cobetter®
filtration

ViruClear VF Plus

Virus Removal Filter

◀ Viruclear VF Plus Plastic-housing cassette

ViruClear VF Plus

New Generation Reliable & Effective Virus Removal Filter

▲ Viruclear VF Plus Silicone Cassette

At present, virus removal filtration is regarded as a very effective and robust step for virus retention and has been widely applied in biologics manufacturing due to advantages such as simple and gentle operation, clear mechanism and ease of validation. The virus removal filters with a cut-off pore size of 20 nm are the most widely used products as it provides high retention assurance toward minute viruses.

Virus retention is basically achieved by size exclusion mechanism. The pore size of membrane retention layer is larger than the size of feed stream proteins yet smaller than the size of viruses. In this way, feed stream proteins are able to pass through the membrane while the viruses are retained on the upper surface or inside the porous structure. High levels of virus retention can thus be reached for both parvoviruses and viruses of larger size, which exactly takes the benefited of the size exclusion mechanism.

Cobetter's new generation virus removal filter Viruclear VF Plus adopts PES membrane with a continuous gradient structure. It provides sufficient space for retention of the foulant which are basically protein aggregates. The pore size on the downstream side of the membrane is uniformly distributed around 20 nm that endows the membrane with robust virus retention even under the condition of process interruption or depressurization.

Viruclear VF Plus further develops the hydrophilicity of the PES membrane. Progress in the meantime are made toward optimization of the membrane pore configuration. The upgradation gives improved mass capacity and adaptability across a broad range of typical protein feed streams, thus brings increased process economics. Viruclear VF Plus also enables robust linear scale-up so as to ease the process design and optimization.

Features

- PES membrane has a unique surface hydrophilic improvement,which endows virus removal membranes with high filtration capacity and product yield
- Asymmetric membrane structure, high porosity, which endows the membrane with high flux
- Water flux greater than 500LMH@30psi 25°C
- Narrow pore size distribution gives the membrane good separation performance
- Robust parvovirus removal capacity
- Model virus removal rate ⩾ 4.0log
- Robust virus removal capacity even under process interruption
- Good chemical stability
- Easy to install, use and test

Typical Application

Monoclonal antibody

Bispecific antibody

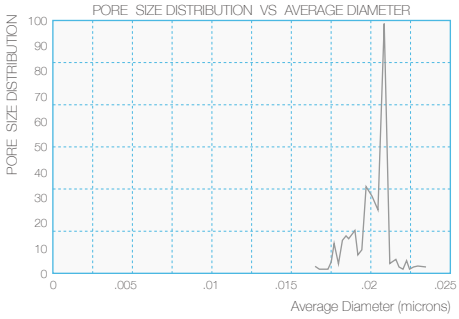
Fc-fusion protein

Nanobody

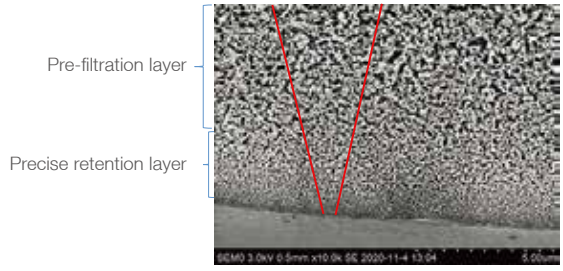
Recombinant Covid-19 vaccine

Small-molecule recombinant proteins (< 180 kD), etc.

Virus Removal Filter Membrane Pore Size Distribution



Viruclear VF Plus membrane pore size distribution



SEM image of virus removal filter membrane

Product Specifications

	Product Specifications	Effective Filtration Area	Application
Application	DS series	2.5cm²	For process development and virus clearance validation research
	Membrane	4.1cm²	For process development and virus clearance validation research
	Pilot device	0.017/0.07/0.22m²	≤200L
	Production device	0.50/1.50m²	>200L
Nylon Pre-filtration	DS series	3.4cm²	For process development and virus clearance validation research
	Pilot device	0.025/0.12/0.30m²	≤200L
	Production device	0.60/1.20/1.8m²	>200L
Depth Pre-filtration	DS series	4.5cm²	For process development and virus clearance validation research
	Pilot device	0.027/0.15/0.4m²	≤200L
	Production device	0.92/1.1m²	>200L

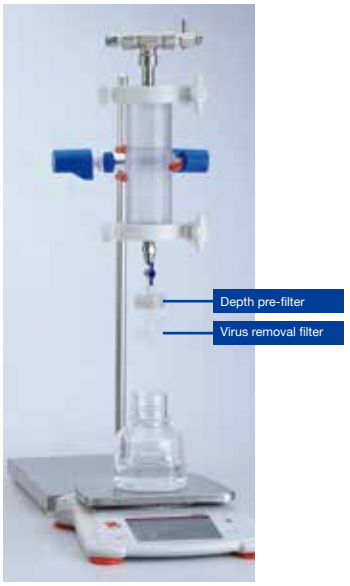
Material of Products

	Specifications	Material of Membrane	Format	Shell	Effective Filtration Area	Accessories Material
Removal Virus	DS series	PES	Syringe filter	Polypropylene	2.5cm²	-
	Pilot device	PES	Disposable capsule filter	Polyvinylidene fluoride	0.017/0.07/0.22m²	Silicone、Polypropylene
			Membrane Cassette	Silicone	0.018/0.08/0.26m²	Polypropylene
	Production device	PES	Disposable capsule filter	Polyvinylidene fluoride	0.50/1.50m²	Silicone、Polypropylene
			Membrane Cassette	Silicone	0.50/1.50m²	Polypropylene
Nylon Pre-filtration	DS series	Nylon	Syringe filter	Polypropylene	3.4cm²	Silicone
	Pilot device	Nylon	Disposable capsule filter	Polypropylene	0.025/0.12/0.30m²	Silicone
	Production device	Nylon	Disposable capsule filter	Polypropylene	0.60/1.20/1.80m²	Silicone
Depth Pre-filtration	DS series	Cellulose, diatomite	Syringe filter	Polypropylene	4.5cm²	Silicone
	Pilot device	Cellulose, diatomite	Disposable capsule filter	Polypropylene	0.027/0.15/0.4m²	Silicone
	Production device	Cellulose, diatomite	Disposable capsule filter	Polypropylene	0.92/1.1m²	Silicone

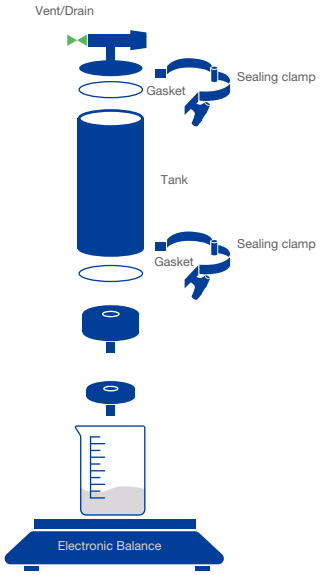
Virus Removal Filtration Process Development Service

Our technical engineers will work with customers to optimize the process parameters during the process development of virus removal filtration to obtain to obtain a robust, efficient and economical filtration operation.

Virus Removal Filterability Testing Device



Virus Removal Assembly Sketch Map



Optimization Strategy of Virus Removal Filtration Process

Replace the traditional microporous pre-filter with the adsorption-type nylon membrane filter PNY

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Adopt Viruclear PDT depth pre-filter.

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Increase the effective filtration area of PNY or PDT.

↓

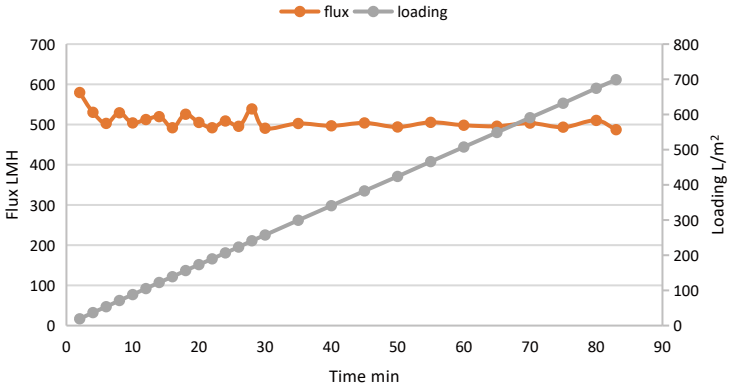
Dilute, and reduce protein concentration.

↓

Optimize pH and conductivity of solution, and add stabilizer.

Customer Application Case

Test conditions: mAb concentration 16.4 g/L; constant pressure at 30 psi; series filtration with Viruclear PDT depth filter; post-filtration buffer flush volume: 30L/m^2.



Filtration kit	Viruclear PDT + VF Plus
Filtration time (min)	83
Flux decay at filtration endpoint(%)	8
Capacity at filtration endpoint L/m^2	698.8
Average flux(LMH)	505
Protein recovery(%)	99

Order Information

Viruclear PDT Virus Removal Pre-Filter (Depth Filter)

V P	D T	□□	□□	P
Application	Material of Membrane	Type	Quantity/Package	Market
VP Viruclear PDF	DT Depth filter	DS Syringe filte ($4.5cm^2$)	N9 Only for syringe filter, 9pcs / pk N1 1pcs / pk	P Biopharmaceutical

Viruclear PDT Virus Removal Pre-Filter (Depth Filter)

V P	D T	□□	□□	P
Application	Material of Membrane	Type	Quantity/Package	Market
VP Viruclear PDF	DT Depth filter	L4 L08TT($0.027m^2$) SA CSCD($0.15m^2$) SC CSCE($0.4m^2$)	N1 1pcs / pk	P Biopharmaceutical

Viruclear PDT Virus Removal Pre-Filter (Depth Filter)

V P	D T	□□	□□	P
Application	Material of Membrane	Type	Quantity/Package	Market
VP Viruclear PDF	DT Depth filter	SB CSCB($0.92m^2$) SM CSCM($1.1m^2$)	N1 1pcs / pk	P Biopharmaceutical

Order Information

Viruclear PNY Virus Removal Pre-Filter (Nylon Filter)

V P	N Y	□□	□□	P
Application	Material of Membrane	Type	Quantity/Package	Market
VP Viruclear PNY	NY mNylon, Modified nylon membrane	DS Syringe filte (3.4cm^2)	N9 Only for syringe filter, 9pcs / pk N1 1pcs / pk	P Biopharmaceutical

Viruclear PNY Virus Removal Pre-Filter (Nylon Filter)

V P	N Y	□□□	□□	□□	P
Application	Material of Membrane	Type	Type	Quantity/Package	Market
VP Viruclear PNY	NY mNylon, Modified nylon membrane	C02 250cm^2 L02 0.12m^2 L05 0.30m^2	TT 3/4" TC	N1 1pcs / pk	P Biopharmaceutical

Viruclear PNY Virus Removal Pre-Filter (Nylon Filter)

V P	N Y	□□□	□□	□□	P
Application	Material of Membrane	Type	Type	Quantity/Package	Market
VP Viruclear PNY	NY mNylon, Modified nylon membrane	L10 0.60m^2 L20 1.20m^2 L30 1.80m^2	SS 1 1/2" TC	N1 1pcs / pk	P Biopharmaceutical

Order Information

Viruclear VF Plus Virus Removal syringe filter with PP shell

V F	P	M P	□□	□□	P
Application		Material of Membrane	Type	Quantity/Package	Market
VF Virus filtration	P Plus	MP mPES, Hydrophilic modified PES membrane	DS Syringe filter (2.5cm²)	N9 Only for syringe filter, 9pcs/pk (3 batchs, 3 pcs per batch) N1 1pcs / pk	P Biopharmaceutical

Viruclear VF Plus Virus Removal membrane filter

V F	P	M P	□□	□□	P
Application		Material of Membrane	Type	Membrane Diameter	Market
VF Virus filtration	P Plus	MP mPES, Hydrophilic modified PES membrane	FS Circular membrane, should be installed in holder to use	25 Only for membrane filter, diameter 25mm	P Biopharmaceutical

Viruclear VF Plus Virus Removal capsule filter with PVDF shell

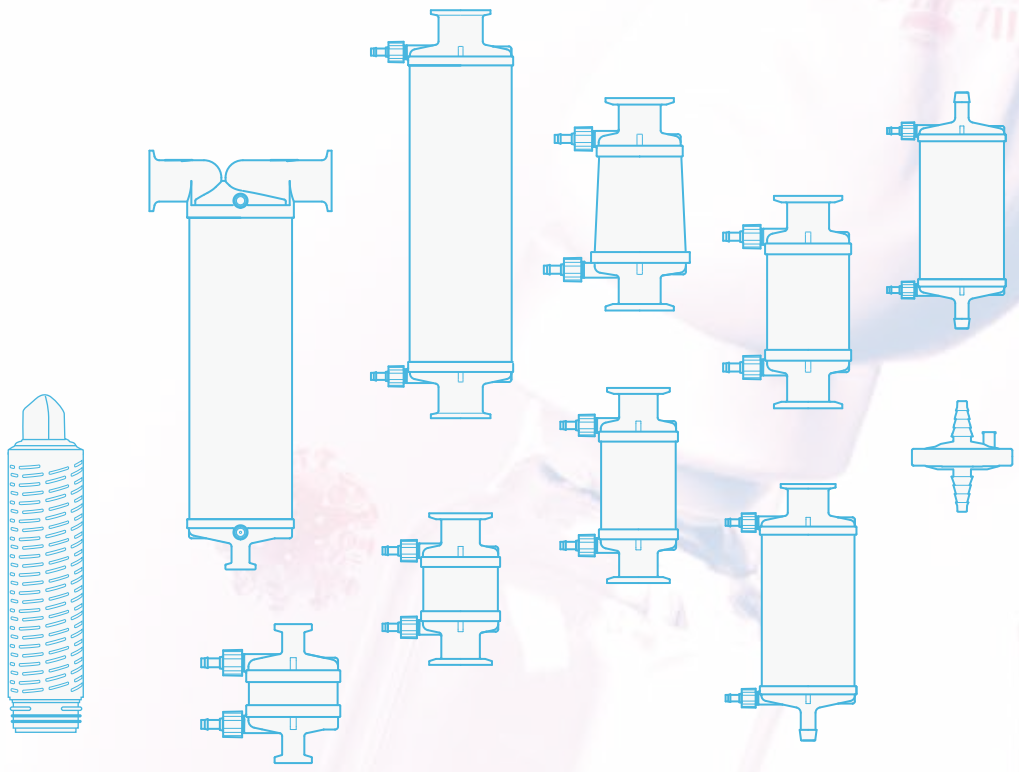
V F	P	E	S	□□	□□□	□□	P
Application		Material of Membrane	Configuration Code	Type	Filtration Area	Quantity/Package	Market
VF Virus filtration	P Plus	E PES (same asmPES)	S Standard	LA Lab (0.017m² & 0.07m²) FL Flow (0.22m² 0.50m² & 1.50m²)	002 0.017m² 008 0.07m² 026 0.22m² 050 0.50m² 150 1.50m²	N1 1pcs / pk	P Biopharmaceutical

Viruclear VF Plus Virus Removal membrane cassettes

V F	P	M P	□□	□□	P
Application		Material of Membrane	Type	Quantity/Package	Market
VF Virus filtration	P Plus	MP mPES, Hydrophilic modified PES membrane	A1 Pilot device 1 (0.018m²) A2 Pilot device 2 (0.08m²) B1 Amplification device 1 (0.26m²) B2 Amplification device 2 (0.5m²) B3 Amplification device 3 (1.5m²)	N1 1pcs / pk	P Biopharmaceutical

Our Mission

Through Excellent Products & Sustainable Innovative Solutions,
We Help Customers Solve Process Problems & Increase Yield.



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Please contact us for more information
Hangzhou Cobetter Filtration Equipment Co.,Ltd.

Sales Add 13-18 F, Building 1, Zicheng International Innovation Center,
No.39 Jincheng Road, Xiaoshan District, Hangzhou 311215, China

Factory Cobetter Park, Heshang New Material Industrial Park,
Xiaoshan District, Hangzhou 311265, China

Tel +86 400-070-4266
Fax +86-571-87704256
www.cobetterfiltration.com