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LifeASSURE™ IMC Series

Membrane Filters for Industrial Applications

LifeASSURE IMC filter cartridges are highly efficiency naturally hydrophilic Nylon 6,6 filter elements designed to meet the exacting requirements of DI water, critical parts cleaning and chemical applications. Utilising 3M Purification's FlexN Multi-Zone membrane and Advanced Pleat Technology (APT) construction, LifeASSURE IMC 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 labour.

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



Features and 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 hydrophobic membranes such as Polypropylene, Polyethylene and PTFE
- Enhanced contaminant removal capacity results in longer filter lifetime
- Economic alternative to PTFE 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 and reduced energy consumption
- Provides a low differential pressure to minimise microbubble formation
- Increased throughput and filter lifetime which lowers cost-of-ownership

Applications

DI Water

Ink Jet

Parts Cleaning

Optical Fibre

Plating Solutions

High Purity Chemicals

3M

Figure 1: SEM Showing the Multi-Zone Structure

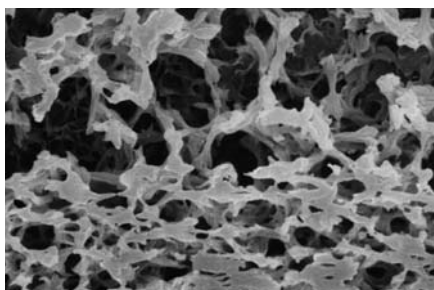


Figure 2: Conventional pleat design

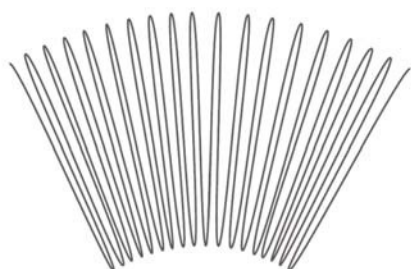


Figure 3: Advanced Pleat Technology Design

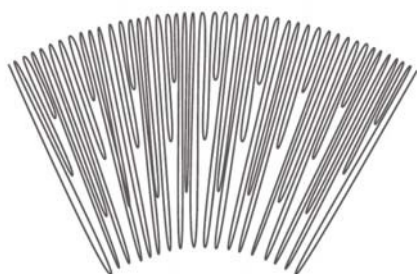
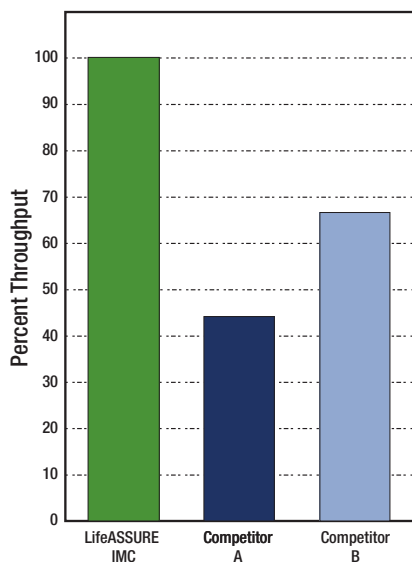


Chart 1: Comparative Throughput



FlexN Multi-Zone Membrane Technology

LifeASSURE IMC filter cartridges incorporate 3M Purification's FlexN Multi-Zone membrane technology to maximise 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 lifetime. The lower porosity zone on the downstream section provides a sharp retention cut-off at the rated pore size. 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.

Superior Gel Removal Provided by APT

Normally a small amount of gel particles can be found in DI water 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. 3M Purification has been able to maximise filtration surface area, which assures a low differential pressure, making it ideal for gel removal. The increase in filtration surface area is achieved by using the 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 IMC filter cartridge is manufactured using a staggered and stepped configuration (Figure 3) which reduces the open space between the outside pleats. This novel technology maximises 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 IMC filter – indicative of both enhanced service life and greater contaminant holding capacity. When compared to competitive products, the available grades of LifeASSURE IMC allow the users to select equivalent effluent quality with vastly superior life, or, improve the effluent quality with reduced, yet competitively superior, service life. Either way the result is the same - LifeASSURE IMC filters allow significantly more throughput than competitive filters and provide as much as twice the service life.

Benefits of Higher Per-Cartridge Flow Rates

The construction of the LifeASSURE IMC filter results in higher per cartridge flow rate at the same pressure drop at the same flow rate as compared to competitive filters.

This can reduce filtration costs two ways:

Less Frequent Filter Change-outs – 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 IMC 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 typical flow rate vs. pressure drop data for the five grades of LifeASSURE IMC filters (0.1 µm, 0.2 µm, 0.45 µm, 0.65 µm and 0.80 µm) available.

LifeASSURE IMC Cartridge Construction

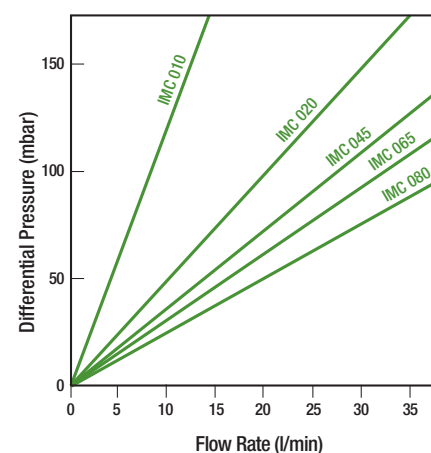
LifeASSURE IMC filter cartridges are constructed of high efficiency, naturally hydrophilic, single layer multi-zone Nylon 6,6 membranes. The cage, core, end caps and membrane supports are made of polypropylene. No adhesives, binders, or surfactants are used in the manufacturing process. Cartridges are manufactured, bagged in a clean environment under an ISO certified quality system using the most advanced thermoplastic welding techniques to ensure filter integrity out of the package.

LifeASSURE IMC Specifications

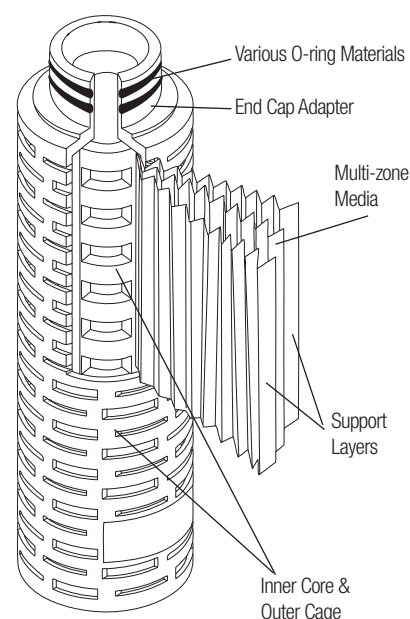
Cartridge Component	Material of Construction
Cage, Core, End caps and Media Support Layers	Polypropylene
Membrane	FlexN Multi-Zone Naturally Hydrophilic Nylon 6,6
Cartridge Dimensions	Dimension
Filter Surface Area	5" element = 0.465 m ² 10" element* = 1 m ²
Outside Diameter	7 cm nominal
Length	Nominal 10, 20, 30 and 40 inches (nominal 25.4, 50.8, 76.2 and 101.6 cm)
Operating Parameters	Specification
Maximum Operating Temperature	80 °C for 30 minutes
Maximum Differential Pressure	Forward: 5.5 bar at 25 °C 2.4 bar at 80 °C
Recommended Filter Change-out Differential Pressure	2.4 bar
Removal Ratings	0.1, 0.2, 0.45, 0.65, 0.80 Microns

* For 20, 30 and 40" elements multiply by 2, 3, and 4 respectively.

Chart 2: 10" Cartridge Flow Rates



Standard Cartridge



LifeASSURE IMC Filter Cartridge Ordering Guide

Cartridge Grade	Removal Rating (µm)	Configuration	Length (Inches)	End modifications	Gasket/O-Ring Material
IMC	010 – 0.10 020 – 0.20 045 – 0.45 065 – 0.65 080 – 0.80	F	01 – 10" 02 – 20" 03 – 30" 04 – 40" 50 – 5" *	B – 226 O-Ring & Spear (Code 7) C – 222 O-Ring & Spear (Code 8) D – Double Open End (10" Length) E – Double Open End (9¾" Length) F – 222 O-Ring & Flat Cap (Code 3)	A – Silicone (MVQ)** B – Fluorocarbon (FPM)** C – EPDM (EPDM)** D – Nitrile (NBR)** H – Clear Silicone*** K – PTFE Encapsulated Fluorocarbon***

* Available in F end modification only.

** ISO Designation

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

Important Notice

3M Purification MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Since a variety of factors can affect the use and performance of a 3M Purification product in a particular application, some of which are uniquely within the user's knowledge and control, user is responsible for determining whether or not the 3M Purification product is fit for a particular purpose and suitable for user's method of application.

Limited Warranty

3M Purification warrants it this product to be free from defects in material and workmanship during normal use for a period of one (1) year from the date of shipment from the factory. If the Product(s) is (are) defective within this warranty period, your exclusive remedy and 3M Purification's sole obligations shall be, at 3M Purification's option, to replace or repair the Product(s) or refund the original purchase price of the Product(s). This warranty does not apply to failures that result from abuse, misuse, alteration or damage not caused by 3M Purification or failure to properly follow installation and use instructions.

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