point (with 50% IPA Wetted)		> 17psi (1.19Kg/cm^2)	> 11psi (0.77Kg/cm^2)
Microbial RetentioMicrobial Bacterial Retention (LRV >7 for)		*Brevundimonas diminuta* (ATCC 19146) per cm^2	*Serratia marcescens* (ATCC 14756) per cm^2
Size			
Size		25 mm	50 mm
EFA (Effective Filtration Area)		5cm^2	20cm^2
Operational Radius (with Vent/ Drain)		15 mm	28 mm
Operational			
Max. Operating Temperature		55 °C	60 °C
Max. Differential Pressure		5Kg/cm^2 (75 Psi) @ 25° C	3Kg/cm^2 (42 Psi) @ 30° C
Hold-up Volume(with air purge)		<50µL	<300µL
Burst Pressure		> 14 Kg/cm^2	> 8 Kg/cm^2
Sterilization	By Gas	Sterilizable by Ethylene Oxide	
	By Autoclave	Autoclavable at 125°C for 30 minutes. Can not be in-line steam sterilized	
Shelf Life		3 years after EO sterilization	

Assurance	
Toxicity	Passes Biological reactivity test, In Vivo, as per USP <88> for Class VI plastics
Bioburden	Bioburden level is < 1000 cfu/filter device as per ISO 11737-1: 2018
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
Extractables with WFI	Passes NVR test as per USP <661>
Particle Shedding	The filtrate complies with USP <788> test for particulate matter in injections
TOC/Conductivity at 25 °C	Meets the WFI requirements of USP <643> for Total Organic Carbon and USP <645> for Water Conductivity after a 500ml WFI flush
Indirect Food Additive	All Polypropylene components meet the FDA Indirect Food Additive requirements cited in 21 CFR 177.1520
Good Manufacturing Practice	These products are manufactured in a facility which adheres to Good Manufacturing Practices
Oxidizable Substances	Passes test as per USP <1231>
Quality Management System	ISO-9001 Certified
USFDA	DMF No. 015554

Specifications

AseptiCap® NL/NS

Datasheet

Construction			
Final Filter Pore Size	0.2 µm	0.45 µm	
Pre-filter Membrane (in case of *AseptiCap® NS*)	0.8 µm, 0.45µm	0.8 µm	
Membrane	Nylon- 66		
Support Layer	Polyester		
Body and Core	Polypropylene		
Integrity Testing / Retention			
Bubble Point (with 50% IPA Wetted)	> 17psi (1.19Kg/cm^2)	> 11psi (0.77Kg/cm^2)	
Microbial RetentioMicrobial Bacterial Retention (LRV >7 for)	*Brevundimonas diminuta* (ATCC 19146) per cm^2	*Serratia marcescens* (ATCC 14756) per cm^2	

Size					
Size		1″	2″	5″	8″
Effective Filtration Area (Nominal)	*AseptiCap® NL*	250cm^2	900cm^2	1800cm^2	2700cm^2
	AseptiCap® NS	200cm^2	700cm^2	1400cm^2	2100cm^2
Operational Radius (with Vent/ Drain)		30 mm	65 mm	65 mm	65 mm
Vent and Drain		¼" 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 30 minutes. Can not be in-line steam sterilized
Shelf Life		3 years after EO sterilization

Assurance	
Toxicity	Passes Biological reactivity test, In Vivo, as per USP <88> for Class VI plastics
Bioburden	Bioburden level is < 1000 cfu/filter device as per ISO 11737-1: 2018
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
Extractables with WFI	Passes NVR test as per USP <661>
Particle Shedding	The filtrate complies with USP <788> test for particulate matter in injections
TOC/Conductivity at 25 °C	Meets the WFI requirements of USP <643> for Total Organic Carbon and USP <645> for Water Conductivity after a 3 liter of WFI flush
Indirect Food Additive	All Polypropylene components meet the FDA Indirect Food Additive requirements cited in 21 CFR 177.1520
Good Manufacturing Practice	These products are manufactured in a facility which adheres to Good Manufacturing Practices.
Oxidizable Substances	Passes test as per USP <1231>
Quality Management System	ISO-9001 Certified
USFDA	DMF No. 015554

Specifications

Datasheet

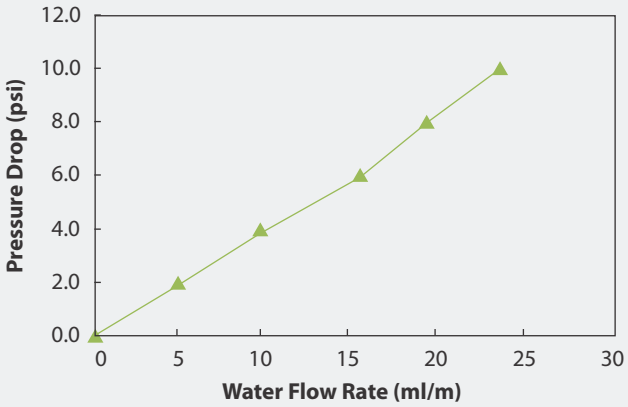
AseptiCap® NL/NS

Construction					
Final Filter Pore Size		0.2 µm		0.45 µm	
Pre-filter Membrane (in case of *AseptiCap® NS*)		0.8 µm, 0.45µm		0.8 µm	
Membrane		Nylon- 66			
Support Layer		Polyester			
Body and Core		Polypropylene			
Integrity Testing / Retention					
Air Diffusion Flow per 10" Capsule Filter (water wetted)		< 30ml/min @ 37 psi (2.60 Kg/cm^2)		<30ml/min @ 22 psi (1.54 Kg/cm^2)	
Microbial Bacterial Retention (LRV >7 for)		*Brevundimonas diminuta* (ATCC 19146) per cm^2		*Serratia marcescens* (ATCC 14756) per cm^2	
Size					
Size		5"	10"	20"	30"
Effective Filtration Area (Nominal)		3000 cm^2	6000 cm^2	12000 cm^2	18000 cm^2
Operational Radius (with Vent/Drain)		78 mm	78 mm	78 mm	78 mm
Vent and Drain		¼" Hose Barb with Silicone "O" rings			
Operational					
Max. Operating Temperature		80 °C @ < 2 Kg/cm^2 (30 psi)			
Max. Differential Pressure		< 4 Kg/cm^2 (60 psi) @ 30 °C			
Sterilization	By Gas	Sterilizable by Ethylene Oxide			
	By Autoclave	Autoclavable at 125 °C for 30 minutes. Can not be in-line steam sterilized			
Shelf Life		3 years after EO sterilization			
Assurance					
Toxicity		Passes Biological reactivity test, In Vivo, as per USP <88> for Class VI plastics			
Bioburden		Bioburden level is < 1000 cfu/filter device as per ISO 11737-1:2018			
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			
Extractables with WFI		Passes NVR test as per USP <661>			
Particle Shedding		The filtrate complies with USP <788> test for particulate matter in injections			
TOC/Conductivity at 25 °C		Meets the WFI requirements of USP <643> for Total Organic Carbon and USP <645> for Water Conductivity after a 3 liter of WFI flush			
Indirect Food Additive		All Polypropylene components meet the FDA Indirect Food Additive requirements cited in 21 CFR 177.1520			
Good Manufacturing Practice		These products are manufactured in a facility which adheres to Good Manufacturing Practices.			
Oxidizable Substances		Passes test as per USP <1231>			
Quality Management System		ISO-9001 Certified			
USFDA		DMF No. 015554			

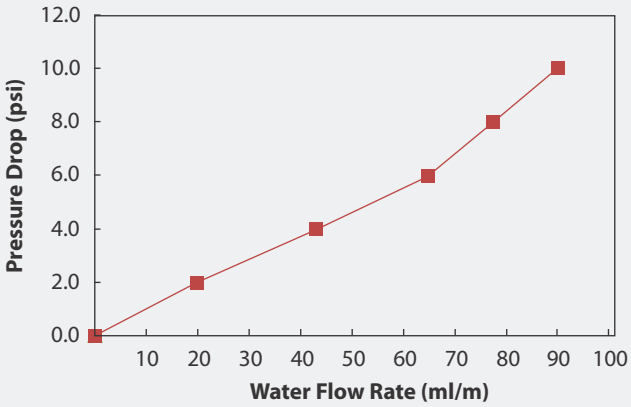
Typical Water Flow Rates

Datasheet

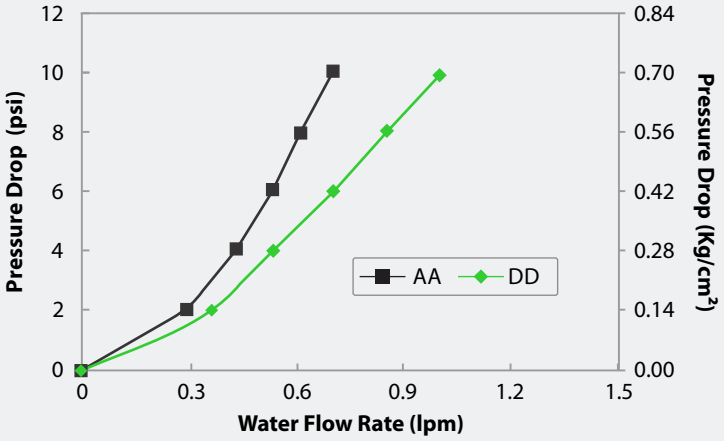
25 mm Capsule Filters

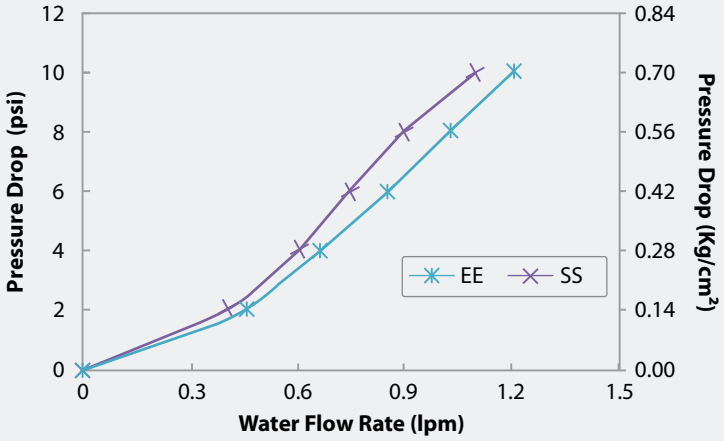


50 mm Capsule Filters

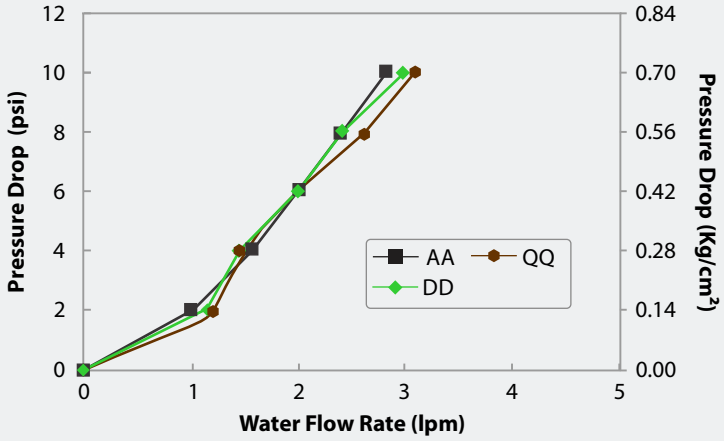


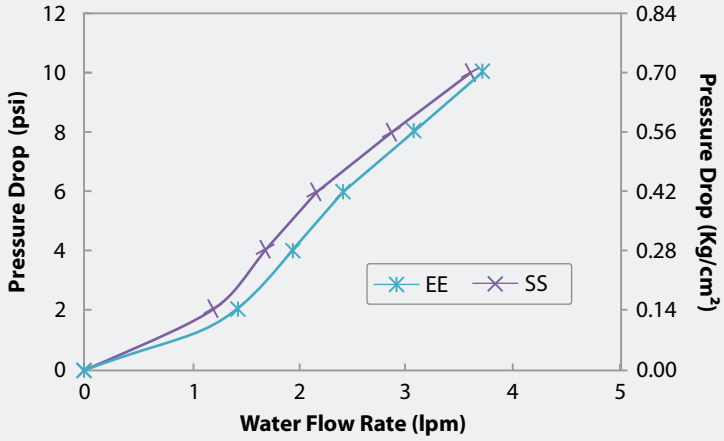
0.2µm *AseptiCap® NS*, 1" Capsule Filters





0.2µm *AseptiCap® NS*, 2" Capsule Filters





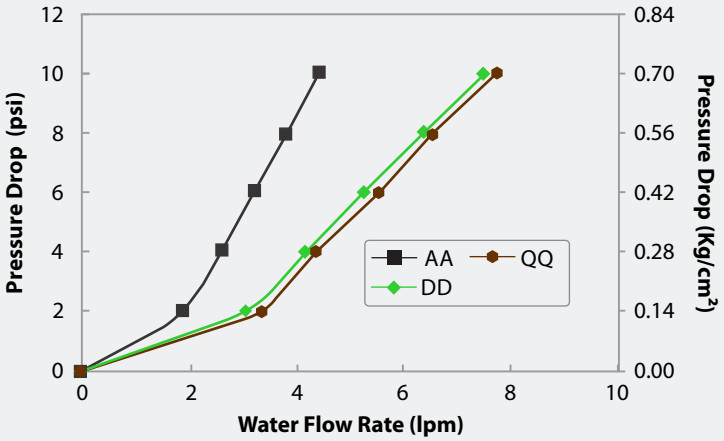
End Connection Type:

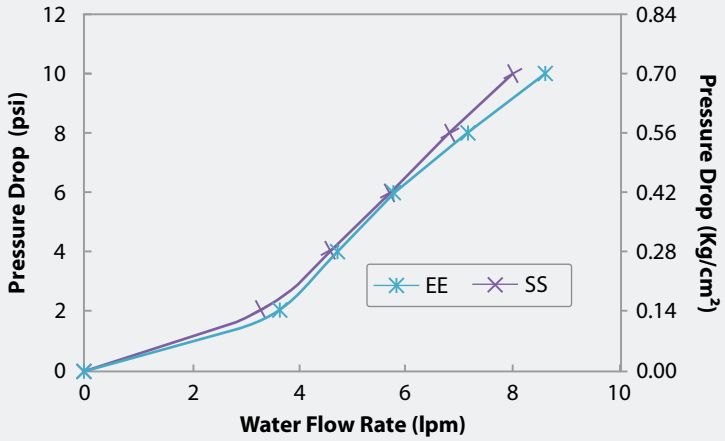
A: ¼" Stepped Hose Barb Q: ½" Single Step Hose Barb E: 1½" Sanitary Flange D: ½" Hose Barb S: ¾" Sanitary Flange

Typical Water Flow Rates

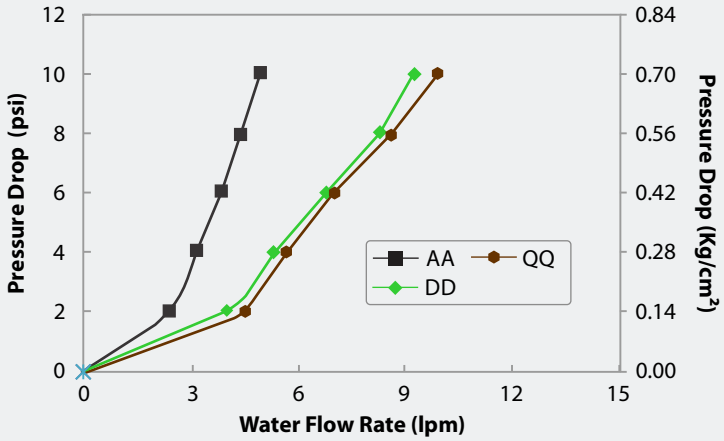
Datasheet

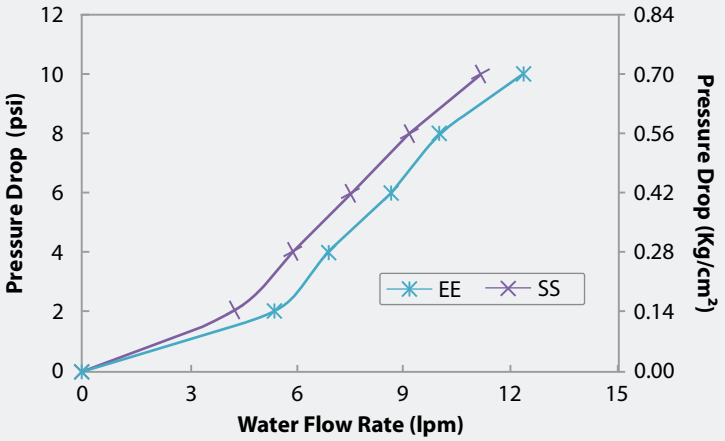
0.2µm *AseptiCap® NS*, 5″ Capsule Filters



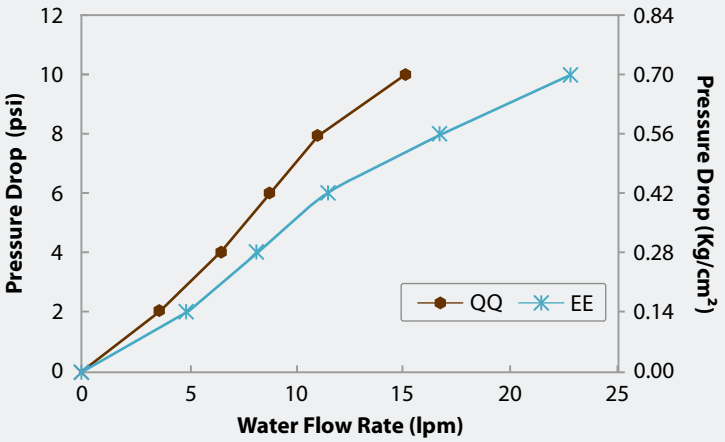


0.2µm *AseptiCap® NS*, 8″ Capsule Filters

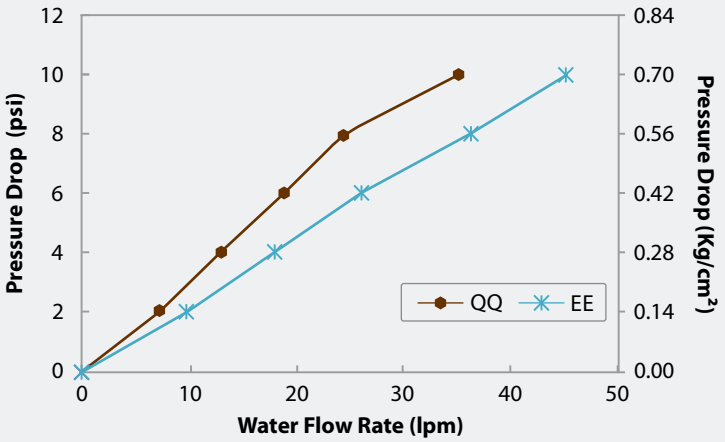




0.2µm *AseptiCap® NS*, 5″ Large Capsule Filters



0.2µm *AseptiCap® NS*, 10″ Large Capsule Filters



End Connection Type:

A: ¼″ Stepped Hose Barb Q: ½″ Single Step Hose Barb E: 1½″ Sanitary Flange D: ½″ Hose Barb S: ¾″ Sanitary Flange

Ordering Information

Datasheet

AseptiCap® NL/NS 25mm

Type	
	Code
AseptiCap® NL (Single Layer)	INLX
*AseptiCap® NS** (0.45µm upstream)	INSX
AseptiCap® NS (0.8µm upstream)	INS5

Size	
Dia	**Code**
25 mm	06

Pore Size	
	Code
0.2 µm	01
0.45 µm	02

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

X

X

Sterility	
	Code
Non Sterile	1
EO Sterile	2

Pack Size	
	Code
100	04

Example

INSX	06	01	MN	X	X	1	04

***0.45µm Upstream is only available in 0.2µm Pore Size**

AseptiCap® NL/NS 50mm

Type	
	Code
AseptiCap® NL (without Vent) (Single Layer)	INLX
AseptiCap® NS (without Vent)* (0.45µm upstream)	INSX
AseptiCap® NS (without Vent) (0.8µm upstream)	INS5
AseptiCap® NL (with Vent) (Single Layer)	VNLX
AseptiCap® NS (with Vent)* (0.45µm upstream)	VNSX
AseptiCap® NS (with Vent) (0.8µm upstream)	VNS5

Size	
Dia	**Code**
50 mm	10

Pore Size	
	Code
0.2 µm	01
0.45 µm	02

Inlet/Outlet	
	Code
¼" - ¾" Stepped Hose Barb	B
¾" Sanitary Flange	S
Female Luer Lock	M

X

X

Sterility	
	Code
Non Sterile	1
EO Sterile	2

Pack Size	
	Code
10	02

Example

VNSX	10	01	SS	X	X	1	02

***0.45µm Upstream is only available in 0.2µm Pore Size**

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

Dimension (Length) (in mm)

Inlet/ Outlet	25mm	50mm
¼" - ⅜" Stepped Hose Barb I/O	-	79
¼" Single Step Hose Barb I/O	38	-
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

AseptiCap® NL/NS 1", 2", 5", 8"

Type	
	Code
AseptiCap® NL	DNLX
*AseptiCap® NS** (0.45µm upstream)	DNSX
AseptiCap® NS (0.8µm upstream)	DNS5

Size	
Size	**Code**
1"	51
2"	52
5"	53
8"	57

Pore Size	
	Code
0.2 µm	01
0.45 µm	02

Inlet/Outlet	
	Code
¼" SHB	A
¼" MNPT	B
½" MNPT	C
½" Hose Barb	D
1½" Sanitary Flange	E
¾" Sanitary Flange	S
Quick Connector	J
Single Step ½" HB	Q
Female Luer Lock	U
Male Luer Slip	W
3⁄16" Hose Barb	N
3⁄8" Hose Barb	I

X

Bell	
	Code
Yes**	B
No Bell	X

Sterility	
	Code
Non Sterile	1
EO Sterile	2

Pack Size	
Qty	**Code**
1	01

Example	**DNS5**	**53**	**01**	**QQ**	**X**	**X**	**1**	**01**

***0.45µm Upstream is only available in 0.2µm Pore Size**

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)	√	√	√	√
Female Luer Lock	√	√	√	√
Male Luer Slip	Outlet Only	X	X	X
3/16" Hose Barb	√	√	Outlet Only	X
3/8" Hose Barb	X	√	√	√

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
Operational Radius	40	65	65	65

**Bell at Outlet Available with (Size/Outlet)
1" / ¼" SHB
1", 2", 5", 8"/ ½" HB

Ordering Information

AseptiCap® NS 5", 10", 20", 30"

Type	
	Code
*AseptiCap® NS** (0.45µm upstream)	LNSX
AseptiCap® NS (0.8µm upstream)	LNS5

Size	
Size	**Code**
5"	53
10"	54
20"	55
30"	56

Pore Size	
	Code
0.2 µm	01
0.45 µm	02

Inlet/Outlet	
	Code
1½" Sanitary Flange	E
¾" Sanitary Flange	S
Single Step ½" Hose Barb	Q
⅜" Hose Barb	I
1" Hose Barb	Z

X

Inline/T-line	
	Code
Inline	X
T-line	T

Sterility	
	Code
Non Sterile	1
EO Sterile	2

Pack Size	
Qty	**Code**
1	01

Example

LNS5	56	01	EE	X	X	1	01

*** 0.45µm Upstream is only available in 0.2µm Pore Size**

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	878	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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