Supor™ EKV

STERILIZING GRADE FILTERS

Supor™ EKV filters are validated sterilizing grade membranes for the cost-effective filtration of a wide range of liquids such as buffers tissue, culture media, and others.

The incorporated polyethersulfone (PES) membrane demonstrates very high compatibility over the whole pH range plus very low protein binding to ensure the maximum transmission of the active ingredients.

The patented Ultipleat™ filter technology, combined with the optimized, built-in asymmetric prefilter for higher flow rates and throughput, allows very compact sizing for easy integration in disposable systems.

Supor EKV filters are available in a wide range of scalable, encapsulated formats which allow fast and easy scale-up, to bring your product to the market faster.

From syringe filters to production scale, all products incorporate the same membrane and identical materials of construction.*

*Except Novasip™ capsules. See materials of construction tables for each product for further details.

Fig 1. Supor EKV filters are available in a range of styles and sizes.

Every Supor EKV pleated filter is:

- Integrity tested during manufacture.
- Identified by lot and serial number for total traceability.
- Supplied with a certificate of test confirming each filter:
  - meets USP Biological Reactivity Test *in vivo* for class VI-121°C plastics.
  - meets cleanliness per USP <788> Particulates in Injectables.
  - is non-fiber-releasing.
  - is non-pyrogenic per USP Endotoxins (< 0.25 EU/mL).
  - meets total organic carbon and water conductivity per USP Purified Water.

Mini Kleenpak syringe filters

Materials of construction	
Filter membrane	Hydrophilic PES
Housing, vent plug and support material	Polypropylene
Sealing technology	Insert molding

Operating parameters [1]	
Maximum operating temperature and pressure	5.4 bar (80 psi) at 20°C 2.1 bar (30 psi) at 60°C

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

Typical hold-up volume	
	< 2.5 mL

Sterilization [2]
Pre-sterilized, subject to a minimum of 25 kGy of gamma-irradiation

[2] Pre-sterilized Mini Kleenpak syringe filters must not be re-sterilized. Mini Kleenpak syringe filters must not be sterilized *in situ* by passing steam under pressure

Nominal dimensions	
Capsule length	21 mm (0.8 in.)
Capsule diameter	29 mm (1.2 in.)

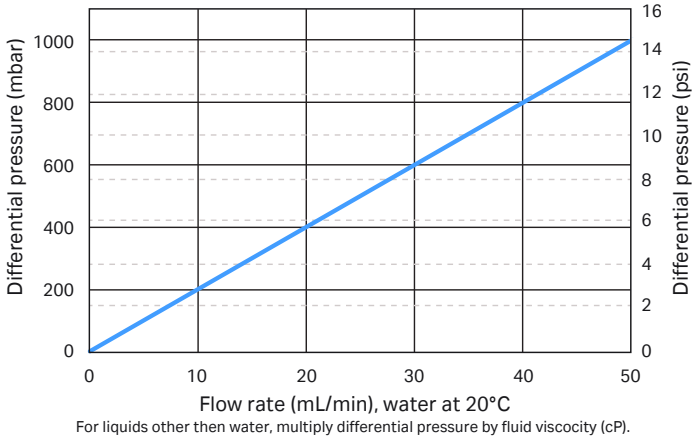
Nominal effective filter area (EFA)	
	2.8 cm^2 (0.43 $in.^2$)

Ordering information [3]

Product code	KM2EKVP	S

Shipping format
Presterilized using gamma irradiation

[3] 50 filters per box



For liquids other then water, multiply differential pressure by fluid viscocity (cP).

Fig 2. Typical liquid flow vs differential pressure.

Mini Kleenpak 20 capsules

Materials of construction	
Filter membrane	Hydrophilic PES
Housing, vent plug and support material	Polypropylene
Filling bell	Polycarbonate
Sealing technology	Thermal bonding without adhesives

Operating parameters [4]	
Maximum operating temperature and pressure	1.4 bar (20 psi) at 22°C

[4] In compatible fluids which do not soften, swell or adversely affect the filter or its materials of construction

Typical hold-up volume	
	< 2.5 mL

Sterilization [5]	
Autoclave	1 × 60 minutes at 125°C

[5] Mini Kleenpak 20 capsules must not be sterilized *in situ* by passing steam under pressure. Water wet Supor EKV capsules prior to steaming to retain full water wettability for integrity testing. Pre-sterilized Mini Kleenpak 20 capsules should not be re-irradiated.

Nominal dimensions	
Capsule length	83 mm (3.3 in.)
Capsule diameter	67 mm (2.7 in.)

Nominal EFA	
	20 cm^2 (3.1 $in.^2$)

Ordering information

Product code **KM5EKVP** **2** ☐

Connection	Code	Shipping format
¼ to ½ in. (6 to 13 mm) stepped hose barb with inner bore to accept female slip luer interior and outer diameter to accept filling bell outlet	G [6]	Non-sterile Gamma irradiatable/ autoclavable
	S [7]	Pre-sterilized using gamma irradiation (maximum 25 kGy)

[6] 3 filters per box
[7] 100 filters per box

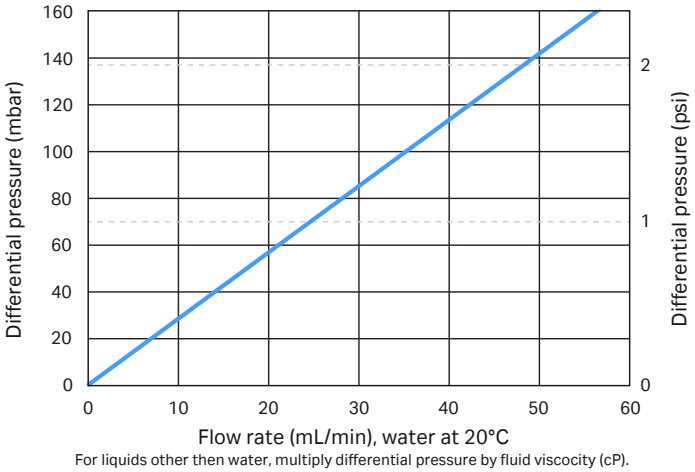


Fig 3. Typical liquid flow vs differential pressure.

Mini Kleenpak capsules

Materials of construction	
Filter membrane	Hydrophilic PES
Support/drainage	Polypropylene
Capsule shell	Polypropylene
Filling bell	Polycarbonate
Sealing technology	Thermal bonding without adhesives

Operating parameters [8]	
Maximum 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

[8] In compatible fluids which do not soften, swell or adversely affect the filter or its materials of construction

Sterilization [9]	
Autoclave	3 × 60 minutes at 140°C
Gamma irradiation	Maximum of 50 kGy

[9] Pre-sterilized Mini Kleenpak capsules must not be re-sterilized. Mini Keenpak capsules must not be sterilized *in situ* by passing steam under pressure. Water wet Supor EKV capsules prior to steaming to retain full water wettability for integrity testing.

Typical extractables in water at 20°C	
	< 5.0 mg per capsule

Nominal dimensions	
Maximum diameter including valves	53 mm (2.1 in.)
Length code 2	105 mm (4.1 in.)
Length code 8	73 mm (2.9 in.)

Nominal EFA	
	220 cm^2 (0.24 ft^2)

Ordering information [10]

Product code **KA02EKVP** ☐ ☐

Code	Connection options	Code	Shipping format
2	¼ to ½ in. (6 to 13 mm) hose-barb	G	Non-sterile Gamma irradiatable/ autoclavable
8	½ to ¾ in. (13 to 19 mm) sanitary flange	S [11]	Pre-sterilized using gamma irradiation (maximum 25 kGy)

[10] 3 filters per box
[11] S grade with P2 connection is provided with filling bell on outlet. It is removable for in-line use

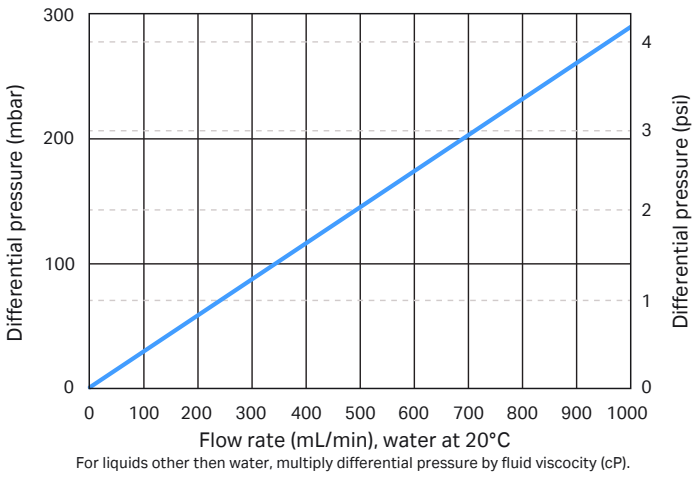


Fig 3. Typical liquid flow vs differential pressure.

Kleenpak capsules

Materials of construction	
Filter membrane	Hydrophilic PES
Support/drainage	Polypropylene
End cap, core and cage	Polypropylene
Capsule shell	Polypropylene
Sealing technology	Thermal bonding without adhesives

Operating parameters [12]	
Maximum temperature	40°C
Maximum operating pressure	5.2 bar (75 psi) at 20°C 4.0 bar (58 psi) at 40°C
Maximum differential pressure	4.0 bar (58 psi) at 40°C

[12] In compatible fluids which do not soften, swell or adversely affect the filter or its materials of construction

Sterilization [13]	
Autoclave	5 × 60 minutes at 125°C slow exhaust
Gamma irradiation	Maximum of 50 kGy

[13] Pre-sterilized Kleenpak capsules must not be re-sterilized. Kleenpak capsules must not be sterilized *in situ* by passing steam. Water wet Supor EKV capsules prior to steaming to retain full water wettability for integrity testing.

Typical extractables in water at 20 °C	
KA1 / KA2	< 5 mg per capsule
KA3	< 10 mg per capsule

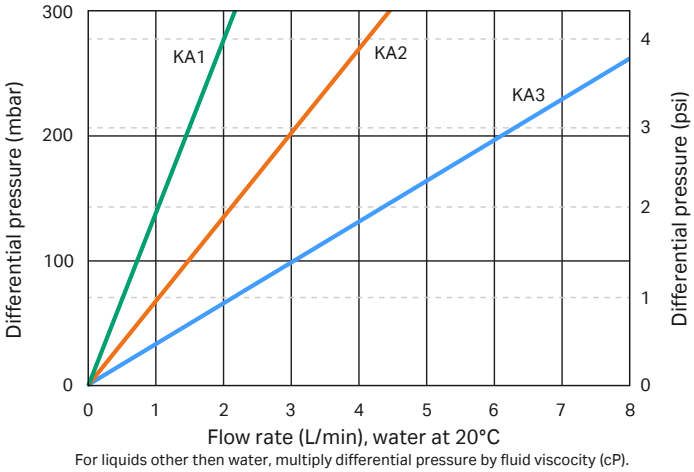
Nominal dimensions	KA1	KA2	KA3
Diameter including valves	94 mm (3.7 in.)	94 mm (3.7 in.)	105 mm (4.1 in.)
Length - code 1	117 mm (4.6 in.)	157 mm (6.2 in.)	174 mm (6.8 in.)
Length - code 6	157 mm (6.2 in.)	197 mm (7.7 in.)	210 mm (8.3 in.)
Length - code 16	137 mm (5.4 in.)	177 mm (7.0 in.)	192 mm (7.6 in.)

Nominal EFA	
KA1	375 cm^2 (0.4 ft^2)
KA2	750 cm^2 (0.8 ft^2)
KA3	1500 cm^2 (1.6 ft^2)

Ordering information

Product code KA ☐ **EKVP** ☐ ☐

Code	Filter area	Code	Connection options	Code	Shipping format
1	375 cm^2	1	1½ in. sanitary flange	G	Non-sterile Gamma irradiatable/ autoclavable
2	750 cm^2	6	½ in. (13 mm) single hose barb		
3	15 000 cm^2	16	1½ in. sanitary flange inlet and ½ in. (13 mm) single hose barb outlet	S	Pre-sterilized using gamma irradiation (maximum 25 kGy)



For liquids other then water, multiply differential pressure by fluid viscocity (cP).

Fig 4. Typical liquid flow vs differential pressure.

Novasip capsule

Materials of construction	
Filter membrane	Hydrophilic PES
Support/drainage	Polypropylene
End cap, core and cage	Polypropylene
Capsule bowl	Polyetherimide
Sealing technology	Thermal bonding without adhesives
Housing head	Polytherimide with TiO_2

Operating parameters [14]	
Maximum temperature	60°C
Maximum operating pressure	6.5 bar (94 psi) at 40°C 2.0 bar (29 psi) at 60°C
Maximum differential pressure	4.1 bar (60 psi) at 60°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 minutes at 125°C slow exhaust
In-line	5 × 60 minutes at 125°C

[15] Water wet Supor EKV capsules prior to steaming to retain full water wettability for integrity testing

Typical extractables in water at 20°C	
	< 10 mg per capsule

Nominal dimensions	
Diameter including valves	123 mm (4.8 in.)
Overall length	157 mm (6.2 in.)

Nominal EFA	
	1500 cm^2 (1.6 ft^2)

Ordering information

Product code **C3EKVP** [1] [ ]

Inlet/outlet connections	Code	Vent/drain connections
1½ in. sanitary flange	Blank	Vent: quick connect and disconnect coupling (compatible with Stäubli fitting) Valve drain: Hose barb for ⅛ in. to ¼ in. (4 to 6 mm) ID tube, with valve
	A	Vent and drain: quick connect and disconnect coupling (Stäubli compatible) with valve
	B	Vent and drain: ½ in. (13 mm) sanitary flange, no valve sanitary clamp

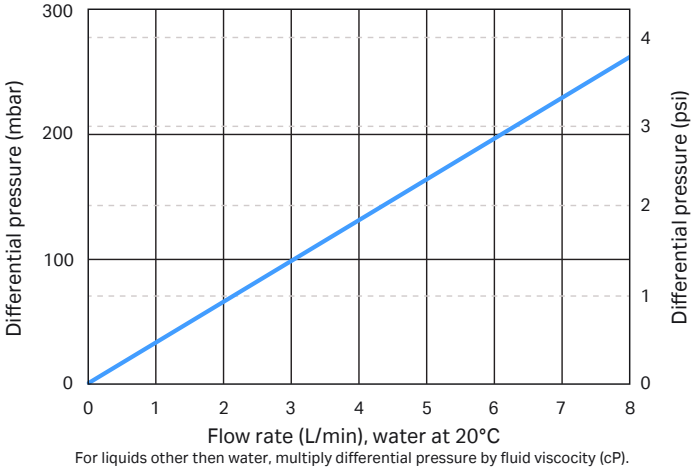


Fig 5. Typical liquid flow vs differential pressure.

Kleenpak Nova capsules

Materials of construction

Filter membrane	Hydrophilic PES
Support/drainage	Polypropylene
Core/end caps	Polypropylene
Cage [16]	Polypropylene
O-rings	Silicone elastomer
Sealing technology	Thermal bonding without adhesives
Housing bowl	Polypropylene
Housing head [16]	Polypropylene

[16] Formulated with TiO_2 whitener which does not contribute to organic extractables

Operating parameters [17]

Maximum temperature	40°C
Maximum operating pressure	3 bar (44 psi) at 40°C
Maximum differential pressure	3 bar (44 psi) at 40°C

[17] In compatible fluids which do not soften, swell or adversely affect the filter or its materials of construction

Sterilization [18]

Autoclave	1 × 60 minutes at 135°C
Gamma irradiation	Maximum of 50 kGy

[18] Pre-sterilized Kleenpak Nova capsules must not be re-sterilized. Kleenpak Nova capsules must not be sterilized *in situ* by passing steam under pressure. Water wet Supor EKV capsules prior to steaming to retain full water wettability for integrity testing.

Typical extractables in water at 20°C [19]

< 25 mg after 4 hours extraction (per 254 mm module)

[19] Tested on elements without pre-flushing

Nominal dimensions

	In-line		
	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/outlet	397 mm (15.6 in.)	644 mm (25.4 in.)	895 mm (35.2 in.)
Length with sanitary inlet/outlet	335 mm (13.2 in.)	584 mm (23.0 in.)	834 mm (32.8 in.)

	T-style		
	NT6	**NT7**	**NT8**
Maximum diameter including valves	240 mm (9.5 in.)	240 mm (9.5 in.)	240 mm (9.5 in.)
Length	349 mm (13.7 in.)	598 mm (23.5 in.)	848 mm (33.4 in.)

Nominal EFA

0.6 m^2 per 254 mm module (6.5 ft^2 per 10 in. module)

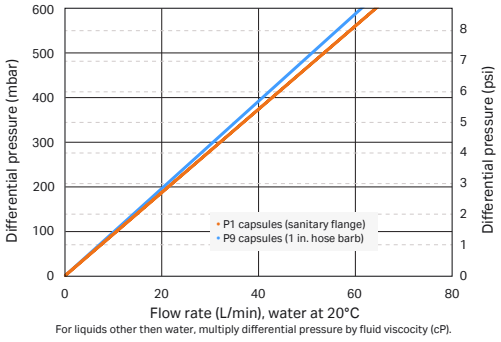


Fig 6. Kleenpak Nova (NP) typical liquid flow vs differential pressure.

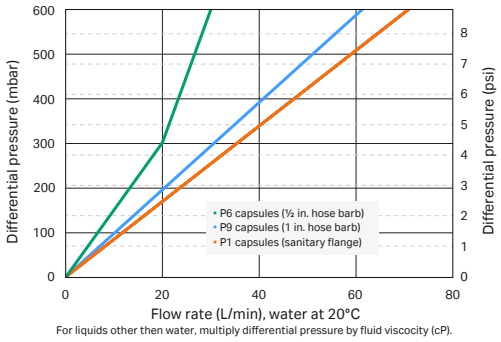


Fig 7. Kleenpak Nova (NT) typical liquid flow vs differential pressure.

Ordering information

Product code N [ ] [ ] **EKVP** [ ] [ ] [ ]

Code	Style
P	In-line
T	T-style

Code	Filter size
6	254 mm (10 in.)
7	508 mm (20 in.)
8	762 mm (30 in.)

Code	Shipping format
G	Non-sterile Gamma irradiatable/ autoclavable
S	Pre-sterilized using gamma irradiation (mimimum 25 kGy)

Code	Vent/drain
Blank	Stäubli vent and stepped hose barb drain
A	Stäubi vent and drain

Code	Connection options
1	1 to 1½ in. sanitary flange inlet and outlet
9	1 in. (25 mm) single barb hose barb inlet and outlet
19	1 to 1½ in. sanitary flange inlet and 1 in. (25 mm) single barb hose barb outlet
6 [1]	½ in. (13 mm) single barb hose barb inlet and outlet
16 [1]	1 to 1½ in. sanitary flange inlet and ½ in. (13 mm) single barb hose barb outlet
1H [2]	1 to 1½ in. sanitary flange inlet and outlet, with ½ in. sanitary port on inlet
1H9 [2]	1 to 1½ in. sanitary flange inlet and 1 in. (25 m) single barb hose barb outlet, with ½ in. sanitary port on inlet

[1] for P-style only
[2] for T-style only

Junior filter cartridges

Materials of construction	
Filter membrane	Hydrophilic PES
Support/drainage	Polypropylene
End cap, core and cage	Polypropylene
Sealing technology	Thermal bonding without adhesives
O-rings	Silicone elastomer

Operating parameters [20]	
Maximum differential pressure	5.2 bar (75 psi) at 40°C

[20] In compatible fluids which do not soften, swell or adversely affect the filter or its materials of construction

Sterilization [21]	
Autoclave	5 × 60 minutes at 125°C, slow exhaust
In situ steam	30 × 60 minutes at 125°C

[21] Water wet Supor EKV capsules prior to steaming to retain full water wettability for integrity testing.

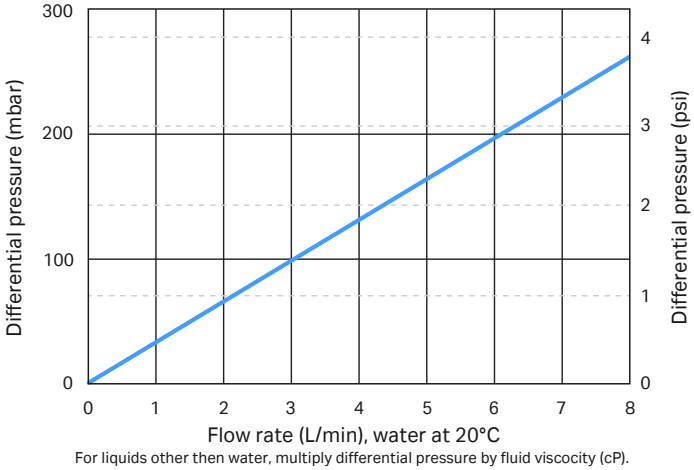
Typical extractables in water at 20°C
< 10 mg per filter

Nominal EFA
1500 cm^2 (1.6 ft^2)

Ordering information

Product code **MCY4440EKVP** **H4**

O-ring material
Silicone elastomer (other material available on request)



For liquids other then water, multiply differential pressure by fluid viscocity (cP).

Fig 8. Typical liquid flow vs differential pressure.

Filter cartridges

Materials of construction	
Filter membrane	Hydrophilic PES
Support/drainage	Polypropylene
Core/end caps	Polypropylene
Cage	Polypropylene with TiO_2 (white colored)
O-rings	Silicone elastomer
Sealing technology	Thermal bonding without adhesives

Operating parameters [22]	
Maximum differential pressure (forward direction)	5.5 bar (80 psi) at 40°C 4.0 bar (58 psi) at 80°C
Maximum differential pressure (reverse direction)	2.0 bar (30 psi) at 40°C

[22] In compatible fluids which do not soften, swell or adversely affect the filter or its materials of construction

Sterilization [23]	
Autoclave	30 × 60 minutes at 125°C slow exhaust
In situ steam	30 × 60 minutes at 125°C 5 × 60 minutes at 142°C

[23] Water wet Supor EKV capsules prior to steaming to retain full water wettability for integrity testing.

Typical extractables in water at 20°C [24]
<25 mg after 4 hours extraction (per 254 mm module)

[24] Tested on elements without pre-flushing

Integrity test values	
Values for 254 mm (10 in.) filter at 20°C	
Maximum allowable forward flow (air test gas)	Water wet 17 mL/min at 2760 mbar (40 psi)

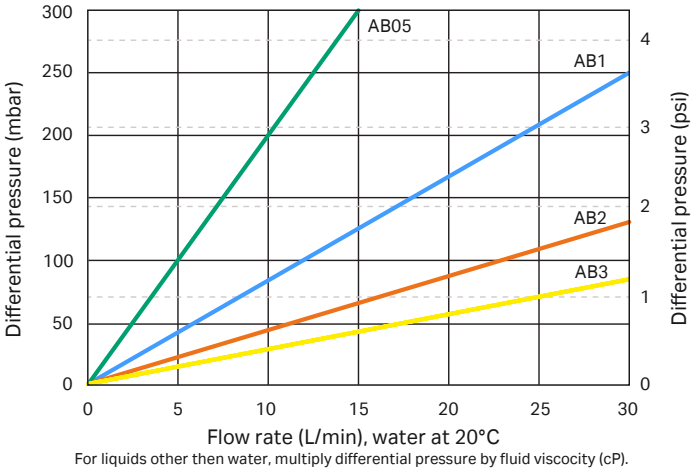
Nominal EFA [25]
0.60 m^2 per 254 mm module (6.5 ft^2 per 10 in. module)
0.26 m^2 per 125 mm module (2.8 ft^2 per 5 in. module)

[25] 125 mm [5 in.] filters are standard pleated

Ordering information

Product code AB [ ] EKV [ ] P H4

Code	Nominal length	Code	Adapter style	O-ring material
05	125 mm (5 in.)	7	Code 7 double O-ring bayonet lock and fin	Silicone elastomer (other materials available on request)
1	254 mm (10 in.)			
2	508 mm (20 in.)	2	Code 2 double O-ring bayonet lock, no fin (code 05 only)	
3	762 mm (30 in.)			



For liquids other then water, multiply differential pressure by fluid viscocity (cP).

Fig 9. Typical liquid flow vs differential pressure.

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