Supor™ EKV

STERILIZING GRADE FILTERS

Supor™ EKV filters are validated sterilizing grade filters designed for the filtration of a wide range of liquids. Typical applications include growth media, bioreactor feeds, buffers and intermediates.

Supor EKV filters have high flow rates and throughput due to an asymmetric polyethersulfone (PES) membrane with a built-in prefilter layer, supported in some formats via a laid-over pleat pack geometry. This allows compact filter designs for integration into single-use systems.

Supor EKV filters are available in a wide range of scalable, encapsulated formats allowing 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 materials of construction.*

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).

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



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

Mini Kleenpak syringe filters

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

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

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

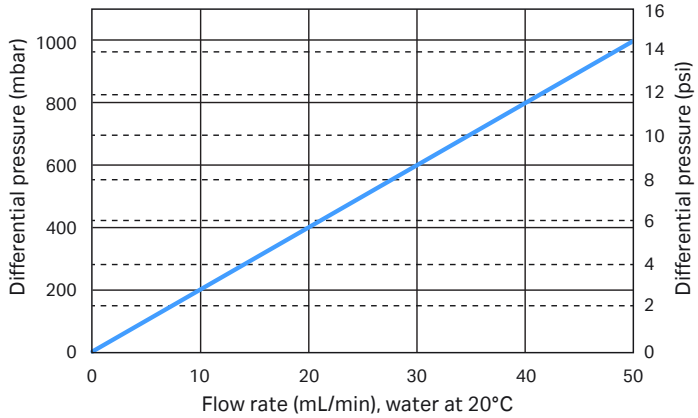
Typical hold-up volume	< 2.5 mL

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

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 $in.^2$)



For liquids other than water, multiply differential pressure by fluid viscosity (cP).

Fig 2. Typical liquid flow vs differential pressure.

Ordering information

50 filters per box

Product code	**KM2EKVS**

Shipping format
Presterilized using gamma irradiation

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	
Maximum operating temperature and pressure	1.4 bar (20 psi) at 22°C

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	
Autoclave	1 × 60 min at 125°C

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 $in.^2$)

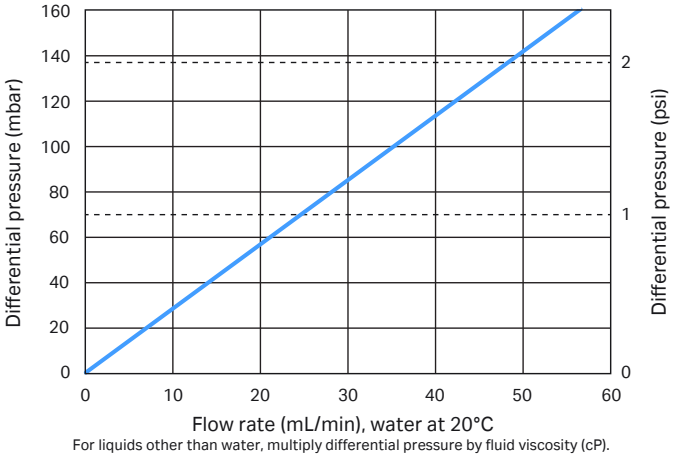


Fig 3. Typical liquid flow vs differential pressure.

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[1]	Non-sterile Gamma irradiatable or autoclavable
	S[2]	Pre-sterilized using gamma irradiation

[1] 100 filters per box.
[2] 3 filters per box.

Mini Kleenpak capsules

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

Operating parameters	
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

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

Sterilization	
Autoclave	3 × 60 min at 135°C
Gamma irradiation	Maximum of 50 kGy

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	< 8.0 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	200 cm^2 (0.22 ft^2)

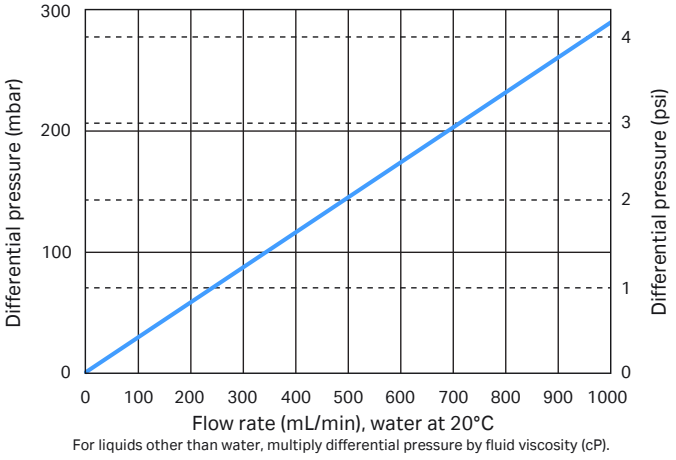


Fig 4. Typical liquid flow vs differential pressure.

Ordering information

3 filters per box.

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 or autoclavable
8	½ to ¾ in. (13 to 19 mm) sanitary flange	S[3]	Pre-sterilized using gamma irradiation

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

Kleenpak capsules

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

Operating parameters	
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

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

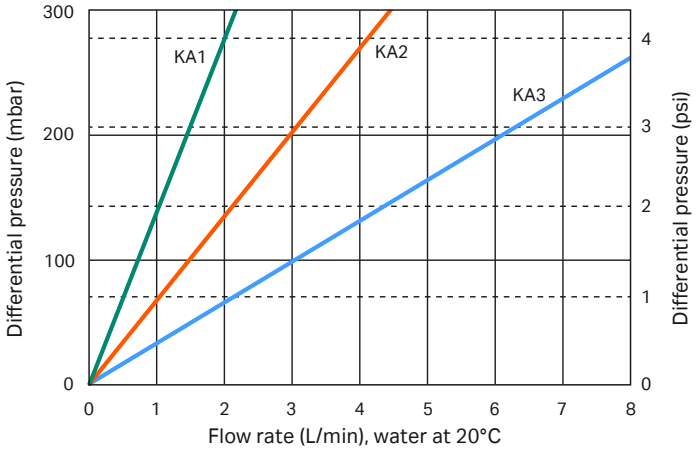
Sterilization	
Autoclave	5 × 60 min at 125°C slow exhaust
Gamma irradiation	Maximum of 50 kGy

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 and 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)



For liquids other than water, multiply differential pressure by fluid viscosity (cP).

Fig 5. Typical liquid flow vs differential pressure.

Ordering information

Product code KA [ ] **EKVP** [ ] [ ]

Code	Filter area	Code	Connection options	Code	Shipping format
1	375 cm^2	1	1 to 1 ½ in. sanitary flange	G	Non-sterile Gamma irradiatable or autoclavable
2	750 cm^2	6	½ in. (13 mm) single hose barb		
3	1500 cm^2	16	1 to 1 ½ in. sanitary flange inlet and ½ in. (13 mm) single hose barb outlet	S	Pre-sterilized using gamma irradiation

Novasip capsule

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

Operating parameters	
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

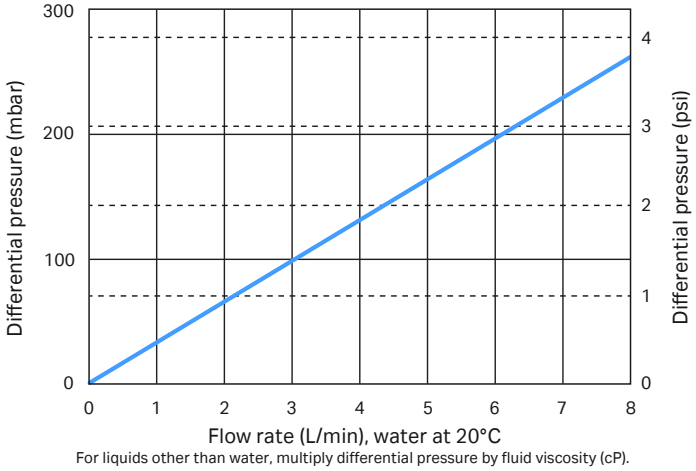
In compatible fluids which do not soften, swell or adversely affect the filter or its materials of construction.

Sterilization	
Autoclave	5 × 60 min at 125°C slow exhaust
In-line	5 × 60 min at 125°C

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)



For liquids other than water, multiply differential pressure by fluid viscosity (cP).

Fig 6. Typical liquid flow vs differential pressure.

Ordering information

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

Inlet/outlet connections	Code	Vent/drain connections
1 to 1 ½ 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) i.d. 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

Kleenpak Nova capsules

Materials of construction

Filter membrane	Hydrophilic PES
Support and drainage	Polypropylene
Core and end caps	Polypropylene
Cage[1]	Polypropylene
O-rings	Silicone elastomer
Sealing technology	Thermal bonding without adhesives
Housing bowl	Polypropylene
Housing head[1]	Polypropylene

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

Operating parameters

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

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

Sterilization

Autoclave	All: 3 × 60 min at 125°C NP5: 1 × 60 min at 135°C
Gamma irradiation	Maximum of 50 kGy

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

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

Tested on elements without pre-flushing.

Nominal dimensions

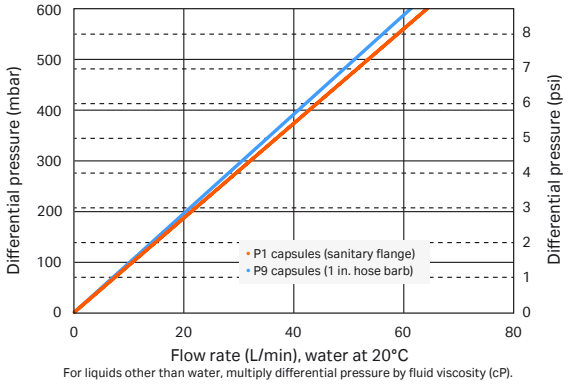
In-line 1	NP5	NP6	NP7	NP8
Maximum diameter including valves	154 mm (6.1 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)
Length with hose barb inlet/outlet	275 mm (10.8 in.)	397 mm (15.6 in.)	644 mm (25.4 in.)	895 mm (35.2 in.)
Length with sanitary inlet/outlet	213 mm (8.4 in.)	335 mm (13.2 in.)	584 mm (23.0 in.)	834 mm (32.8 in.)

T-style capsules	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

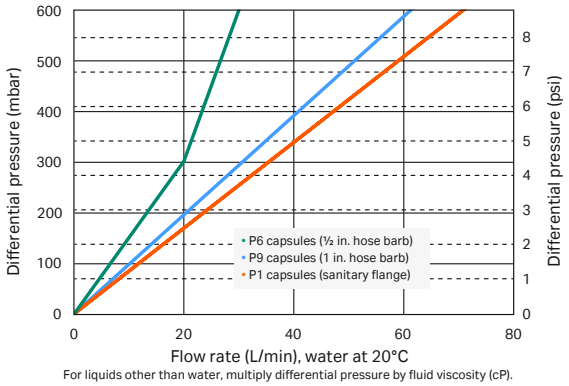
0.6 m^2 per 254 mm module (6.5 ft^2 per 10 in. module)

0.26 m^2 per 127 mm module (2.8 ft^2 per 5 in. module)



For liquids other than water, multiply differential pressure by fluid viscosity (cP).

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



For liquids other than water, multiply differential pressure by fluid viscosity (cP).

Fig 8. 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
5	127 mm (5 in.)
6	254 mm (10 in.)
7	508 mm (20 in.)
8	762 mm (30 in.)

Code	Shipping format
G	Non-sterile Gamma irradiatable or autoclavable
S	Pre-sterilized using gamma irradiation

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

Code	Connection options
1	1 to 1½ in. (25 to 38 mm) sanitary flange inlet and outlet
9	1 in. (25 mm) single barb hose barb inlet and outlet
19	1 to 1½ in. (25 to 38 mm) sanitary flange inlet and 1 in. (25 mm) single barb hose barb outlet
6[2]	½ in. (13 mm) single barb hose barb inlet and outlet
16[2]	1 to 1½ in. (25 to 38 mm) sanitary flange inlet and ½ in. (13 mm) single barb hose barb outlet

[2] P-style only

Junior filter cartridges

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

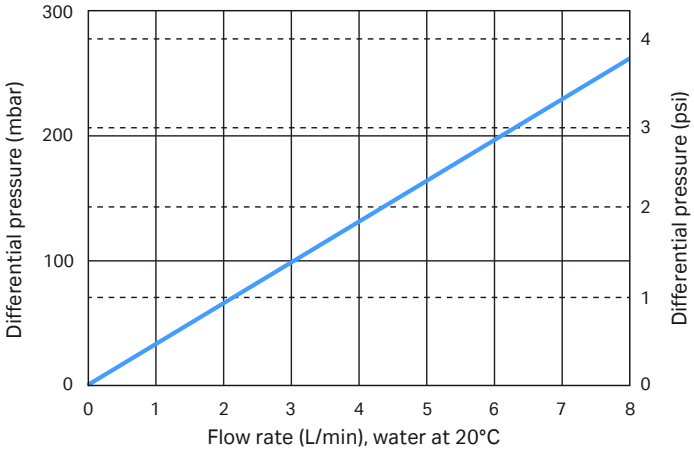
Operating parameters	
Maximum differential pressure	5.2 bar (75 psi) at 40°C

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

Sterilization	
Autoclave	5 × 60 min at 125°C, slow exhaust
In situ steam	30 × 60 min at 125°C

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)



For liquids other than water, multiply differential pressure by fluid viscosity (cP).

Fig 9. Typical liquid flow vs differential pressure.

Ordering information

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

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

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	
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

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

Sterilization	
Autoclave	30 × 60 min at 125°C slow exhaust
In situ steam	30 × 60 min at 125°C 5 × 60 min at 142°C

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

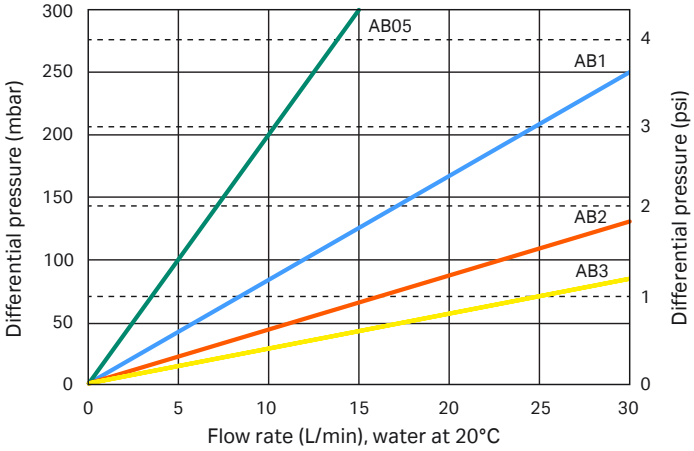
Typical extractables in water at 20°C
< 25 mg after 4 hours extraction (per 254 mm module)

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
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)

125 mm (5 in.) filters are standard pleated.



For liquids other than water, multiply differential pressure by fluid viscosity (cP).

Fig 10. Typical liquid flow vs differential pressure.

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.)			

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