

LifeASSURE[®] EMC Filter Cartridges

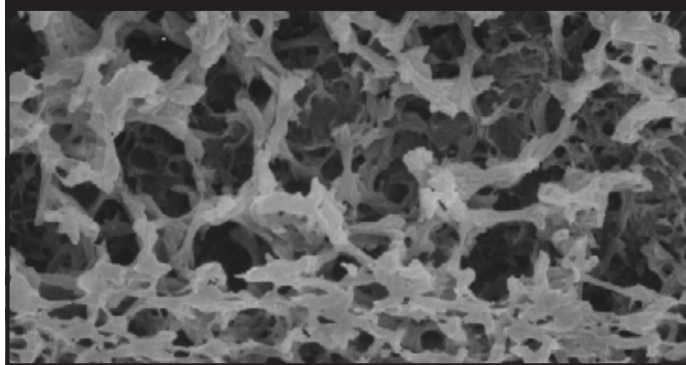


LifeASSURE EMC filter cartridges are highly retentive naturally hydrophilic Nylon 6,6 filter elements designed to meet the exacting requirements of DI water, critical parts cleaning, photoresists, and chemical applications. Utilizing CUNO's FlexN[™] Multi-Zone membrane⁽¹⁾ and Advanced Pleat Technology[™] (APT)⁽²⁾ construction, LifeASSURE EMC filter cartridges provide superior flow characteristics with minimal pressure drop. Increasing flow while maintaining filter efficiency results in particle

specifications being achieved in less time. This decrease in processing time results in lower total filtration costs – reduced energy consumption, pump wear, and labor.

The naturally hydrophilic Nylon 6,6 membrane in an all virgin polypropylene construction, provides low extractables, increased filter life, and superior contaminant removal as compared to other membrane cartridges. LifeASSURE EMC filter cartridges are ideally suited for DI water, critical parts cleaning, photoresists, and other UHP chemical applications where superior downstream cleanliness and high efficiency contaminant removal at 0.1, 0.2, 0.45, 0.65, and 0.80 µm are required.

Figure 1. - SEM Showing the Multi-Zone Structure



Applications

DI Water	Photoresists
Critical Parts Cleaning	Ultra High Purity Chemicals
Plating Solutions	TFT- LCD
M.E.M.S.	FPD
O.L.E.D.s	Fuel Cells

Features	Benefits
■ Multi-Zone Naturally Hydrophilic Nylon 6,6 Membrane	■ No IPA pre-wetting and system flushing required – eliminates a potential source of contamination and chemical interaction, while reducing downtime and hazardous waste disposal ■ Reduces potential for microbubble formation by not dewetting in outgassing fluids unlike naturally hydrophobic membranes such as Polypropylene, Polyethylene, and PTFE ■ Enhanced contaminant removal capacity results in longer filter lifetime ■ Economic alternative to PTFE and UPE filter cartridges
■ Advanced Pleat Technology[™] Construction	■ Superior flow characteristics in a compact design reduces the number of required filters ■ Increased flow rates provide faster bath clean-up, reduced energy consumption, and reduced pump wear ■ Provides a low differential pressure to minimize microbubble formation ■ Increased throughput and filter lifetime which lowers cost-of-ownership
■ Low Cartridge Extractables	■ Excellent downstream cleanliness out of the package unlike other filter materials which can extract ionic, organic, and metallic contaminants

(1) US Patents 6,056,529; 6,090,441; 6,264,044; 6,267,916; 6,280,791 (2) US Patent 6,315,130

FlexN Multi-Zone Membrane Technology

LifeASSURE EMC filter cartridges incorporate CUNO's advanced FlexN Multi-Zone membrane technology to maximize contaminant holding capacity while maintaining particle removal efficiency. FlexN membrane creates a multi-zone membrane that consists of a higher porosity (more open) zone on the upstream section and a lower porosity (tighter) section on the downstream side. The higher porosity zone on the upstream side provides effective pre-filtration of large particles resulting in higher contaminant removal capacity and increased filter life-time. The lower porosity zone on the downstream section provides a sharp retention cut-off for the specified pore size rating. As shown in SEM micrograph (Figure 1) the multi-zone structure enhances the surface area, lowers pressure drop, and increases contaminant holding capacity and filter lifetime thereby eliminating the need for more costly filters constructed with a double layer of membrane.

Normally a small amount of gel contaminants can be found in DI water, photoresists, and chemicals. Their removal from these fluids is highly dependent on differential pressure across the filtration system. Since, these gels are deformable; they can extrude through a filter at high differential pressures. At low differential pressures, the forces that would deform gels are correspondingly lower and the gels are retained by the membrane media. CUNO has been able to maximize filtration surface area, which assures both a low inlet pressure to the pump, and low differential pressure, making it ideal for gel removal. The increase in filtration surface area is achieved by using Advanced Pleat Technology construction.

Figure 2. - Conventional pleat design

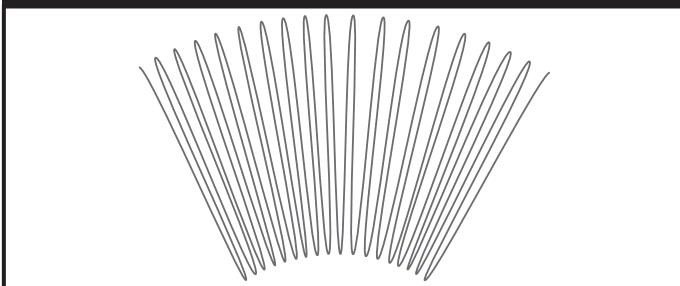
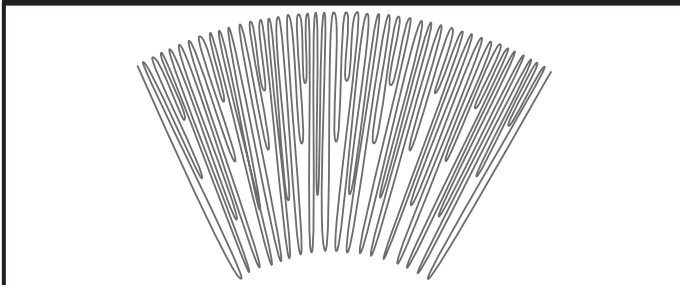


Figure 3. - Advanced Pleat Technology

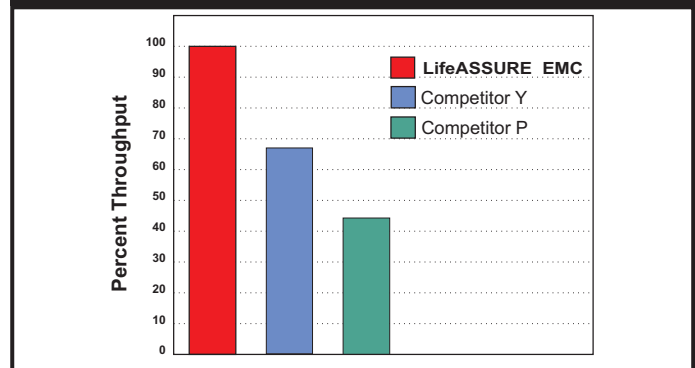


The service life of a pleated filter cartridge is often dictated by the accessible surface area. Conventional pleated filters may offer a large gross surface area, but when the media is packed into the cartridge, only part of the surface area is used resulting in both flow restrictions and limited contaminant holding capacity. The "blind" or unused area commonly occurs near the inside diameter (Figure 2) where the pleats are most tightly compressed. The LifeASSURE EMC filter cartridge is manufactured using a staggered and stepped configuration (Figure 3) which reduces the open space between the outside pleats. This novel technology maximizes capacity by increasing the open area which allows for greater particle loading at the inside diameter, while the shorter stepped pleats take advantage of existing open space closer to the outside diameter of the cartridge. The result is a fully used surface area that provides superior filter life.

Enhanced Filter Lifetime

The data in Chart 1 illustrates the throughput advantage of the LifeASSURE EMC filter – indicative of both enhanced filter life and greater contaminant holding capacity. When compared to competitive products, the available grades of LifeASSURE EMC filters allow users to select equivalent effluent quality, or, improve the effluent quality with reduced, yet competitively superior, service life. Either way the result is the same; LifeASSURE EMC filters allow significantly more throughput than competitive filters and provide as much as twice the service life.

Chart 1. - Comparative Throughput



Benefits of Low Filter Pressure Drop

The novel construction of the LifeASSURE EMC filter results in a lower per cartridge pressure drop (Table 1) at the same flow rate as compared to competitive filters.

Table 1. - Comparative Flow Rates (10" 0.2 µm Filter Cartridge)				
Filter	LifeASSURE EMC		Competitor Y	Competitor P
Pressure Drop (25°C Water@ 1 gpm)	0.29 psid	(0.020 bar)	0.32 psid (0.022 bar)	0.40 psid (0.028 bar)

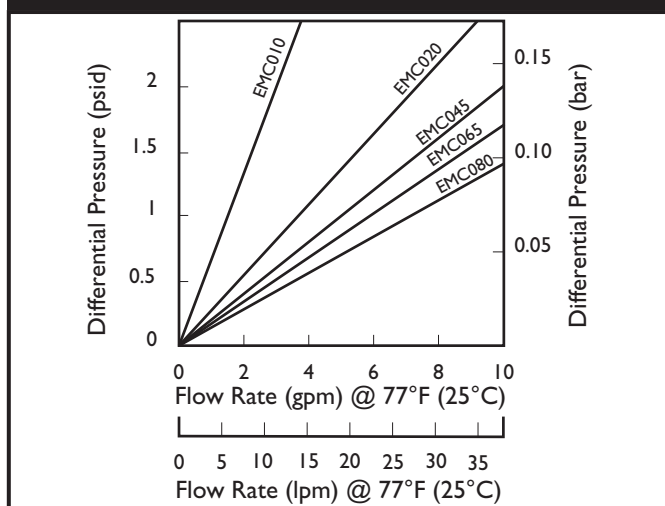
This can reduce filtration costs two ways:

Less Frequent Filter Changeouts – For existing applications at a given flow rate, filter cartridges with more surface area per cartridge have a lower flux (flow per unit surface area) than filters cartridges with less surface area.

Since filter lifetime is inversely proportional to flux (lower flux = longer filter life) in most applications, LifeASSURE EMC filter cartridges provide longer life and require fewer filter cartridge change-outs.

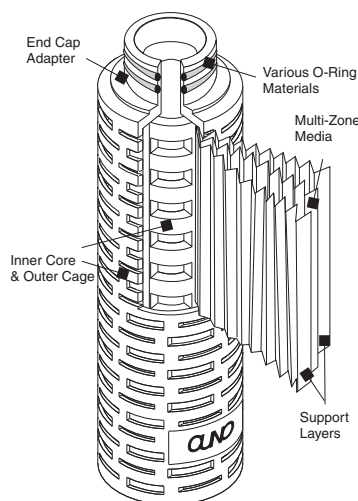
Reduced Filter Housing Costs – A filter cartridge that can deliver a higher flow rate at the same pressure drop when compared to competitive products will reduce filtration costs because fewer filters are required for the system. This in turn, allows for the use of smaller and less costly filter housings which reduces initial capital investment, filter change-out time, and total cost-of-ownership for the life of the process. Chart 2 provides the water flow rate vs. pressure drop data for the five available grades of LifeASSURE EMC filters (0.1 µm, 0.2 µm, 0.45 µm, 0.65 µm, 0.80 µm).

Chart 2. - 10" Cartridge Flow Rates



LifeASSURE EMC Cartridge Construction

LifeASSURE EMC filter cartridges are constructed of high efficiency, naturally hydrophilic, multi-zone Nylon 6,6 membranes. The cage, core, end caps, and membrane supports are made of virgin polypropylene. No adhesives, binders, or surfactants are used in the manufacturing process. Cartridges are manufactured, double bagged, and vacuum sealed in a clean environment under an ISO certified quality system using the most advanced thermoplastic welding techniques to ensure filter integrity and superior downstream cleanliness. All LifeASSURE EMC filters are integrity tested in both the membrane subassembly and final cartridge forms, unlike other filter manufacturers who only integrity test the membrane subassembly. This additional quality control step assures that your CUNO filter will perform consistently each and every time out of the package.



Cartridge Component	Material of construction
Membrane	FlexN Multi-Zone Naturally Hydrophilic Nylon 6,6
Cage, Core, End-Caps, and Media Support Layers	Virgin Polypropylene
Cartridge Dimensions	Dimension
Filtration Surface Area	11.0 ft ² (1m ²)
Outside Diameter	2¾" (7 cm) nominal
Nominal Length	5, 10, 20, 30, and 40 inches (12.7, 25.4, 50.8, 76.2, and 101.6 cm)
Operating Parameters	Specification
Maximum Operation Temperature	176°F (80°C) for 30 minutes
Maximum Differential Pressure	Forward: 80 psid @ 77°F (5.5 bar @ 25°C) 35 psid @ 176°F (2.4 bar @ 80°C)
Removal Ratings	0.1, 0.2, 0.45, 0.65, 0.80 Microns
Filter Cartridge Rinse	18 Megohm-cm DI water
Filter Cartridge Integrity	100% Tested

LifeASSURE® EMC Filter Cartridge Ordering Guide

Cartridge	Removal Rating (µm)	Configuration	Length (Inches)	End Modification	O-ring Material
EMC	010 - 0.1	F	01 - 10	B - 226 O-ring & Spear (Code 7)	A - Silicone
	020 - 0.2		02 - 20	C - 222 O-ring & Spear (Code 8)	B - Fluorocarbon
	045 - 0.45		03 - 30	D - Double Open End (10")	C - EPR
	065 - 0.65		04 - 40	E - Double Open End (9 3/4")	D - Nitrile
	080 - 0.80		50 - 5*	F - 222 O-ring & Flat Cap (Code 3)	H - Silicone (clear)**
					K - Teflon Encapsulated Viton**

* Available in F end modification only.

** Available in B, C, and F end modifications only.

WARRANTY

Seller warrants its equipment against defects in workmanship and material for a period of 12 months from date of shipment from the factory under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by Seller and for purposes disclosed in writing at the time of purchase, if any. Any unauthorized alteration or modification of the equipment by Buyer will void this warranty. Seller's liability under this warranty shall be limited to the replacement or repair, F.O.B. point of manufacture, of any defective equipment or part which, having been returned to the factory, transportation charges prepaid, has been inspected and determined by the Seller to be defective. THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, AS TO DESCRIPTION, QUALITY, MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR USE, OR ANY OTHER MATTER. Under no circumstances shall Seller be liable to Buyer or any third party for any loss of profits or other direct or indirect costs, expenses, losses or consequential damages arising out of or as a result of any defects in or failure of its products or any part or parts thereof or arising out of or as a result of parts or components incorporated in Seller's equipment but not supplied by the Seller.

Your Local CUNO Distributor:

LENNTECH

info@lenntech.com Tel. +31-152-610-900

www.lenntech.com Fax. +31-152-616-289



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