

LifeASSURE™ BLA Series

Filter Cartridges for Beverage Service

LifeASSURE™ BLA series Filters

LifeASSURE™ BLA Series filters are 3M Purification Inc.'s latest advance in membrane filter cartridge technology. Encompassing two leading-edge processes, multi-zone microporous membrane technology and Advanced Pleat Technology (APT) construction, the LifeASSURE BLA series of filter cartridges offers unmatched protection of final membrane filter cartridges, as well as exceptionally long service life. Designed with pleated Nylon 6,6 membrane in an all-polypropylene cartridge construction, LifeASSURE BLA series filters cartridges are ideally suited for a wide range of pre-filtration and clarification applications in the beverage industry.

Optimal System Performance

Used as a pre-filter, LifeASSURE BLA series filter cartridges help protect and extend the service life of 3M Purification's LifeASSURE™ BA series, LifeASSURE™ SA series, and LifeASSURE™ PSA series final filter cartridges, as well as other membrane filter cartridges. LifeASSURE BLA series filter cartridges will:

- Increase final filter cartridge life substantially, often by 10 times.
- Decrease filter cartridge change-outs, greatly reducing filter cartridge costs.
- Significantly reduce effluent microorganism content.

Multi-zone Microporous Membrane Technology

LifeASSURE BLA series filter cartridges incorporate 3M Purification's advanced Multi-zone microporous membrane technology. It allows unmatched flexibility in creating a multi-zone membrane that offers the maximum in contaminant holding capacity while maintaining high retention efficiency. The SEM photograph on page two shows that the *single layer* LifeASSURE BLA membrane consists of an "open" zone on the upstream side of the membrane and a "tighter" zone on the downstream side. In effect, the open zone acts as a pre-filter by capturing larger particles and colloids while the tighter zone provides the retention of smaller contaminants. This multi-zone structure eliminates dual-layer membrane construction to provide a larger surface area, significantly increased contaminant holding capacity, and longer service life than competitive filter cartridges.

Features & Benefits

Multi-zone microporous membrane

- Increased contaminant capacity
- Extended service life
- Maximum membrane protection
- Lower total filtration costs than competitive filter cartridges

Advanced Pleat Technology construction for extremely high surface area

- Higher throughputs and longer service life than competitive filter cartridges
- Lower total filtration costs than competitive filter cartridges

100% Integrity tested in manufacturing and *in situ*

- Ensures proper installation and operation

True membrane construction

- Significant reduction of microorganisms

Constructed with CFR 21 listed materials

- Safe for food contact. Complies with requirements of the Pure Food, Drug and Cosmetic Act.



Applications

LifeASSURE™ BLA series filters are optimized for prefiltration and clarification service in food and beverage applications.

- Wine
- Beer
- Bottled Water
- Soft Drinks
- Syrups
- Food grade dyes and flavors
- Preservative solutions
- Blending & wash water
- Distilled Spirits

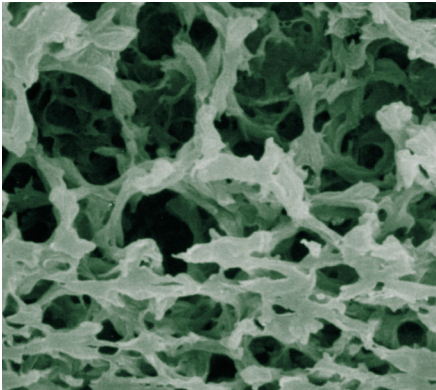


Figure 1 - SEM of Multi-zone microporous Membrane

Products	LRV
LifeASSURE™ BLA020	7.3
Millipore Milligard® CWSS	4.5
LifeASSURE™ BLA045	3.5
Millipore Milligard® CWSC	2.6

Table 1 - Comparative Log Reduction Values

Advanced Pleat Technology Construction

LifeASSURE™ BLA series filters also feature 3M Purification’s innovative Advanced Pleat Technology (APT) construction for extended service life. This design construct maximizes the useful surface area of the filter cartridge while maintaining proper flow paths between media pleats. By employing as much as 50% more effective surface area* than competitive filters (see chart 1), the LifeASSURE BLA series filter cartridge provides lower pressure drops, longer service life, and lower overall filtration costs.

Comparative Surface Area

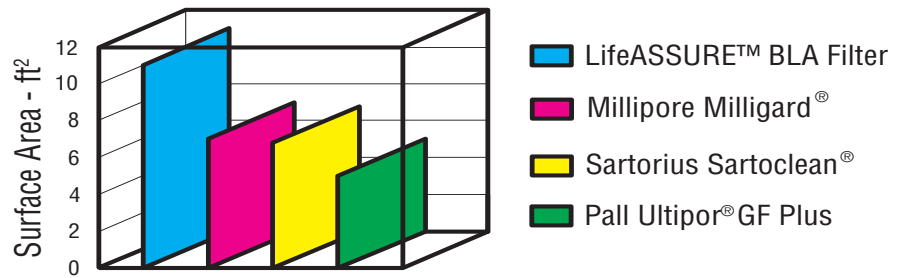


Chart 1 - Surface Area Comparison

Significant Microorganism Reduction

3M Purification Inc. LifeASSURE BLA series filter cartridges consistently exhibit a greater reduction of micro-organisms than competitive filters that are either constructed of glass or polypropylene fibers, or filters that are constructed with non-integral membranes. For effective pre-filtration and clarification of beverages, microorganism reduction is a critical parameter resulting in economical, reliable filter cartridge systems.

In tests with *Brevundimonas diminuta*, (considered one of the smallest bacteria) LifeASSURE BLA020 series grade filter cartridges exhibited an average log reduction value** (LRV) of 7.3 and the LifeASSURE BLA045 series grade filter cartridges exhibited an average LRV of 3.5.

Throughput Comparison

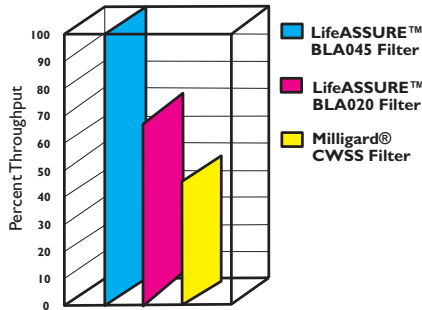


Chart 2. - Throughput comparison of LifeASSURE™ BLA Series filter cartridge and 0.2 µm nominal filter cartridges.

Throughput Comparison

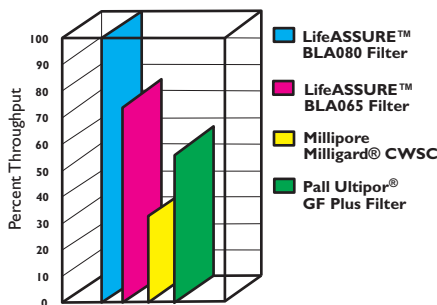


Chart 3. - Throughput comparison of LifeASSURE™ BLA Series filter cartridges and 0.2 µm nominal filter cartridges.

Optimize for Service Life and Effluent Quality

As the data in Charts 2 & 3 demonstrate, LifeASSURE BLA filter cartridges are designed to provide both enhanced service life and performance. When compared to competitive products, the available grades of LifeASSURE BLA series filter cartridges allow the user 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 BLA series filter cartridges allow significantly more throughput than the competitive filter cartridges and provide up to double the service life.

* Competitive filter surface area data is from the respective manufacturers’ published literature.

** LRV =log10 number of organisms in/number of organisms out.

Pre-filter Selection

Since beverages encompass a wide range of fluid conditions, 3M Purification provides an array of LifeASSURE™ BLA series pre-filters to meet the needs of filter users.

Pre-filtration selection is highly dependent on:

- The nature of the fluid
- The particulate/colloid content of the fluid
- The amount of pre-treatment or clarification of the fluid
- The rating of the membrane filter being protected

The table below is provided as a guide to pre-filter selection, although actual process conditions may dictate the use of a more open or closed pre-filter, than specified below. Pre-filter selection can be aided by smaller scale pilot tests or flow decay studies using membrane discs. Consult 3M Purification Inc.'s Scientific Applications Support Services (SASS) or 3M Purification Technical Sales for more information.

Pre-Filter Chart

Grade	Upstream Zone	Downstream Zone	Fluid Condition	Pre-filter for:
BLA020	0.65µm	0.2µm	Low particulate/colloid content	LifeASSURE™ SA /LifeASSURE™ PSA series 0.20 micron
BLA045	0.8µm	0.45µm	Low particulate/colloid content	LifeASSURE™ SA /LifeASSURE™ PSA™ series 0.20 micron
				Or LifeASSURE™ BA045 series
BLA065	1.2µm	0.65µm	High particulate/colloid content	LifeASSURE™ BA045 series
BLA080	2.5µm	0.8µm	High particulate/colloid content	LifeASSURE™ BA045 series
				Or LifeASSURE™ BA045 series

3M Purification Inc. Final series filters

LifeASSURE™ BA series filter cartridges - Typically employed as the final filter cartridge in wine and beer filtration, the LifeASSURE BA series filter cartridge has up to 40% more surface area than competitive filter cartridges, is resistant to repetitive hot water sanitation, and provides excellent throughputs for low running costs. Available in both 0.65µm and 0.45µm retention ratings, LifeASSURE BA series are the filter cartridges of choice for discerning brewers and winemakers.

LifeASSURE™ PSA series & LifeASSURE™ SA series filter cartridges – typically employed as final series filter cartridges in applications requiring absolute retention of microorganisms at 0.2 µm. Both are qualified for absolute retention of *B. diminuta* (ATCC 19146) following American Society of Testing and Materials (ASTM) methodology at a minimum challenge level of 10⁷ CFU/cm² of filter cartridge area. **LifeASSURE PSA series filter cartridges** contain non-charge modified, double-layer, dual zone, Nylon 6,6 membrane while **LifeASSURE SA series filter cartridges** contain positively charge-modified Nylon 6,6 membrane.





Benefits of Higher Per-Filter Cartridge Flow Rates

The LifeASSURE™ BLA series filter cartridge construction results in a higher per-filter cartridge flow rate at the same pressure drop when compared to competitive filter cartridges. This can reduce filter cartridge costs two ways:

Change-out filter cartridges less frequently - 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 those filter cartridges with less surface area. Since service life is inversely proportional to flux (lower flux = longer service life) in most applications, LifeASSURE BLA series filter cartridges provide longer service life and require fewer filter cartridge change-outs than competitor cartridges.

Reduce filter cartridge housing costs - For new applications (where filter cartridge housing size is selected based on a desired “clean” initial pressure drop), filter cartridges that provide a higher flow rate per-cartridge at a given pressure drop will require fewer filter cartridges, and hence a smaller filter cartridge housing, to complete the task.

Installation Integrity Test

The installation integrity test is a non-destructive measurement of a filter cartridge’s ability to function as intended. Conducting an installation integrity test assures the user that the filter cartridge is installed and sealed correctly in the filter cartridge housing and is ready for service.

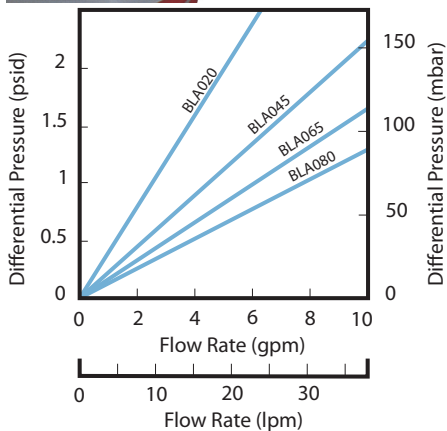
Unlike other pre-filter cartridges, LifeASSURE BLA series filter cartridges are 100% tested for integrity in manufacturing prior to shipment. Additionally, LifeASSURE BLA series filter cartridges are integrity testable *in situ* by the user. For integrity test procedures and values, please consult 3M Purification document .70-0202-6586-7.

Sanitation and Sterilization

The use of hot water (176°F/80°C) sanitation or steam (250 °F/121 °C) sterilization are common strategies employed in beverage production to maintain clean systems. LifeASSURE BLA series filter cartridges are constructed with Nylon 6,6 membrane optimized for thermal stability to ensure resistance to hot water or steam cycles.

Longer Life with Caustic Cleaning

Cleaning solutions, such as sodium hydroxide, can effectively reduce the impact of beverage colloids in plugging membrane filter cartridges. LifeASSURE™ BLA series filter cartridges, as with LifeASSURE BA series filter cartridges, can be cleaned with a dilute caustic flush, reducing differential pressure build up and extending service life.

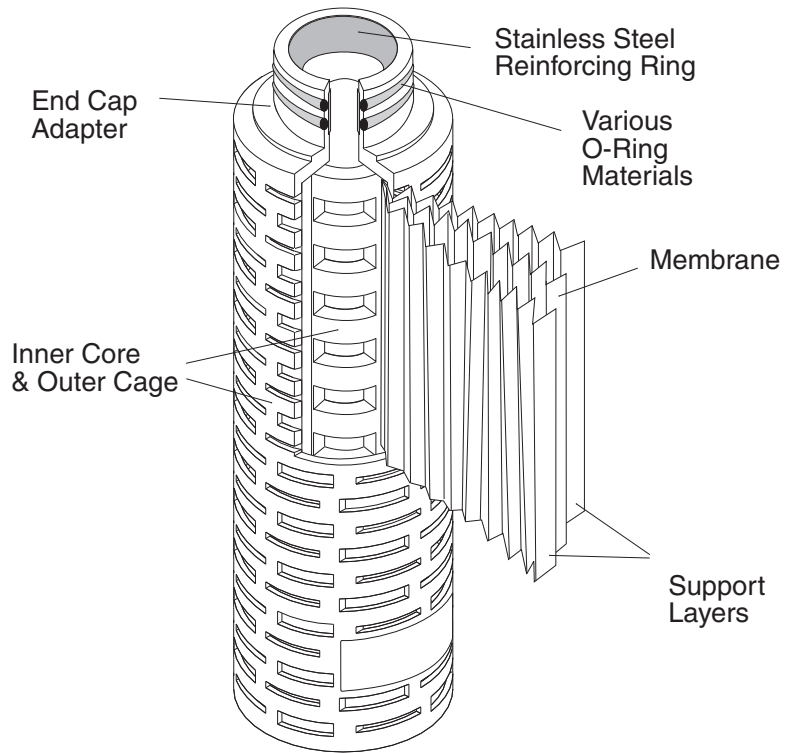


LifeASSURE™ BLA Series 10” filter cartridge water flow rates @ 77° (25 °C)

Recommended Cleaning Parameters	
NaOH concentration	2% by weight
Maximum Temperature	140° F/60 °C
Flow rate	3 GPM/11 LPM
Duration	30 minutes

LifeASSURE™ BLA series Filter Cartridges Construction

LifeASSURE™ BLA series filter cartridges are constructed of single-layer, Nylon 6,6 microporous membrane pleated with polypropylene upstream and downstream support materials. The inner core, outer cage and end-cap adapters are made of polypropylene. Multiple length filter cartridges with industry standard connection styles are produced to fit the most widely used housing designs and system sizes. No resin or binder compounds are added. All materials used in manufacturing are traceable and meet requirements and are approved for direct food contact, thereby complying with requirements of the Pure Food, Drug and Cosmetic Act. Filter cartridges are manufactured under an ISO 9001:2008 Quality Management System (QMS) using the most advanced thermoplastic welding techniques to ensure filter cartridge integrity. LifeASSURE BLA series filter cartridges are 100% integrity tested after manufacture to ensure quality.



Filter Cartridge Component	Material of construction
Outer Cage, Inner Core, End-Cap Adapters, and Media Support Layers	Polypropylene
Membrane	Nylon 6,6
Adapter Support Ring	Polysulfone
Filter Cartridge Dimensions	
Filtration Surface Area	11ft ² (1m ²)
Outside Diameter	2¾" (7 cm) nominal
Length	Nominal 10, 20, 30, and 40" (Nominal 25.4, 50.8, 76.2, and 101.6 cm)
Operating Parameters	
Maximum Operation Temperature	176°F (80°C) for 30 min. sanitation
Maximum Differential Pressure	Forward: 80 psid (5.5 bar) @ 77 °F (25 °C) 25 psid (1.7 bar) @ 176 °F (80 °C)
	Reverse: 50 psid (3.4bar) @ 77 °F (25 °C)
Recommended Filter Cartridge Change-out Differential Pressure	35 psid (2.4 bar)
Hot Water Sanitation	30 minutes @ 176 °F (80 °C)
Steam Sterilization	30 minutes @ 250 °F (121 °C)
Integrity Test Methods	Consult 3M Purification Inc. for appropriate values for the specific filter cartridge and housing in use.



Scientific Applications Support Services (SASS)

The cornerstone of 3M Purification Inc.'s philosophy is service to customers, not only in product quality and prompt service, but also in problem solving, application support and in the sharing of scientific information. 3M Purification's Scientific Applications Support Services group is a market-oriented group of scientists and engineers who work closely with customers to solve difficult separations problems and aid in the selection of the most effective and economical filtration systems. SASS specialists are skilled in performing on-site Vmax testing (a predictive method for filter cartridge throughput) and are able to relate field test results to full manufacturing scale operations. SASS projects can also be performed in 3M Purification's extensive state-of-the-art laboratory facilities. 3M Purification's vast experience with countless beverage installations provides the knowledge and insight to resolve problems promptly and efficiently in a cost-effective and confidential manner.

3M Purification Filter Cartridge Housings

A specialized range of filter cartridge housings are available to meet the needs of the beverage industry. They provide easy access for filter cartridge change-out and the greatest assurance that LifeASSURE BLA series filter cartridges are sealed securely, thus eliminating the possibility of fluid bypass. All housings are constructed using 316L stainless steel to maximize corrosion resistance. Internal surfaces of the ZWB filter cartridge housings are polished to limit microbial adhesion and provide easy cleaning.



Model ZWB



Model 4SD2

3M Purification Inc. Filter Housings				
Base Housing Models	ZWB (Swing Bolt Closure)		SD (Clamp Style Closure)	
	Model By Filter Cartridge Capacity	Number of Filter Cartridges*	Model By Filter Cartridge Capacity	Number of Filter Cartridges*
	4ZWB	4	5SD	5
	8ZWB	8	12SD	12
	11ZWB	11	22SD	22
	21ZWB	21		
Housing Style	t-line Sanitary type connection		NTP & Raised Face Flange	
Cartridge Lengths	10, 20, 30, and 40"			
Materials of Construction	316L Stainless Steel			
Literature #	70-0201-8884-6		70-0201-8760-8	
* Filter Cartridge Lengths from 10" to 40"				

LifeASSURE™ BLA Series Filters

LifeASSURE™ BLA Series Filter Cartridge Ordering Guide

Filter Cartridge Grade	Removal Rating	Configuration	Length Inches	End-modification	Gasket/O-ring Material
BLA	020 - 0.20 micron 045 - 0.45 micron 065 - 0.65 micron 080 - 0.80 micron	B - Pleated APT Configuration	01 - 10" 02 - 20" 03 - 30" 04 - 40"	B - 226 O-ring & Spear (Code 7) C - 222 O-ring & Spear (Code 8) D - Double open end (10" Length) E - Double open end (9 3/4" Length) F - 222 O-ring & Flat Cap (Code 3) J - 226 O-ring & Flat Cap	A - Silicone B - Fluorocarbon C - EPR D - Nitrile H - Clear Silicone *

* O-Ring Only.

Important Notice:

The test results described in this literature are accurate to the best of our knowledge. A variety of factors, however, can affect the performance of the Product(s) in a particular application, some of which are uniquely within your knowledge and control. **INFORMATION IS SUPPLIED UPON THE CONDITION THAT THE PERSONS RECEIVING THE SAME WILL MAKE THEIR OWN DETERMINATION AS TO ITS SUITABILITY FOR THEIR USE. IN NO EVENT WILL 3M PURIFICATION INC. BE RESPONSIBLE FOR DAMAGES OF ANY NATURE WHATSOEVER RESULTING FROM THE USE OF OR RELIANCE UPON INFORMATION.**

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