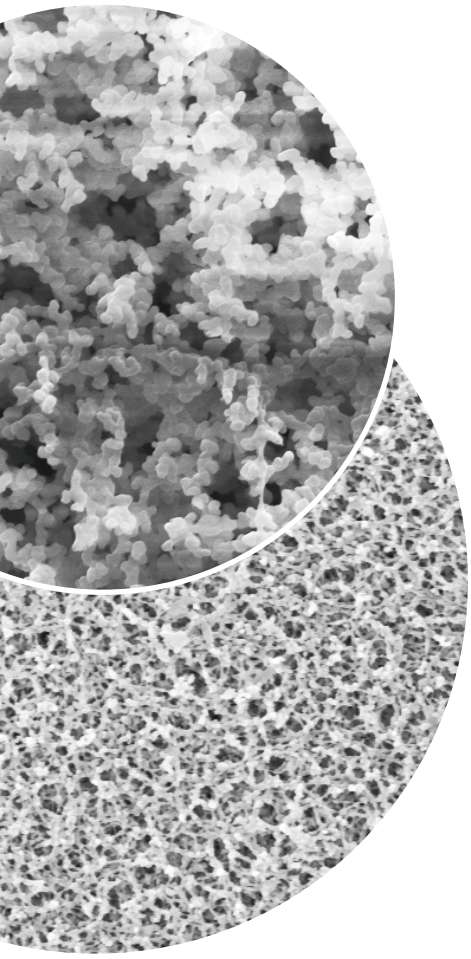


# AseptiPrime® KS-γ

## Taking Throughput to the next level

### Sterile filtration with upto 3x smaller filter area

Bio-pharmaceutical manufacturing is a complex, multistep process which involves a very wide variety of process streams under different process conditions at different steps. These process streams include cell culture media, media additives, growth regulators in the upstream and post centrifuge cell harvest supernatants, post viral inactivation intermediates, buffers, and high value product concentrates in the downstream. Filtration and purification of such a wide spectrum of fluid streams, to achieve varied objectives at each step, is quite a challenge for the process owner.

Microfiltration accounts for a very high (approximately 25%) of the filtration and purification costs. Sterilizing filters are a huge component of this cost as these are critical for multiple applications across the entire biopharmaceutical process. Some of these are:

- Sterile filtration of culture media and product concentrates
- Protection of expensive virus filters and chromatography columns
- Control of microbial load throughout the process chain

There is therefore a continuous need to enhance the throughput obtained from 0.2µm/0.1µm filters with various process streams.

*AseptiPrime® KS-γ* is designed to fulfil the above need. These gamma sterilizable low protein binding filters, incorporate a very high porosity optimized pre-filter PES membrane with unique pore structure that ensures high loading capacity for suspended contaminants and high volume handling. This results in much higher throughput when compared with other available sterilizing filters.

The robust, highly retentive final membrane layer ensures that *AseptiPrime® KS-γ* filters meet international regulatory requirements for microbial retention and deliver sterile filtrate.

*AseptiPrime® KS-γ* capsule filters offer additional advantages of 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 connectivity to the existing fittings.

mdi
Membrane Technologies

# *AseptiPrime® KS-γ*

## High Throughput Sterilizing Filters

*AseptiPrime® KS-γ* capsule filters use **mdi** PES membrane in Gamma compatible 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. *AseptiPrime® KS-γ* are manufactured in class 10,000 clean rooms and ISO 9001 certified facilities. Packaging is done in double polybags for direct irradiation by gamma or for convenience of taking *AseptiPrime® KS-γ* in clean areas for making disposable assemblies for subsequent sterilization.

### 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

### Key Features

- Very high throughput
- Absolute retention
- 100% integrity tested
- Low protein binding
- Very low hold up volume in filters
- High flow rates
- 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 Gamma irradiation

### 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.

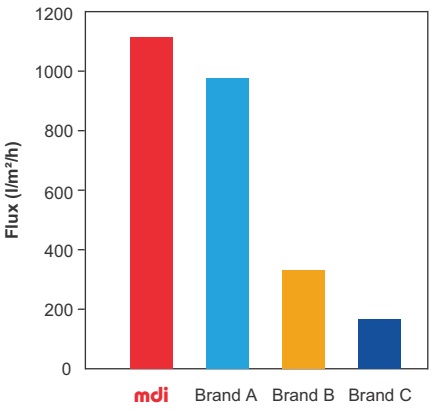
# Performance Data

## High Throughputs

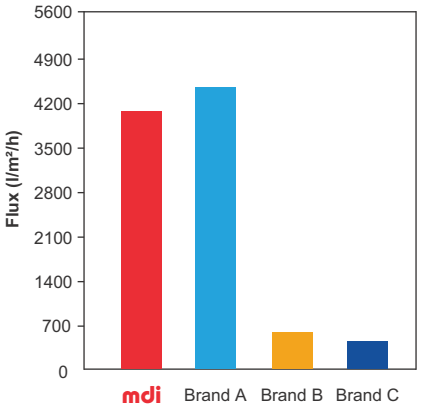
**mdi** *AseptiPrime® KS-γ* filter consistently outperformed other available sterilizing filters by exhibiting much higher throughput with a wide variety of fluid streams .

The large throughput difference allows use of filters with much smaller filter area and enhance process economy.

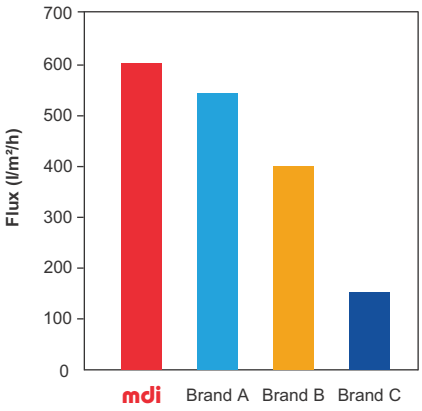
Also, optimized filter sizes do away with the possibilities of mid batch change out of filters or having to isolate a complete batch because it could not be processed.



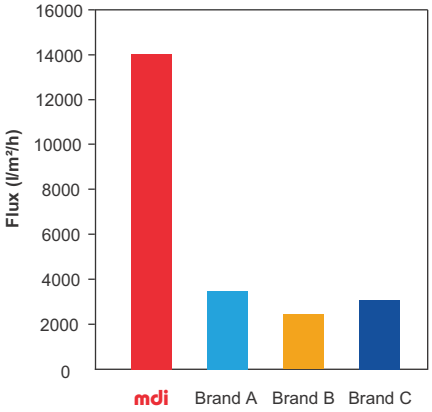

**Soy Media**



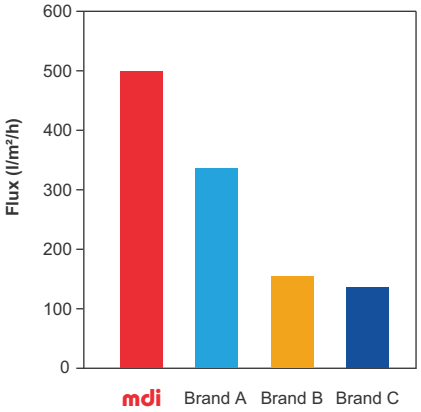

**RPMI**



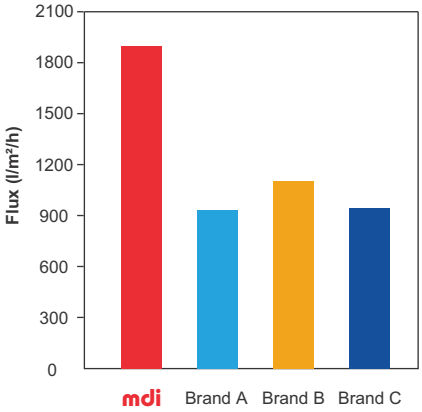

**Yeast Peptone Dextrose**




**Luria Bertani**




**6M Urea**




**6M Guanidine HCl**

# Quality Assurance

**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 *Acholeplasma laidlawii* (ATCC 23206) and with *B.diminuta* (ATCC 19146) as per ASTM F838-05 to establish acceptable integrity test values.

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

## 100% Integrity Tested

Each *AseptiPrime® KS-γ* 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.

## Protein Adsorption

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

| 0.2 µm *AseptiPrime®* Filters | Protein Binding (0.75% BSA) |
|---|---|
| 25 mm, 5 $cm^2$ | 1.45 µg |
| 50 mm, 20 $cm^2$ | 6.3 µg |
| 1", 250 $cm^2$ | 80.5 µg |
| 2", 500 $cm^2$ | 175 µg |
| 10", 6000 $cm^2$ | 1925 µg |

## Pressure, Temperature Endurance

*AseptiPrime® KS-γ* 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.

*AseptiPrime® KS-γ* 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

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

## Total Traceability

*AseptiPrime® KS-γ* 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

*AseptiPrime® KS-γ* 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 indirect food additives**
- **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>**

# Linear Upscaling from R&D to Production Process

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 *AseptiPrime® KS-γ* 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 *AseptiPrime® KS-γ* filters there by reducing the additional validation cost and time.

***AseptiPrime® KS-γ*** **25mm, 5$cm^2$**

***AseptiPrime® KS-γ*** **50mm, 20$cm^2$**

***AseptiPrime® KS-γ*** **1", 250$cm^2$**

***AseptiPrime® KS-γ*** **2", 500$cm^2$**

***AseptiPrime® KS-γ*** **5", 1000$cm^2$**

***AseptiPrime® KS-γ*** **8", 2000$cm^2$**

***AseptiPrime® KS-γ*** **10", 6000$cm^2$**

***AseptiPrime® KS-γ*** **20", 12000$cm^2$**

***AseptiPrime® KS-γ*** **30", 18000$cm^2$**

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

# 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 *AseptiPrime® KS-γ* 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 dimensional 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 gamma irradiation.

**¾" Sanitary Flange**

**1½" Sanitary Flange**

**½" Hose Barb**

**½" Single Stepped Hose Barb**

**¼" Stepped Hose Barb**

**Quick Connector**

**Some end connections available with *AseptiPrime® KS-γ***

## Customized Connectivity

mdi *AseptiPrime® KS-γ* 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.

**1½" Sanitary Flange to ½"Barb Hose**

**1½" Sanitary Flange to ¾" Sanitary Flange**

***AseptiPrime®* with HighSecurity ½" hose barb connection**

# Specifications

| Construction | | | | |
|---|---|---|---|---|
| Membrane | 0.1µm/0.2 µm Hydrophilic PES | | | |
| Pre-filter Membrane | **0.1µm:** 0.3µm or 0.5µm PES<br>**0.2µm:** 0.5µm PES | | | |
| Support Layers | Polyester | | | |
| Plastic Parts | Gamma Stable Polypropylene | | | |
| **Integrity Testing / Retention** | | | | |
| Bubble Point | **0.1µm:** ≥ 26 psi (1.82 Kg/cm$^2$) with 50% IPA<br>≥ 65 psi (4.56 Kg/cm$^2$) with Water<br>**0.2µm:** ≥ 50 psi (3.52 Kg/cm$^2$ ) with Water | | | |
| Max. Air Diffusion Flows per 10" Capsule Filter | **0.1µm:** ≤ 29 ml/min @ 50 psi (3.52 Kg/cm$^2$) with water<br>**0.2µm:** ≤ 30 ml/min @ 37 psi (2.6 Kg/cm$^2$) with water | | | |
| Microbial Retention | **for 0.1µm:** LRV >7 for *Acholeplasma laidlawii* (ATCC 23206) per cm$^2$<br>**for 0.2µm:** LRV >7 for *Brevundimonas diminuta* (ATCC 19146) per cm$^2$ | | | |
| **Operational** | | | | |
| Sterilization | **By Irradiation:** Gamma Irradiatiable up to 50 kGy.<br>These filters must not be autoclaved or in-line steam sterilized. | | | |
| Shelf Life | 2 years after Gamma Sterilization | | | |
| | 25 mm | 50 mm | 1", 2", 5", 8" | 5", 10", 20", 30" |
| Max. Operating Temperature | 55 °C | 60 °C | 80 °C @ < 30 psi (2 Kg/cm$^2$) | |
| Max. Differential Pressure | 75 psi (5 Kg/cm$^2$) @ 25 °C | 42 psi (3 Kg/cm$^2$) @ 30 °C | 60 psi (4 Kg/cm$^2$) @ 30 °C | |
| **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 5 liter flush for 5" capsule filters and 10 liter for 10" capsule filters | | | |
| 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. 15554 | | | |

# Dimensions

## Disc Capsule Filters

| Size | 25mm | 50mm |
|---|---|---|
| **Effective Filtration Area ($cm^2$)** | **5** | **20** |
| **End Connections** | **End to End Length** | |
| 1/4" SHB I/O | - | 79 mm |
| 3/4" Sanitary Flange I/O | - | 51 mm |
| Female Luer Lock Inlet/ Male Luer Slip Outlet | 23 mm | - |
| 1/8" Hose Barb I/O | 36 mm | - |
| Operational Radius | 15 mm | 28 mm |

## Small Capsule Filters

| Size | 1" | 2" | 5" | 8" |
|---|---|---|---|---|
| **Effective Filtration Area ($cm^2$)** | **250** | **500** | **1000** | **2000** |
| **End Connections** | **End to End Length** | | | |
| ¼" SHB I/O | 94 mm | 122 mm | 172 mm | 223 mm |
| ¾" Sanitary Flange Inlet I/O | 85 mm | 104 mm | 155 mm | 206 mm |
| 1½" Sanitary Flange I/O | 92 mm | 112 mm | 165 mm | 216 mm |
| ½" Hose Barb I/O | 90 mm | 112 mm | 162 mm | 214 mm |
| ½" Single Step Hose Barb I/O | - | 115 mm | 165 mm | 218 mm |
| 1½" Sanitary Flange Inlet ½" Hose Barb Outlet | - | 112 mm | 165 mm | 216 mm |
| Operational Radius | 40 mm | 65 mm | 65 mm | 65 mm |

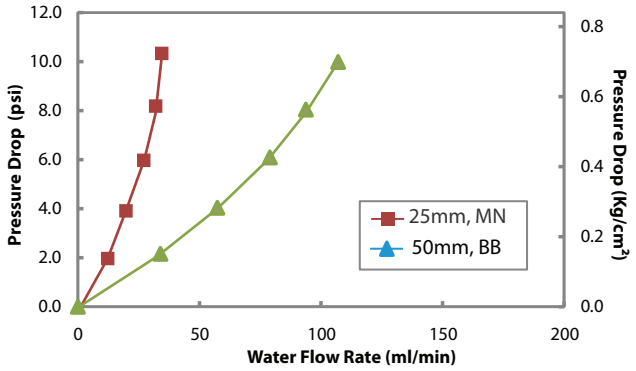
## Large Capsule Filters

| Size | 5" | 10" | 20" | 30" |
|---|---|---|---|---|
| **Effective Filtration Area ($cm^2$)** | **3000** | **6000** | **12000** | **18000** |
| **End Connections** | **End to End Length** | | | |
| 1½" Sanitary Flange I/O | 205 mm | 326 mm | 605 mm | 865 mm |
| ½" Single Step Hose Barb I/O | 218 mm | 332 mm | 628 mm | 888 mm |
| 1½" Sanitary Flange Inlet ½" Hose Barb Outlet | 212 mm | 332 mm | 618 mm | 878 mm |
| 3/8" Hose Barb I/O | 211 mm | 332 mm | 634 mm | 885 mm |
| ¾" Sanitary Flange I/O | 214 mm | 335 mm | x | x |
| Operational Radius | 78 mm | 78 mm | 78 mm | 78 mm |

# Typical Water Flow Rates

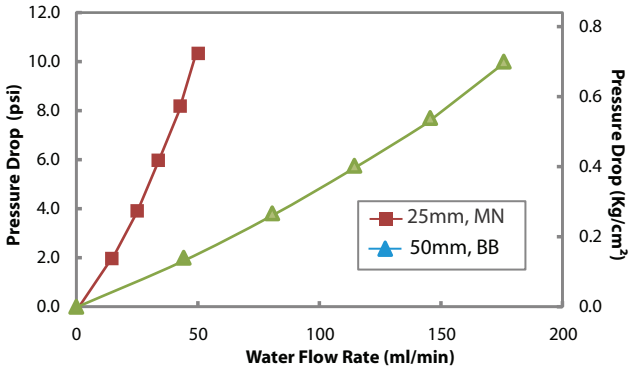
**0.1µm *AseptiPrime® KS-γ***

**25mm and 50 mm capsule filter**



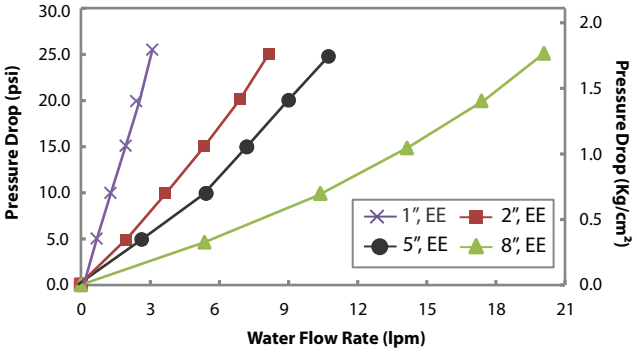

**0.2µm *AseptiPrime® KS-γ***

**25mm and 50 mm capsule filter**



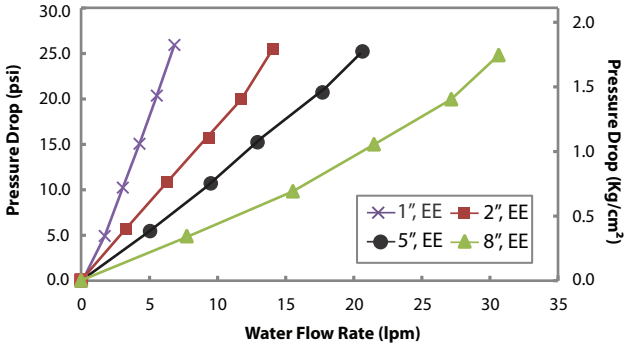

**0.1µm *AseptiPrime® KS-γ***

**1", 2", 5" and 8" Capsule Filters**



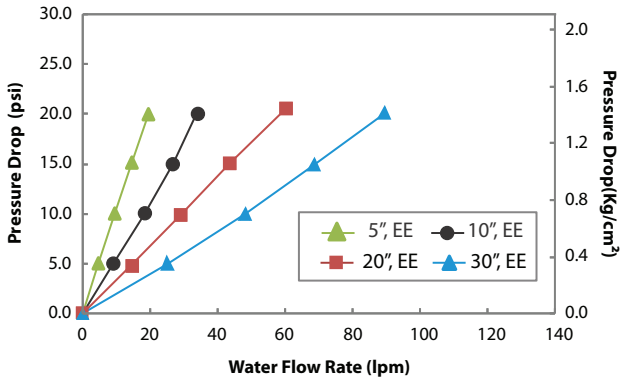

**0.2µm *AseptiPrime® KS-γ***

**1", 2", 5" and 8" Capsule Filters**



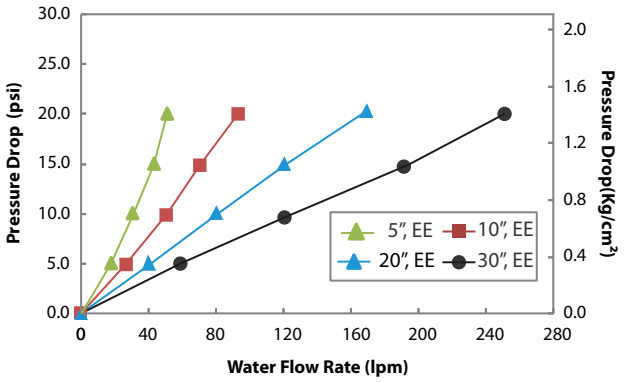

**0.1µm *AseptiPrime® KS-γ***

**5", 10", 20" and 30" Capsule Filters**




**0.2µm *AseptiPrime® KS-γ***

**5", 10", 20" and 30" Capsule Filters**




## End Connection Type:

E: 1½" Sanitary Flange

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

MN: End Connections: Female Luer Lock Inlet/Male Luer Slip Outlet

# Ordering Information

## *AseptiPrime® KS-γ* 25mm PES Membrane Inline Capsule filters

| Type | Code |
|---|---|
| *AseptiPrime® KS* ( 0.3µm optimized pre-filter) | IKX9 |
| *AseptiPrime® KS* ( 0.5µm optimized pre-filter) | IKX7 |

| Size | Code |
|---|---|
| 25mm | 06 |

| Pore Size | Code |
|---|---|
| 0.1µm | 36 |
| 0.2µm** | 01 |

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

| Radiation Sterilizable | Code |
|---|---|
| Yes | R |
| No* | X |

| X |
|---|

| Sterility | Code |
|---|---|
| Non Sterile | 1 |
| Gamma Sterile | 3 |

| Pack Size | Code |
|---|---|
| 100 | 04 |

**Example:**

| IKX7 | 06 | 01 | MN | R | X | 1 | 04 |
|---|---|---|---|---|---|---|---|

***Gamma irradiated filters can not be gamma sterilized again**

**Example for Non Sterile: IKX70601MNRX104** **Example for gamma Sterile: IKX70601MNXX304**

**** 0.2µm capsule filters are available with 0.5µm pre-filter only**

## *AseptiPrime® KS-γ* 50mm PES Membrane Inline Capsule filters

| Type | Code |
|---|---|
| *AseptiPrime® KS* ( 0.3µm optimized pre-filter) | VKX9 |
| *AseptiPrime® KS* ( 0.5µm optimized pre-filter) | VKX7 |

| Size | Code |
|---|---|
| 50mm | 10 |

| Pore Size | Code |
|---|---|
| 0.1µm | 36 |
| 0.2µm** | 01 |

| Inlet/Outlet | Code |
|---|---|
| ¼" SHB | B |
| ¾" Sanitary Flange | S |
| Female Luer Lock | M |

| Radiation Sterilizable | Code |
|---|---|
| Yes | R |
| No* | X |

| X |
|---|

| Sterility | Code |
|---|---|
| Non Sterile | 1 |
| Gamma Sterile | 3 |

| Pack Size | Code |
|---|---|
| 10 | 02 |

**Example:**

| VKX7 | 10 | 01 | BB | R | X | 1 | 02 |
|---|---|---|---|---|---|---|---|

*** Gamma irradiated filters can not be gamma sterilized again**

**Example for Non Sterile: VKX71001BBRX102** **Example for gamma Sterile: VKX71001BBXX302**

****0.2µm capsule filters are available with 0.5µm pre-filter only**

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

| Connections Available | | |
|---|---|---|
| **Inlet/Outlet** | **25mm** | **50mm** |
| ¼" - ¾ Stepped Hose Barb | X | √ |
| ¾" Sanitary Flange | X | √ |
| Female Luer Lock | Inlet Only | √ |
| Male Luer Slip | Outlet Only | X |
| ⅛" Hose Barb | √ | X |
| Male Luer Lock | Outlet Only | X |
| ¼" Hose Barb | √ | X |

| Pack Size Available | | |
|---|---|---|
| **Pack Size** | **25mm** | **50mm** |
| 10/Pack | X | √ |
| 100/Pack | √ | X |

# Ordering Information

## *AseptiPrime® KS-γ* PES Membrane Small Capsule filters

| Type | |
|---|---|
| | Code |
| *AseptiPrime® KS* ( 0.3µm optimized pre-filter) | DKX9 |
| *AseptiPrime® KS* ( 0.5µm optimized pre-filter) | DKX7 |

| Size | |
|---|---|
| | Code |
| 1″ | 51 |
| 2″ | 52 |
| 5″ | 53 |
| 8″ | 57 |

| Pore Size | |
|---|---|
| | Code |
| 0.1µm | 36 |
| 0.2µm* | 01 |

| Inlet/Outlet | |
|---|---|
| | Code |
| ¼″ SHB | A |
| ¼″ MNPT (18 TPI) | B |
| ¼″ BSP (19 TPI) | M |
| 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 |
| ⅜″ Hose Barb | I |

| Radiation Sterilizable | |
|---|---|
| | Code |
| Yes | R |
| No** | X |

| X |
|---|

| Sterility | |
|---|---|
| | Code |
| Non Sterile | 1 |
| Gamma Sterile | 3 |

| Pack Size | |
|---|---|
| | Code |
| 1 | 01 |

**Example:**

| DKX7 | 57 | 01 | DD | R | X | 1 | 01 |
|---|---|---|---|---|---|---|---|

**Example for Non Sterile: DKX75101QQRX101** **Example for gamma Sterile: DKX75101QQXX301**

*** 0.2µm capsule filters are available with 0.5µm pre-filter only**

**** Gamma sterile capsule filters cannot be gamma irradiated again**

**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 |
| ⅜″ Hose Barb | X | √ | √ | √ |

# Ordering Information

## *AseptiPrime® KS-γ* PES Membrane Large Capsule filters

| Type | |
|---|---|
| | Code |
| *AseptiPrime® KS* ( 0.3µm optimized pre-filter) | LKX9 |
| *AseptiPrime® KS* ( 0.5µm optimized pre-filter) | LKX7 |

| Size | |
|---|---|
| | Code |
| 5″ | 53 |
| 10″ | 54 |
| 20″ | 55 |
| 30″ | 56 |

| Pore Size | |
|---|---|
| | Code |
| 0.1µm | 36 |
| 0.2µm* | 01 |

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

| Radiation Sterilizable | |
|---|---|
| | Code |
| Yes | R |
| No** | X |

| Inline/ T-Line | |
|---|---|
| | Code |
| Inline | X |
| T-Line | T |

| Sterility | |
|---|---|
| | Code |
| Non Sterile | 1 |
| Gamma Sterile | 3 |

| Pack Size | |
|---|---|
| | Code |
| 1 | 01 |

**Example:**

| LKX7 | 54 | 01 | EE | R | T | 1 | 01 |
|---|---|---|---|---|---|---|---|

**Example for Non Sterile: LKX75301QQRX101** **Example for gamma Sterile: LKX75301QQXX301**

*** 0.2µm capsule filters are available with 0.5µm pre-filter only**

**** Gamma irradiated filters can not be gamma sterilized again**

**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 |

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