

3M™ LifeASSURE™ BDA020 and BGA020 Series Sterilizing Grade Filters

0.2 µm Rated Filters for Bottled Water and Beverage Microbiological Stability

3M™ LifeASSURE™ BDA020 and BGA020 Series Filters help bottled water and other beverage processors meet the highest standards for microorganism control. Combined with 3M's range of particle control and prefiltration filter cartridges, BDA020 and BGA020 series filters offer bottlers a complete solution for rigorous contaminant control while maintaining long service life and low operating costs. 3M LifeASSURE BDA Series Filters were designed for standard water conditions while the 3M LifeASSURE BGA Series Filters were designed for water containing very fine sub-micronic silt.

Durable Design

The 3M LifeASSURE BDA020 and BGA020 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 Technology Highly Asymmetric Membrane

3M LifeASSURE BDA020 and BGA020 Series Filters incorporate a novel dual-layer 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 down stream surface. Compared to conventional membranes common in the market with a symmetric pore structure, this structure provides greater contaminant capacity, since it presents greater open spaces (void volume) in which to retain most common contaminants in water.

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 typical competitive filters, allowing a user to employ fewer 3M LifeASSURE BDA020 and BGA020 series filters for any given flow rate.



Applications

3M™ LifeASSURE™ BDA020 and BGA020 Series Filters are optimized for Food and Beverage applications requiring sterilizing 0.2 µm retention rated performance.

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

Features & Benefits

Validated 0.2 µm absolute rated membrane

- Reliable sterilizing filtration

Asymmetric dual-layer polyethersulfone membrane

- High capacity and service life to help maximize economy

Advanced pleat technology construction (BDA020 series only)

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

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™ BDA020 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 3M LifeASSURE BDA020 Series Filter can help provide lower pressure drops, longer service life, and lower overall operational costs. The 3M LifeASSURE BGA series employs a conventional pleat design which can help withstand reverse water-hammer from rapidly closing valves in downstream filling equipment.

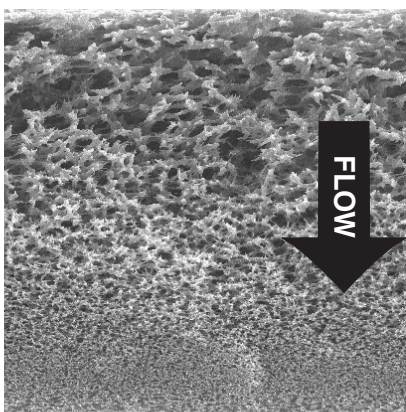


Figure 1. SEM Photograph Showing 3M™ LifeASSURE™ BDA020 and BGA020 Series Filter Membrane Cross-Section

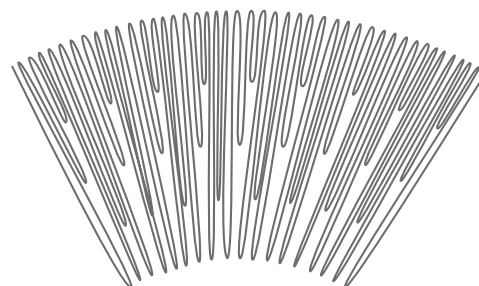


Figure 2. Advanced Pleat Technology

Novel Media Support Design

3M LifeASSURE BDA020 Series Filter Cartridges employ a design that results in higher beverage flow versus pressure drop compared to common competitive filters. This 3M Purification development combines the high flowing 3M LifeASSURE BDA020 Series Filter 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 as compared to filters without these features.

Advanced Performance 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 3M LifeASSURE BDA020 Series Filter Cartridge's combination of highly asymmetric membrane, APT design, and novel upstream and downstream supports all work together to help maximize the volume of beverage that can be processed.

Table 1. Comparative Flow Rates (10" 0.2 µm Rated Filters)

| | Microorganism | Retention Level |
|-------------------|-------------------------------|-----------------|
| BDA020 and BGA020 | <i>Brevundimonas diminuta</i> | Complete |
| BDA020 and BGA020 | <i>Pseudomonas aeruginosa</i> | Complete |

Absolute 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 Series Filters provide superior retention of common spoilage microorganisms, even at challenge concentrations that far exceed those experienced by most beverage producers. The 3M LifeASSURE BDA020 and BGA020 Series Cartridge Membrane has been validated for complete retention of *Brevundimonas diminuta* (*B.diminuta*) (ATCC 19146) at a concentration of 10⁷ CFU/cm² or greater.

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 common alternative filters. When installed in an existing system with a fixed flow rate, 3M LifeASSURE BDA020 Series Filters exhibit a lower pressure drop compared to common alternative 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.

Prefiltration Selections

Many bottling applications employ a prefilter and final filter in series to achieve maximum performance and economy. Prefilters are used to protect and extend the life of more expensive final filters. 3M offers a number of 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 Cartridges feature 3M's APT design 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. For additional bioburden control, 3M's LifeASSURE BLA Series Filter Cartridges, featuring dual-zone membrane, are designed to deliver ultimate final membrane protection and bioburden reduction.

3M™ LifeASSURE™ BDA020 and BGA020 Membrane Design

3M LifeASSURE BDA020 Series Filters contain two layers of PES membrane. The upstream layer is rated at 0.65 micron while the downstream layer is rated at 0.2 micron. Our testing has shown this arrangement results in long service life while maintaining the necessary retention of microorganisms. However, in circumstances where very fine silt may result in lower service life, the 3M LifeASSURE BGA020 is offered. This filter employs a 0.45 micron rated upstream membrane layer to better retain this fine silt before it reaches the 0.2 micron rated membrane layer. Furthermore, the 3M LifeASSURE BGA020 Series Filter employs a conventional pleating design, which helps provide resistance to "water hammer" conditions in some filling systems than BDA series.

Operating Parameters and Specifications

| Materials of Construction | |
|--|---|
| Membrane | Dual layer Polyethersulfone |
| Media Support Layers | BDA: 0.65 micron upstream/ 0.2 micron downstream BGA020: 0.45 micron upstream/ 0.2 micron downstream |
| Inner Core, Outer Cage, End Cap Adapters | Polypropylene |
| Gasket and O-ring Options | Various polymers available |
| Encapsulated Adapter Reinforcing Ring | Polyethersulfone |
| Operating Conditions | |
| Typical Water Flow Rate at 25°C | 2 gpm/psid (11 lpm/100 mbar) |
| Maximum Forward Pressure Differential | 80 psid @ 77°F (5.5 bar @ 25°C) 35 psid @ 194°F (2.4 bar @ 90°C) |
| Maximum Reverse Pressure Differential | 10 psid @ 77°F (0.689 bar @ 25°C) |
| Maximum Forward Flow Diffusion at 25°C per 10" filter | 33 cc/min @ 40 psig (2.75 bar) |
| Maximum Hot Water Sanitation Temperature | 85°C |
| Maximum Steam Temperature | 126°C |
| Maximum Peracetic Acid Exposure | 1% (10,000 ppm) |
| Cartridge Dimensions | |
| Filtration Surface Area | 7.2 ft. ² (0.67 m ²) |
| Outer Diameter | 2.75" (70 mm) |
| Nominal Length | 10" (254 mm), 20" (508 mm), 30" (762 mm), 40" (1016 mm) |

3M™ LifeASSURE™ BDA020 Series Filter Cartridge Ordering Guide¹

| Cartridge | Configuration | Length (Inches) | End-modification | Gasket/O-ring Material |
|-----------|---------------|--------------------|--|--------------------------|
| BDA020 | F | 01 – 10 03 – 30 | B – 226 O-ring & Spear (Code 7)* F – 222 O-ring & Flat Cap (Code 3) | A – Silicone C – EPR* |

3M™ LifeASSURE™ BGA020 Series Filter Cartridge Ordering Guide¹

| Cartridge | Configuration | Length (Inches) | End-modification | Gasket/O-ring Material |
|-----------|---------------|--------------------|----------------------------------|------------------------|
| BGA020 | F | 01 – 10 03 – 30 | B – 226 O-ring & Spear (Code 7)* | C – EPR* |

PLEASE NOTE: The Ordering 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.

**"B" end modification (226 O-ring connector and spear) and "C" O-ring options are NSF/ANSI Standard 61 listed.

1. Additional configurations may be available upon request.



This 3M™ LifeASSURE™ BDA Series Filter Cartridge with the "C" O-ring option is tested and certified by WQA against NSF/ANSI Standard 61 for material safety only.

Cold Water Only: Install this product in accordance with the instructions provided by the housing manufacturer.



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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