

Supor™ EAV

BIOBURDEN CONTROL FILTERS

Supor™ EAV bioburden control filters incorporate a hydrophilic and asymmetric polyethersulfone (PES) membrane to combine superior dirt load capacity for even the finest of particles with a broad pH compatibility. They offer extended service life, as well as very short processing times in the case of high-volume buffers, cell culture media, and supernatants.

In biotechnology, blood product, vaccine, and buffer applications, these membrane benefits mean higher yield, higher process safety, less total filtration time, less filters to change, and less cost.

The features and benefits of Super EAV filter membrane include:

- Low binding PES membrane for maximum transmission of proteins.
- Hydrophilic, controlled asymmetric PES membrane for high microbial and particulate reduction with outstanding service life.
- Bacterial titer reduction in excess of 1×10^6 for *Brevundimonas diminuta*, ensuring low bioburden levels in filtrate regardless of bacterial loading.
- High membrane area with laid-over pleat construction combined with a narrow diameter core.
- Scale up from Mini Kleenpak™ syringe filters and capsules to high-area AB-style cartridges and Kleenpak Nova capsule filters.
- Made without intentionally using PFAS.

Quality standards

- 100% integrity tested.
- Manufactured for use in conformance with cGMP.
- Each filter is fully traceable by individual marked lot and serial number.
- ISO9001 certified quality system.



Fig 1. Supor EAV filter range.

- Meets United States pharmacopeia (USP) biological reactivity test, *in vivo*, for class VI-121°C plastics.
- Certificate of test provided includes:
 - fabrication integrity.
 - materials of constructions.
 - effluent quality for cleanliness, total organic carbon (TOC) and water conductivity, pH and pyrogens.

Supor EAV membrane in Mini Kleenpak syringe filter capsules

Technical specifications

Materials of construction

Filter membrane	PES
Filter housing	Polypropylene (PP)

Operating parameters¹

Maximum operating temperature	2.5 bar (36 psi) at 25°C for 12 hours
and pressure	2.5 bar (36 psi) at 40°C for 6 hours

¹ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Nominal dimensions

Maximum outside diameter	30 mm
Capsule body height	20 mm

Nominal EFA

2.8 cm²

Sterilization

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



Fig 2. Mini Kleenpak syringe filter capsule.

Ordering information

Product	Pack quantity	Product code
Supor EAV in Mini Kleenpak syringe filter capsules	50/pkg	KM2EAVS
Female luer lock inlet and male slip luer outlet connections		

Supor EAV membrane in Mini Kleenpak 20 capsules

Technical specifications

Materials of construction

Filter membrane	Hydrophilic PES
Housing, vent plug, and support material	PP
Filling bell	Polycarbonate
Sealing technology	Thermal bonding

Operating parameters¹

Maximum operating pressure	4.1 bar (60 psi) at 20°C
Minimum operating pressure	1.0 bar (15 psi) at 60°C

¹ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Nominal dimensions

Capsule length	83 mm
Capsule diameter	67 mm

Sterilization

Autoclave	1 cycle at 125°C
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This product is supplied pre-sterilized by gamma irradiation.

Typical hold-up volume

< 2.5 mL

Effective filtration area (EFA)

20 cm²



Fig 3. Mini Kleenpak 20 filter capsule.

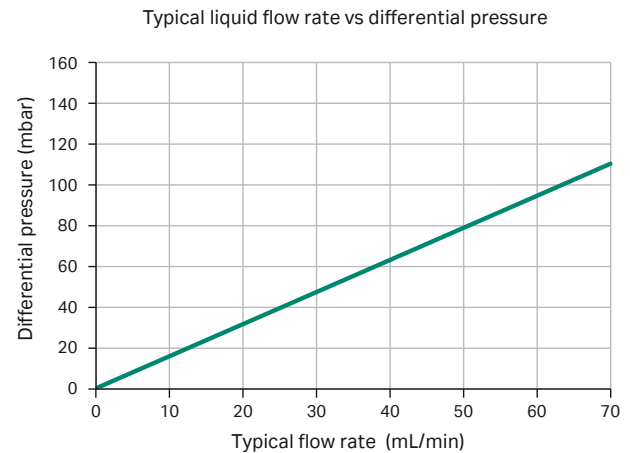


Fig 4. Typical flow rate (mL/min) vs differential pressure (mbar) in water at 20°C.

Ordering information

Connection	Sterilization	Product code
6 to 13 mm stepped hose barb	Pre-sterilized	KM5EAVP2S

Supor EAV membrane in Mini Kleenpak capsules

Technical specifications

Materials of construction

Filter membrane	Hydrophilic asymmetric PES
Support/drainage	Non-woven PP
Capsule shell	PP
Core and end caps	PP
Filling bell	Polycarbonate
Sealing technology	Thermal bonding without adhesives

Operating parameters¹

Maximum operating temperature	40°C
Maximum operating pressure	4.1 bar (60 psi) at 38°C

¹ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Nominal dimensions

Maximum diameter including valves	53 mm (2.1 in.)
¼ to ½ in. (6 to 13 mm) stepped hose barb inlet and outlet	105 mm (4.1 in.)
½ to ¾ in. (13 to 19 mm) sanitary flange inlet and outlet	73 mm (2.9 in.)

Nominal EFA

260 cm ²

Sterilization²

Autoclave	3 × 30 minute cycles at 135°C
Gamma irradiation	Maximum of 50 kGy

² Pre-sterilized Mini Kleenpak capsules must not be re-sterilized. Mini Kleenpak capsules must not be sterilized in situ by passing steam under pressure.

Typical extractables in water at 20°C

< 2 mg per filter capsule

Removal rating³

Nominal rating	0.2 µm
Titer reduction of <i>B. diminuta</i>	1 × 10 ⁶

³ Validated titer reduction of *B. diminuta* at 10⁶ TR (6 LRV), correlated to an integrity test value. Please contact Cytiva for further information.



Fig 5. Mini Kleenpak filter capsule.

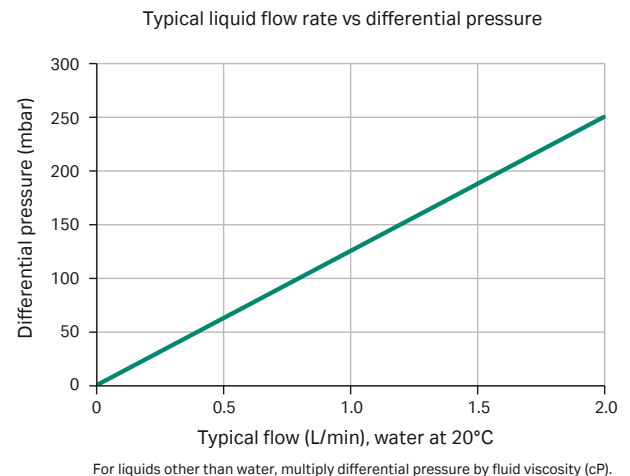


Fig 6. Typical liquid flow rate (L/min) vs differential pressure (mbar) in water at 20°C.

Ordering information⁴

Connection	Sterilization	Product code
¼ to ½ in. (6 to 13 mm) stepped hose barb	Non-sterilized, gamma irradiatable/ autoclavable	KA02EAVP2G
	Pre-sterilized using gamma irradiation	KA02EAVP2S ⁵
½ to ¾ in. (13 to 19 mm) sanitary flange	Non-sterilized, gamma irradiatable/ autoclavable	KA02EAVP8G
	Pre-sterilized using gamma irradiation	KA02EAVP8S

⁴ Three filters per box.

⁵ Provided with filling bell on outlet. It is removable for in-line use.

Supor EAV membrane in Kleenpak capsules

Technical specifications

Materials of construction

Membrane	Hydrophilic PES
Support and drainage layers	PP
End caps, core, and cage	PP
Outer shell	PP

Operating parameters¹

Maximum temperature	40°C
Maximum operating pressure	5.2 bar (75 psi)
Maximum differential pressure	4.1 bar (59 psi)

¹ In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Dimensions

Diameter including valves	109 mm (4.2 in.)
1½ in. sanitary clamp inlet and outlet	174 mm (6.8 in.)
13 mm (½ in.) single hose barb inlet and outlet	210 mm (8.3 in.)
1½ in. sanitary clamp inlet and 13 mm (½ in.) single hose barb outlet	192 mm (7.5 in.)

Sterilization

Autoclave	10 × 60 minute cycles at 125°C, slow exhaust
Gamma irradiation	Maximum dose: 50 kGy

Warning: pre-sterilized Kleenpak assemblies should not be re-sterilized. Kleenpak assemblies must not be sterilized *in situ* by passing steam under pressure. Do not autoclave after use if heat labile chemical contaminants are present on the filter. Filters must be wetted prior to autoclave sterilization.

Typical extractables in water at 20°C

< 10 mg per capsule

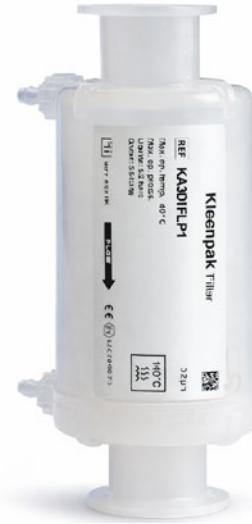


Fig 7. Kleenpak KA3 filter capsule.

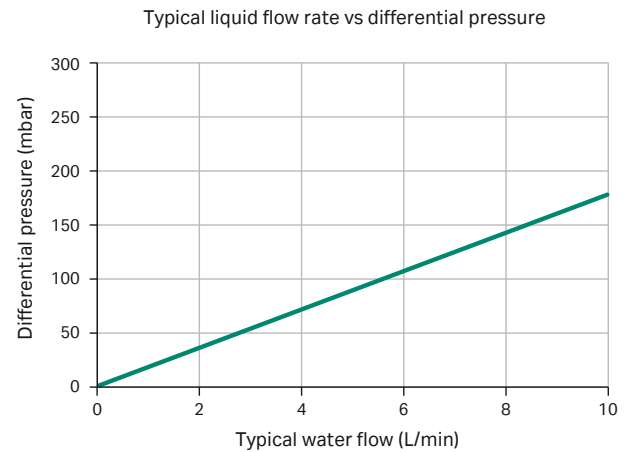


Fig 8. Typical liquid flow rate (L/min) vs differential pressure (mbar) in water at 20°C.

Ordering information

Connection	Sterilization	Product code
1½ in. sanitary clamp	Non-sterilized	KA3EAVP1G
	Pre-sterilized	KA3EAVP1S
13 mm (½ in.) single hose barb	Non-sterilized	KA3EAVP6G
	Pre-sterilized	KA3EAVP6S
1½ in. sanitary clamp inlet and 13 mm (½ in.) single hose barb outlet	Non-sterilized	KA3EAVP16G

Supor EAV membrane in AB style filter cartridges

Technical specifications

Materials of construction

Membrane	PES
Drainage layers	PP
End caps, core, cage ¹ , and fin	PP
Adapter	PP with polyetherimide reinforcing ring
O-rings	Silicone elastomer or ethylene propylene rubber (EPR)

¹ Cage contains TiO₂ whitener which does not contribute to organic extractables.

Operating parameters²

Maximum differential pressure	5.5 bar (80 psi) at 40°C
(Forward direction)	3.0 bar (43.5 psi) at 80°C

² In compatible fluids which do not soften, swell, or adversely affect the filter or its materials of construction.

Sterilization

<i>In situ</i> steam ³	10 × 60 minute cycles at 125°C
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³ With a 30 minute air cooling cycle after each cycle. Maximum differential pressure 300 mbar (4.35 psi) in forward direction; 200 mbar (2.9 psi) in reverse direction. Steam life and service life data were determined by testing under controlled laboratory conditions up to the time indicated. Actual operating conditions may affect the filter's long-term resistance to steam sterilization and hot air service. Filters should be qualified for each process application.

Typical non-volatile residue (NVR) extractables in water at 20°C⁴

< 50 mg NVR after 4 hours extraction (per 254 mm cartridge)

⁴ Tested on elements without pre-flushing after 1 × 60 minute autoclave cycle at 125°C.

Integrity test values (test gas: air, water wet)⁵

Maximum allowable forward flow < 50 mL/min at 2060 mbar (30 psi)

⁵ Pre-flush at 5 L/min per 254 mm (10 in.) module for 10 minutes prior to forward flow testing. Please contact Cytiva for multi-element integrity test values. Values are for one 254 mm (10 in.) filter at 20°C.

Flow rates

Typically 20 L/min/254 mm (10 in.) element at 100 mbar



Fig 9. 257 mm (10 in.) AB style filter cartridge.

Ordering information⁶

Cartridge style	Nominal length	O-ring material	Product code
Double O-ring with bayonet lock and flat end	127 mm (5 in.)	Silicone	AB05UEAV2PH4
Double O-ring with bayonet lock and finned end	254 mm (10 in.)	Silicone	AB1UEAV7PH4
		EPR	AB1UEAV7PJ
	508 mm (20 in.)	Silicone	AB2UEAV7PH4
		EPR	AB2UEAV7PJ
	762 mm (30 in.)	Silicone	AB3UEAV7PH4
		EPR	AB3UEAV7PJ
	1016 mm (40 in.)	Silicone	AB4UEAV7PH4
		EPR	AB4UEAV7PJ

⁶ For availability of specific options, please contact Cytiva or your local Cytiva distributor.

Supor EAV membrane in Kleenpak Nova capsules

Technical specifications

Materials of construction

Membrane	PES
Drainage layers	PP
Support, drainage, core, cage, end caps	PP
Housing bowl	PP
Housing head ¹	PP
O-rings	Silicone elastomer or ethylene propylene and rubber (EPR)

¹ Cage contains TiO₂ whitener which does not contribute to organic extractables.

Operating parameters²

Maximum operating temperature	40°C
Maximum operating pressure	3 barg (43.5 psig) at 40°C

² With compatible fluids which do not soften, swell or adversely affect the product or its materials of construction.

Nominal dimensions

In-line style capsules	NP6	NP7	NP8
Maximum diameter (including valves)	154 mm (6.1 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)
Length with hose barb inlet and outlet	397 mm (15.6 in.)	644 mm (25.4 in.)	895 mm (35.2 in.)
Length with sanitary inlet and outlet	335 mm (13.2 in.)	584 mm (23.5 in.)	834 mm (32.8 in.)
T-style capsules	NT6	NT7	NT8
Maximum diameter (including valves)	240 mm	240 mm	240 mm
Length	349 mm	598 mm	848 mm

Sterilization

Autoclave (maximum)	Single-cycle, 3 × 20 minutes 135°C, for 1 hour
Gamma irradiation	Maximum dosage: 50 kGy

Consult Cytiva for procedures.

Typical non-volatile residue (NVR) extractables in water at 20°C³

< 50 mg NVR after 4 hours extraction (per 254 mm cartridge)

³ Tested on elements without pre-flushing after 1 × 60 minute autoclave cycle at 125°C.

Integrity test values (test gas: air, water wet)⁴

Maximum allowable forward flow < 50 mL/min at 2060 mbar (30 psi)

⁴ Pre-flush at 5 L/min per 254 mm (10 in.) module for 10 minutes prior to forward flow testing. Please contact Cytiva for multi-element integrity test values. Values are for one 254 mm (10 in.) filter at 20°C.

Flow rates

Typically 20 L/min/254 mm (10 in.) element at 100 mbar



Fig 10. Inline and T-style Kleenpak Nova capsules.

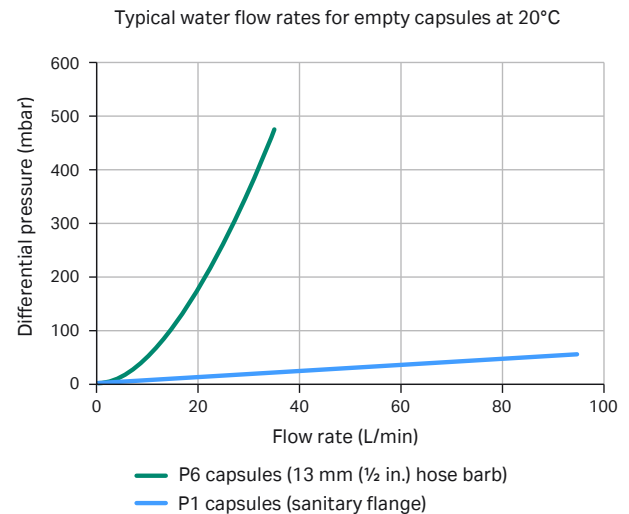
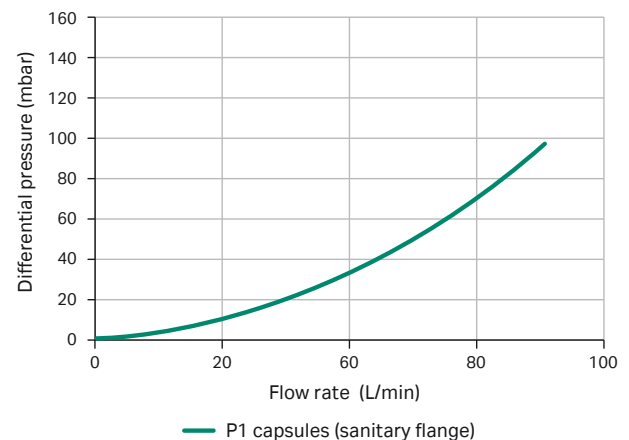


Fig 11. Kleenpak Nova NP style empty capsule, typical water flow rates at 20°C.



Note: Empty Kleenpak Nova capsules for water at 20°C, 1 cP. For other liquids, multiply pressure times the viscosity in centipoise. For complete assembly, including AB-style filter cartridge, add empty capsule and filter cartridge pressure-drop values, contact Cytiva for assistance.

Fig 12. Kleenpak Nova NT style empty capsule, typical water flow rates at 20°C.

Ordering information

In-line style capsule

Filter size	Inlet and outlet connection	Product code	
		Suitable for autoclave or gamma irradiation	Provided pre-sterilized by gamma irradiation
254 mm (10 in.)	1–1½ in. sanitary flange inlet and outlet	NP6UEAVP1G	NP6UEAVP1S
	½ in. single-barb hose barb inlet and outlet	NP6UEAVP6G	NP6UEAVP6S
508 mm (20 in.)	1–1½ in. sanitary flange inlet and outlet	NP7UEAVP1G	NP7UEAVP1S
	½ in. single-barb hose barb inlet and outlet	–	NP7UEAVP6S
762 mm (30 in.)	1–1½ in. sanitary flange inlet and outlet	NP8UEAVP1G	NP8UEAVP1S
	½ in. single-barb hose barb inlet and outlet	NP8UEAVP6G	NP8UEAVP6S

T-style capsule

Inlet and outlet connection	Filter size	Sterilization option	Product code
1–1½ in. sanitary flange inlet and outlet	254 mm (10 in.)	Suitable for autoclave or gamma irradiation	NT6UEAVP1G
		Provided pre-sterilized by gamma irradiation	NT6UEAVP1S
	762 mm (30 in.)	Suitable for autoclave or gamma irradiation	NT8UEAVP1G
		Provided pre-sterilized by gamma irradiation	NT8UEAVP1S

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CY53270-27Apr26-DF