

3M™ LifeASSURE™ BNA020 Series Log Reduction Grade Filters

0.2 µm Rated Filters for Bottled Water and Beverage Microbiological Stability

Help bottle water and other beverage processors meet high standards for microorganism control with the 3M™ LifeASSURE™ BNA020 Series Filter. Combined with 3M's range of particle control and prefilters, 3M LifeASSURE BNA020 Series Filters offer bottlers a complete solution for rigorous contaminant control while maintaining long service life and low operating costs.

Durable Design

3M LifeASSURE BNA020 Series Filter Membrane and Cartridge design innovations result in a durable filter cartridge, capable of secure operation through numerous cycles of hot water sanitation, steam sterilization, and standard chemical based cleaning and sanitation.

Advanced Technologies

Highly Asymmetric Membrane

3M LifeASSURE Series Filters incorporate a novel single-layer 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 3M LifeASSURE BNA020 Series Filters for any given flow rate.

Applications

3M™ LifeASSURE™ BNA020 Series Filters are optimized for Food and Beverage applications requiring reduction of fine particles and microorganisms at the 0.2 micron level.

- Bottled Water
- Soft Drinks
- Process Water
- Intermediates and Ingredients
- Syrups
- Dyes and Flavours



Features and 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

Food contact compliance

- Designated filtration products comply with applicable US regulations for food and beverage use
- The product is compliant with the requirements of Regulation (EC) 1935/2004 for food contact for use in aqueous, acidic, alcoholic and dairy products
- Consult 3M for detailed regulatory compliance information

Advanced Pleat Technology Design

3M™ 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, 3M LifeASSURE BNA020 Series Filters provide lower pressure drops, longer service life, and lower overall operational costs.

Novel Media Support Design

3M LifeASSURE BNA020 Series Filters employ a design that results in higher beverage flow versus pressure drop compared to competitive filters. This 3M 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 labour, downtime between change-outs, filter flushing, etc.). The 3M 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.

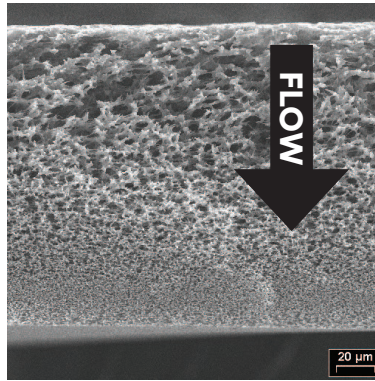


Figure 1. SEM Photograph Showing 3M™ LifeASSURE™ BNA020 Series Filter Membrane Cross-Section

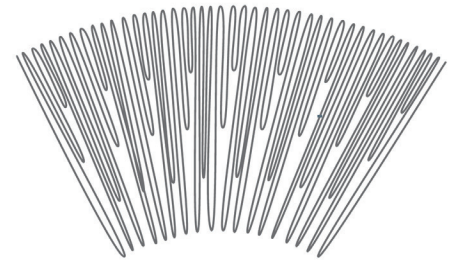


Figure 2. Advanced Pleat Technology

Microbiological Control

The primary purpose of a membrane filter cartridge in bottled water and beverage processing is to effectively control even the smallest microorganisms. 3M 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. 3M 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.

3M™ 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 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™ LifeASSURE™ BNA020 Series Filter	2.2 psid (152 mbar)
Competitor A	3.7 psid (200 mbar)
Competitor B	5.8 psid (400 mbar)
Competitor C	4.5 psid (310 mbar)

As the example above illustrates, the pressure drop at a given flow rate for 3M 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 20 and 35 psid), 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.

3M™ LifeASSURE™ BNA020 Series Log Reduction Grade Filters

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 offers a number of premium prefilter choices: 3M™ Betafine™ XL Series Pleated Filter Cartridges, 3M™ Betapure™ NT-T Series Depth Filter Cartridges and 3M™ LifeASSURE™ BLA Series Membrane Filter Cartridges. 3M Betafine XL Series Filter Cartridges feature 3M's APT maximizing the accessible filter area and supplying exceptionally high flow rates. Those preferring depth-style filters can select from 3M'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 LifeASSURE BLA Series Filter Cartridges, featuring dual-zone membrane, are designed to deliver the ultimate in final membrane protection and bioburden reduction.

3M Filter Housings

A specialized range of filter housings is available to meet the needs of the food and 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.

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

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™ LifeASSURE™ BNA020 Series Filter	5 filters
Competitor A	8 filters
Competitor B	14 filters
Competitor C	8 filters

Operating Parameters and Specifications

Materials of Construction

Membrane	Polyether sulfone (PES)
Media Support Layers	Polypropylene
Inner Core, Outer Cage, End Cap Adapters	Polypropylene
Gasket and O-ring Options	Various polymers available
Encapsulated Adapter Reinforcing Ring	Polyether sulfone

Operating Conditions

Typical Water Flow Rate at 25°C	3.1 gpm/psid (17 lpm/100 mbar)
Maximum Forward Pressure Differential	5.5 bar @ 25°C (80 psid @ 77°F) 1.7 bar @ 80°C (25 psid @ 176°F)
Maximum Reverse Pressure Differential	0.69 bar @ 25°C (10 psid @ 77°F)
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)

Filtration Surface Area

Filtration Surface Area	0.79 m ² (8.5 ft ²)
Outer Diameter	70 mm (2.75")
Nominal Length	254 mm (10"), 508 mm (20"), 762 mm (30"), 1016 mm (40")

*Data from published product literature.

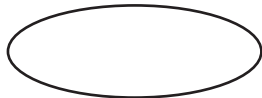
3M™ LifeASSURE™ BNA020 Series Filter Cartridge Ordering Guide

Cartridge	Configuration	Length (Inches)	End-modification	Gasket/O-ring Material
BNA020	F	01 – 10 02 – 20 03 – 30 04 – 40	B – 226 O-ring & Spear (Code C7) C – 222 O-ring & Spear (Code 8) F – 222 O-ring & Flat Cap (Code 3)	A – Silicone B – Fluorocarbon C – EPR

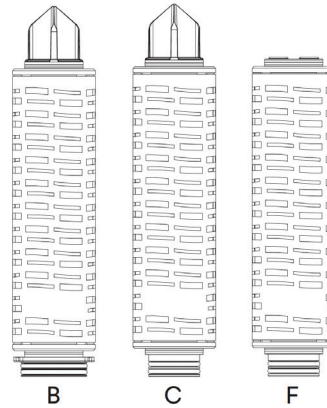
PLEASE NOTE: The Order Guide above is for reference only. Not all combinations are available. Please consult with your 3M representative to determine the appropriate part number for your application.

3M™ LifeASSURE™ BNA020 Series Filter Disc Ordering Guide

Part Number	Size (mm)	Quantity	Packaging
NM04708BNA020	47	40	Box



NM04708BNA020



Product Selection and Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product and appropriate safety products, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.

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