

Supor™ EX ECV

STERILIZING GRADE FILTERS

Supor™ EX ECV filters incorporate high capacity, high flow rate 0.2 µm sterilizing grade filter media validated for the retention of *Brevundimonas diminuta* (ATCC 19146) at a challenge level of 10⁷ colony forming units (CFU) per cm² membrane.

Supor EX ECV filters are available in a wide variety of sizes and formats. Our Mini Kleenpak™ syringe filter capsule and 47 mm membrane discs support filterability studies, while our Mini Kleenpak capsules, Kleenpak Nova capsules, and traditional cartridges provide a scalable range to support all development stages from clinical trials to full scale GMP manufacture in both single-use and traditional stainless-steel applications.

Features and benefits

- Unique polyethersulfone (PES) membrane pairing and pleat geometry results in exceptional process economy with both low and high fouling feeds.
- Very low protein and preservative binding ensures maximum transmission of active ingredients.
- 2D matrix marking ⁽¹⁾ allows full electronic traceability using barcode reader.

Typical applications

- Buffers
- Growth media
- Cell harvest material
- Process intermediates

Quality

- Manufactured in a ISO9001-controlled environment.
- Manufactured for use in conformance with cGMP ⁽¹⁾.
- Materials of construction meet USP <88> biological reactivity test *in vivo* for class VI-121°C plastics.
- ISO 9000 certified quality system.
- Materials of construct are BPA free.
- 100% integrity tested during manufacture ⁽¹⁾.
- Integrity test correlated to microbial retention.



Fig 1. Supor EX ECV product range.

Certificate of test ⁽¹⁾ provided includes:

- Fabrication integrity – each filter has successfully passed a forward flow integrity test correlated to bacterial retention per modified ASTM F838-05.
- Lot sample bacterial retention tests with *Brevundimonas diminuta* (ATCC 19146) at a challenge level of 10⁷ CFU/cm².
- Effluent quality for cleanliness, total organic carbon (TOC) and water conductivity, pH, and pyrogens per USP standard methods.

⁽¹⁾ Excludes FTKECV (filter disc) and KS2ECV2S (Mini Kleenpak syringe capsule).

Filterability tools ⁽²⁾

⁽²⁾ for evaluation purpose only, not suitable for cGMP manufacture.

Specifications

Membrane disc

Materials of construction

Membrane	Dual-layer hydrophilic PES membrane
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Nominal effective filter area (EFA) ⁽³⁾

14 cm ² (0.015 ft ²)

⁽³⁾ Actual EFA dependant on disc holder used.

Nominal dimensions

Maximum outside diameter	47 mm (1.85 in.)
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Mini Kleenpak syringe capsule

Materials of construction

Membrane	Dual-layer hydrophilic PES membrane
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Filter housing	Polypropylene
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Operating parameters ⁽⁴⁾

Maximum operating temperature	2.5 bar (36 psi) at 25°C for 12 hours
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and pressure	2.5 bar (36 psi) at 40°C for 6 hours
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⁽⁴⁾ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Nominal EFA

3.9 cm ² (0.004 ft ²)
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Fig 2. Supor EX ECV 47 mm membrane discs.



Fig 3. Supor EX ECV Mini Kleenpak syringe capsule.

Sterilization

Mini Kleenpak syringe capsules are supplied pre-sterilized and must not be re-sterilized

Nominal dimensions

Maximum outside diameter	30 mm (1.2 in.)
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Capsule body height	20 mm (0.8 in.)
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Ordering information

Product

Supor EX ECV filter in 47 mm disc format	25/pkg	FTKECV
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Supor EX ECV filter in Mini Kleenpak syringe capsule format	50/pkg	KS2ECV2S
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Female luer lock inlet and male slip luer outlet connections

Supplied pre-sterilized by gamma irradiation

Pack quantity

Product code

Mini Kleenpak capsule

Specifications

Materials of construction

Membrane	Dual-layer hydrophilic PES membrane
Support and drainage	Polypropylene
Filter housing	Polypropylene
Core	Polypropylene
Filling bell	Polycarbonate
Sealing technology	Thermal bonding without adhesive

Operating parameters ⁽⁶⁾

Maximum operating temperature	40°C
Maximum operating pressure	4.1 bar (60 psi) at 40°C
Maximum differential pressure	4.1 bar (60 psi) at 40°C

⁽⁶⁾ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Sterilization ⁽⁶⁾

Autoclave	5 × 60 minute cycles at 125°C
Gamma irradiation	Maximum of 50 kGy

⁽⁶⁾ Pre-sterilized Mini Kleenpak capsules must not be re-sterilized. Mini Kleenpak capsules must not be sterilized *in situ* by passing steam under pressure. To retain full water wettability for integrity testing of filter capsules with Supor EX ECV filter media, water wet filter capsules prior to autoclave sterilization.

Typical extractables ⁽⁷⁾

Water at 20°C	< 5 mg / capsule
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⁽⁷⁾ After irradiation or autoclave sterilization.

Nominal EFA

220 cm ² (0.24 ft ²)

Ordering information

Product	Pack quantity	Product code
Supor EX ECV filter in Mini Kleenpak capsule format 6 to 13 mm (¼ to ½ in.) hose barb inlet and outlet connections. Suitable for autoclave/gamma irradiation.	3/pkg	KA02ECP2G
Supor EX ECV filter in Mini Kleenpak capsule format 6 to 13 mm (¼ to ½ in.) hose barb inlet and outlet connections. Supplied pre-sterilized by gamma irradiation.	3/pkg	KA02ECP2S
Supor EX ECV membrane in Mini Kleenpak capsule format 13 to 19 mm (½ to ¾ in.) sanitary flange. Suitable for autoclave/gamma irradiation.	3/pkg	KA02ECP8G
Supor EX ECV membrane in Mini Kleenpak capsule format 13 to 19 mm (½ to ¾ in.) sanitary flange. Supplied pre-sterilized by gamma irradiation.	3/pkg	KA02ECP8S



Fig 4. Supor EX ECV Mini Kleenpak capsule with sanitary flange connection (left) and hose barb connection (right).

Nominal dimensions

Maximum diameter including valves	82 mm (3.2 in.)
Code 2	
Length	105 mm (4.1 in.)
Inlet and outlet connections	6 to 13 mm (¼ to ½ in.) hose barb connections
Code 8	
Length	73 mm (2.9 in.)
Inlet and outlet connections	13 to 19 mm (½ to ¾ in.) sanitary flange connections

Typical clean water flow performance

460 mL/min at 100 mbar differential pressure at 20°C
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Kleenpak Nova capsule

Specifications

Materials of construction

Membrane	Dual-layer hydrophilic PES membrane
Support and drainage	Polypropylene
Core, end caps, adapter	Polypropylene
Cage	Polypropylene with TiO ₂ whitener ⁽⁸⁾
O-ring	Silicone elastomer
Housing bowl	Polypropylene
Housing head	Polypropylene with TiO ₂ whitener ⁽⁸⁾
Sealing technology	Thermal bonding without adhesive

⁽⁸⁾ TiO₂ is an insoluble inorganic mineral filler that does not contribute to organic extractables.



Fig 5. Supor EX ECV Kleenpak Nova 254 mm (10 in.) capsule with in-line style (left) and T-style (right).

EFA

Format	NP1L	NP5L	N(P/T)6	N(P/T)7	N(P/T)8
Nominal filter length	25 mm (1 in.)	127 mm (5 in.)	254 mm (10 in.)	508 mm (20 in.)	762 mm (30 in.)
EFA	0.1 m ²	0.51 m ²	1.04 m ²	2.08 m ²	3.12 m ²

Operating parameters ⁽⁹⁾

Format	NP1L	NP5L	N(P/T)6	N(P/T)7	N(P/T)8
Maximum differential pressure	4.1 bar (60 psi) at 20°C	5.0 bar (72.5 psi) at 40°C	3.0 bar (43.5 psi) at 40°C	3.0 bar (43.5 psi) at 40°C	3.0 bar (43.5 psi) at 40°C
Maximum operating pressure	5.2 bar (75.4 psi) at 20°C	3.0 bar (43.5 psi) at 40°C			
	4.0 bar (58 psi) at 40°C				

⁽⁹⁾ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Typical non-volatile residue (NVR) extractables in water at 20°C ⁽¹⁰⁾

Format	NP1L	NP5L	N(P/T)6	N(P/T)7	N(P/T)8
Post 1 × 60 minute autoclave cycle at 125°C	< 15 mg per capsule	< 75 mg per capsule	< 150 mg per capsule	< 300 mg per capsule	< 450 mg per capsule

⁽¹⁰⁾ Tested on elements after 24 h extraction.

Integrity test values (air test gas, water wet) ⁽¹¹⁾

Format	NP1L	NP5L	N(P/T)6	N(P/T)7	N(P/T)8
Maximum allowable forward flow at 2760 mbar (40 psi)	2.4 mL/min	11 mL/min	21 mL/min	37 mL/min	54 mL/min

⁽¹¹⁾ Values correct at 20°C. Contact Cytiva for multi-element integrity test values or other fluid values and recommended test procedures.

Typical clean water flow performance

Format	NP1L	NP5L	N(P/T)6	N(P/T)7	N(P/T)8
Clean water flow at 100 mbar differential pressure	1.4 L/min	7.6 L/min	17 L/min	34 L/min	51 L/min

Sterilization ⁽¹²⁾

Format	NP1L	NP5L	N(P/T)6	N(P/T)7	N(P/T)8
Autoclave (G option only)	5 × 60 minute cycles at 125°C	5 × 60 minute cycles at 125°C	3 × 60 minute cycles at 125°C	3 × 60 minute cycles at 125°C	3 × 60 minute cycles at 125°C
	1 × 60 minute cycle at 135°C				
Gamma irradiation (G option only)	Maximum of 50 kGy				

⁽¹²⁾ Pre-sterilized Kleenpak Nova capsules must not be re-sterilized. Kleenpak Nova capsules must not be sterilized *in situ* by passing steam under pressure. To retain full water wettability for integrity testing of filter capsules with Supor EX ECV filter media, water wet filter capsules prior to autoclave sterilization.

Nominal dimensions

In-line	NP1L	NP5L	N(P/T)6	N(P/T)7	N(P/T)8
Maximum diameter including valves	154 mm (6.1 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)
Length with hose barb inlet/outlet	N/A	275 mm (10.8 in.)	397 mm (15.6 in.)	644 mm (25.4 in.)	895 mm (35.2 in.)
Length with sanitary inlet/outlet	128 mm (5.0 in.)	213 mm (8.4 in.)	332 mm (13.1 in.)	584 mm (23.0 in.)	834 mm (32.8 in.)
T-Style	N/A	N/A	NT6	NT7	NT8
Maximum diameter including valves	N/A	N/A	240 mm (9.5 in.)	240 mm (9.5 in.)	240 mm (9.5 in.)
Length	N/A	N/A	349 mm (13.7 in.)	598 mm (23.5 in.)	848 mm (33.4 in.)

Ordering information

In-line style

Suitable for autoclave/gamma irradiation

Filter length	Product	Product code
25 mm (1 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and ½ in. hose barb outlet	NP1LUECVP16G
25 mm (1 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP1LUECVP1G
127 mm (5 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and ½ in. hose barb outlet	NP5LUECVP16G
127 mm (5 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP5LUECVP1G
127 mm (5 in.)	Supor EX ECV filter in Kleenpak Nova capsule format ½ in. hose barb inlet and ½ in. hose barb outlet	NP5LUECVP6G
254 mm (10 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP6UECVP1G
254 mm (10 in.)	Supor EX ECV filter in Kleenpak Nova capsule format ½ in. hose barb inlet and ½ in. hose barb outlet	NP6UECVP6G
254 mm (10 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and ½ in. hose barb outlet	NP6UECVP16G
508 mm (20 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP7UECVP1G
762 mm (30 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP8UECVP1G

Supplied pre-sterilized by gamma irradiation.

Filter length	Product	Product code
25 mm (1 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP1LUECVP1S
127 mm (5 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP5LUECVP1S
254 mm (10 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP6UECVP1S
254 mm (10 in.)	Supor EX ECV filter in Kleenpak Nova capsule format ½ in. hose barb inlet and ½ in. hose barb outlet	NP6UECVP6S
762 mm (30 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NP8UECVP1S

T-Style

Suitable for autoclave/gamma irradiation

Filter length	Product	Product code
254 mm (10 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NT6UECVP1G
508 mm (20 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NT7UECVP1G
762 mm (30 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NT8UECVP1G

Supplied pre-sterilized by gamma irradiation.

Filter length	Product	Product code
254 mm (10 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NT6UECVP1S
762 mm (30 in.)	Supor EX ECV filter in Kleenpak Nova capsule format 1 to 1½ in. sanitary flange inlet and 1 to 1½ in. sanitary flange outlet	NT8UECVP1S

Filter cartridges

Specifications

Materials of construction

Membrane	Dual-layer hydrophilic PES membrane
Support and drainage	Polypropylene
Core, end caps, fin, adapter	Polypropylene
Cage	Polypropylene with TiO ₂ whitener ⁽¹³⁾
O-ring	Silicone elastomer
Sealing technology	Thermal bonding without adhesive

⁽¹³⁾ TiO₂ is an insoluble inorganic mineral filler that does not contribute to organic extractables.

Operating parameters⁽¹⁴⁾

Maximum differential pressure	5.0 bar (72.5 psi) at 40°C
(Forward direction)	3.0 bar (43.5 psi) at 80°C

⁽¹⁴⁾ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Sterilization⁽¹⁵⁾

Autoclave	5 × 60 minute cycles at 125°C
<i>In situ</i> steam ⁽¹⁶⁾	5 × 60 minute cycles at 125°C
	1 × 60 minute cycle at 135°C

⁽¹⁵⁾ To retain full water wettability for integrity testing of filter capsules with Supor EX ECV filter media, water wet filter capsules prior to autoclave/steam sterilization.

⁽¹⁶⁾ Maximum differential pressure 300 mbar in forward direction.

Typical NVR extractables in water at 20°C⁽¹⁷⁾

< 150 mg NVR after 24 h extraction (per 254 mm (10 in.) cartridge)

⁽¹⁷⁾ Tested on elements without pre-flushing after 1 × 60 minute autoclave cycle at 125°C.



Fig 6. Supor EX ECV 254 mm (10 in.) filter cartridge with bayonet lock and fin.

Nominal EFA and typical clean water flow performance

Nominal length	EFA	Clean water flow at 100 mbar DP
127 mm (5 in.)	0.51 m ² (5.6 ft ²)	7.6 L/min
254 mm (10 in.)	1.04 m ² (11.2 ft ²)	17 L/min
508 mm (20 in.)	2.08 m ² (22.4 ft ²)	34 L/min
762 mm (30 in.)	3.12 m ² (33.6 ft ²)	51 L/min

Integrity test values (air test gas, water wet)⁽¹⁸⁾

Maximum allowable forward flow 21 mL/min at 2760 mbar (40 psi)

⁽¹⁸⁾ Values for 254 mm (10 in.) cartridges at 20°C. Contact Cytiva for multi-element integrity test values for other filter sizes, or other fluid values and recommended test procedures.

Ordering information

Nominal length	Product	Product code
127 mm (5 in.)	Supor EX ECV filter in cartridge format Cytiva Code 7 double O-ring (silicone elastomer), bayonet lock ⁽¹⁹⁾ and flat top	AB05UECV2PH4
254 mm (10 in.)	Supor EX ECV filter in cartridge format Cytiva Code 7 double O-ring (silicone elastomer), bayonet lock ⁽¹⁹⁾ and fin	AB1UECV7PH4
508 mm (20 in.)	Supor EX ECV filter in cartridge format Cytiva Code 7 double O-ring (silicone elastomer), bayonet lock ⁽¹⁹⁾ and fin	AB2UECV7PH4
762 mm (30 in.)	Supor EX ECV filter in cartridge format Cytiva Code 7 double O-ring (silicone elastomer), bayonet lock ⁽¹⁹⁾ and fin	AB3UECV7PH4

⁽¹⁹⁾ Please contact Cytiva for availability of product with alternative adapter fittings and O-ring materials.

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