

3M Purification

LifeASSURE™ BNA020 Series

Log Reduction Grade Filter



0.2 µm rated filters for Bottled Water & Beverage microbiological stability

The LifeASSURE™ BNA020 series filter helps bottled water and other beverage processors meet high standards for microorganism control. Combined with 3M Purification's range of particle control and prefilters, LifeASSURE™ BNA020 series filters offer bottlers a complete solution for rigorous contaminant control while maintaining long service life and low operating costs.

Durable Design

The LifeASSURE™ BNA020 series filter cartridge membrane and cartridge design innovations result in a highly durable filter cartridge, capable of secure operation through numerous cycles of hot water sanitation, steam sterilization, and chemical based cleaning and sanitation.

ADVANCED TECHNOLOGIES

Highly Asymmetric BNA020 Membrane

LifeASSURE™ series filters incorporate a novel single-layer polyethersulfone (PES) membrane with a high degree of asymmetry (Figure 1. on the next page). When viewed in cross-section, the membrane contains larger pores on the upstream surface that gradually taper to smaller pores towards the downstream surface. Compared to conventional membranes with a symmetric pore structure, this structure provides greater contaminant capacity, since it presents greater open spaces (void volume) in which to retain these contaminants. This increase in capacity leads directly to longer service life. In addition, the asymmetric structure provides less resistance to flow, resulting in a lower pressure drop when compared at a constant flow rate to competitive filters, allowing a user to employ fewer LifeASSURE™ BNA020 series filters for any given flow rate.

Applications

LifeASSURE™ BNA020 Series filters are optimized for Food & Beverage applications requiring reduction of fine particles and microorganisms at the 0.2 micron level.

- Bottled Water
- Soft Drinks
- Process Water
- Intermediates & Ingredients
- Syrups
- Dyes & Flavors

Features & Benefits

0.2 µm rated membrane

- Reliable LRV microorganism control

Asymmetric polyether sulfone (PES) membrane

- Exceptionally high capacity and service life to help maximize economy

Advanced Pleat Technology Construction

- Allows superior fluid and contaminant access to filter surface area for greatest service life and flow rates

CFR 21 Listed Materials of Construction, filter cartridges are compliant with Regulation (EC) 1935/2004, USP Biological Reactivity for Plastics Test—Class VI, Technical Support Guide

- Eases regulatory concerns



Advanced Pleat Technology Design

LifeASSURE™ BNA020 series filters feature Advanced Pleat Technology (APT) design for extended service life. This design technology helps to maximize the useful surface area of the filter while maintaining open flow paths between the media pleats (refer to Figure 2.) By employing the APT design, the LifeASSURE™ BNA020 filter provides lower pressure drops, longer service life, and lower overall operational costs.

Novel Media Support Design

LifeASSURE™ BNA020 series filter employ a design that results in higher beverage flow versus pressure drop compared to competitive filters. This 3M Purification development combines the high flowing PES membrane with special support layers upstream and downstream of the membrane. When combined with the previously mentioned APT, this feature greatly increases flow per cartridge, and results in lower overall operational costs.

ADVANCED PERFORMANCE

Extended Service Life

In the majority of beverage applications, the final membrane filter is used in a continuous (as opposed to a batch) operation. Its service life is measured either by the volume filtered, or the number of days in service, before becoming permanently blocked. Filters that provide longer service life not only reduce direct operational costs, but also reduce indirect filter costs as well (filter change-out/installation labor, downtime between change-outs, filter flushing, etc.). The LifeASSURE™ BNA020 series filter's combination of highly asymmetric PES membrane, APT design, and novel upstream/downstream supports all work together to maximize the volume of beverage that can be processed.

Microbiological Control

The primary purpose of a membrane filter cartridge in bottled water and beverage processing is to effectively control even the smallest microorganisms. LifeASSURE™ BNA020 series 0.2 µm rated filters provide superior retention of common spoilage microorganisms, even at challenge concentrations that far exceed those experienced by most beverage producers. LifeASSURE™ BNA020 series membrane has been shown to provide Log Reduction Values (LRV) in excess of 7 with *Brevundimonas diminuta* (*B. diminuta*) (ATCC 19146) and *Pseudomonas aeruginosa* (*Ps. aeruginosa*) at a concentration of 10⁷ CFU/cm² or greater.

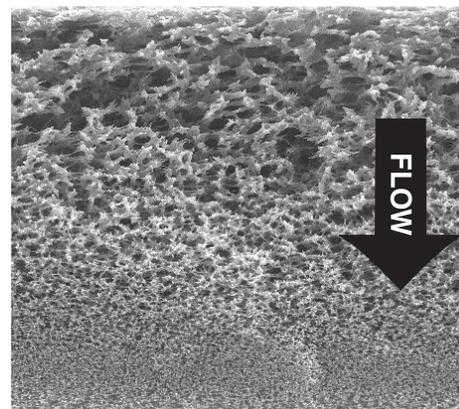


Figure 1. SEM Photograph Showing LifeASSURE™ BNA020 Series Membrane Cross-Section

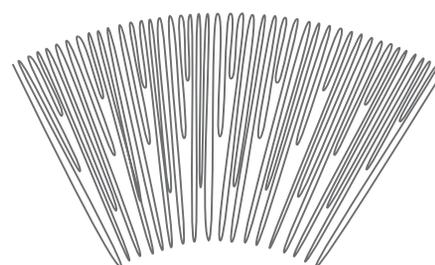


Figure 2. - Advanced Pleat Technology

LifeASSURE™ BNA020 Series Filters	Microorganism	Retention Level
BNA020	<i>B. diminuta</i>	LRV > 7
BNA020	<i>Ps. aeruginosa</i>	LRV > 7

Fast Flow Rates at Low Pressure Drops

3M Purification has combined three key technological advances to provide a fast flow rate per unit of pressure drop. These three technologies, APT design, a novel upstream and downstream support design, and a highly asymmetric microporous membrane, afford users with faster process flow rates using fewer filters as compared to alternative filters.

Initial Clean Pressure Drop* (water) for a 30" Filter Flowing at 20 gpm (76 lpm)	
3M Purification LifeASSURE™ BNA020 Series Filter	2.2 psid (0.15 bar)
Competitor A	3.7 psid (0.20 mbar)
Competitor B	5.8 psid (0.40 mbar)
Competitor C	4.5 psid (0.31 mbar)

As the example above illustrates, the pressure drop at a given flow rate for LifeASSURE™ BNA020 series filters can be significantly lower compared to competitive filters. Since filter change-out is usually tied to a terminal differential pressure drop (typically between 1.4 and 2.4 bar), employing filters that exhibit a lower initial pressure drop can result in longer filter service life.

Alternatively, in a system when determining the number of filters needed to provide a desired flow rate at a given pressure drop, faster flowing filters will result in smaller, more economical systems.

*Data from published product literature

The number of 30" filters needed to provide a 45 gpm flow with a clean pressure drop of 1 psid (170 lpm flow @ 69 mbar)

3M Purification LifeASSURE™ BNA020 Series Filters	5 filters
Competitor A	8 filters
Competitor B	14 filters
Competitor C	8 filters

As the example above illustrates*, the nearest competitor requires significantly more 30" filters to provide the same flow rate and pressure drop.

Prefiltration Selections

Many bottling applications employ a prefilter and final filter in series to achieve maximum performance and economy. Prefilters are used to help protect and extend the life of more expensive final filters. 3M Purification offers a number of premium prefilter choices: Betafine™ D series pleated filter cartridges, Betapure™ NT-T series depth filter cartridges and LifeASSURE™ BLA series membrane filter cartridges. Those preferring depth-style filters can select from 3M Purification's Betapure™ NT-T series prefilter family which employs an advanced media design that enhances flow while extending service life. For additional bioburden control, 3M Purification's LifeASSURE™ BLA series filter cartridges featuring dual-zone membrane, are designed to deliver the ultimate in final membrane protection and bioburden reduction.

3M Purification Filter Housings

A specialized range of filter housings is available to meet the needs of the food & beverage industry. They provide easy access for filter change-out and afford a secure seal between filter and housing to help prevent fluid bypass. All housings are constructed using 316L stainless steel to help maximize corrosion resistance. Internal surfaces of the housings are polished to 20 micro-inch Ra to limit microbial adhesion and provide easy cleaning. 3M Purification also offers custom-design, fully automated filtration skids and mobile units. These units can incorporate membrane housings, prefilter housings, SIP and CIP systems along with all necessary piping, valves, monitoring devices and computer controls for reliable, hands-free operation.

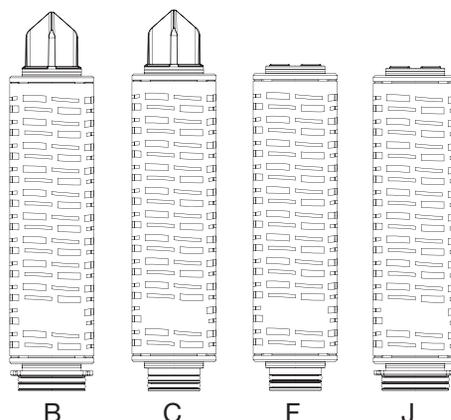
Operating Parameters & Specifications

Materials of Construction	
Membrane	Polyethersulfone (PES)
Media Support Layers	Polypropylene
Inner Core, Outer Cage, End Cap Adapters	Polypropylene
Gasket & O-ring Options	Various polymers available
Encapsulated Adapter Reinforcing Ring	Polysulfone
Operating Conditions	
Typical Water Flow Rate at 25 °C	17 lpm/100 mbar
Maximum Forward Pressure Differential	5.5 bar @ 25 °C, 1.7 bar @ 80 °C
Maximum Reverse Pressure Differential	0.69 bar @ 25 °C
Maximum Forward Flow Diffusion at 25 °C per 10" filter	51 cc/min @ 35 psig (2.41 bar)
Maximum Hot Water Sanitation Temperature	85 °C
Maximum Peracetic Acid Exposure	1% (10,000 ppm)
Cartridge Dimensions	
Filtration Surface Area	0.79 m ²
Outer Diameter	70 mm
Nominal Length	10" (254 mm), 20" (508 mm), 30" (762 mm), 40" (1016 mm)

*Data from published product literature

LifeASSURE™ BNA020 Series Filter Ordering Guide

Cartridge Code	Configuration Code	Nominal Length Code	End Modification Code	Gasket/O-ring Material Code
BNA020	F	01 10"	B — 226 O-ring & Spear, Code 7	A — Silicone
		02 20"	C — 222 O-ring & Spear Code 8	B — Fluorocarbon
		03 30"	F — 222 O-ring & FlatCap, Code 3	C — EPR
		04 40"	J — 226 O-ring & FlatCap	D — Nitrile



Important Notice

The information described in this literature is 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 BE RESPONSIBLE FOR DAMAGES OF ANY NATURE WHATSOEVER RESULTING FROM THE USE OF OR RELIANCE UPON INFORMATION.

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