

BevASSURE™ BNA020 Series Log-Reduction Grade Filter

0.2 µm rated filters for bottled water & beverage microbiological stability



CUNO's BevASSURE BNA020 series filter features a new asymmetrical polyether sulfone (PES) membrane with proprietary Advanced Pleat Technology (APT) construction. This design results in a robust filter that is optimized for both long service life and fast flowing applications, while providing 0.2 µm rated filtration for superior removal of microorganisms.

The BevASSURE BNA020 series filter helps bottled water and other beverage processors meet

high standards for microorganism control. Combined with CUNO's range of particle control and prefiltration filter cartridges, BevASSURE BNA020 series final filters offer bottlers a complete solution for rigorous contaminant control while maintaining long service life and low operating costs.

Durable Design

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

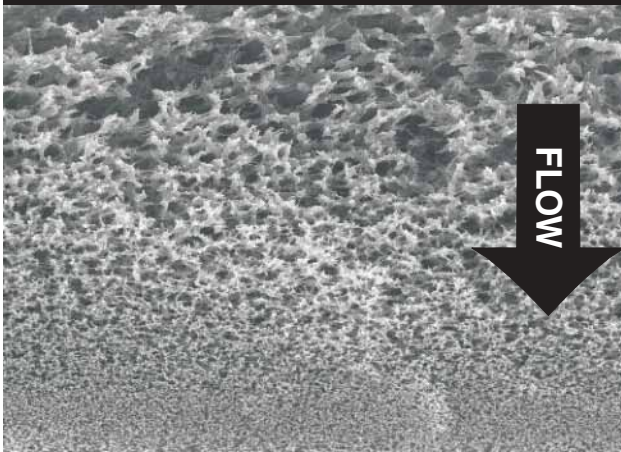
ADVANCED TECHNOLOGIES

Highly Asymmetric BNA020 Membrane

BevASSURE BNA020 series filters incorporate a novel single layer PES membrane with a high degree of asymmetry (Figure 1). 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 BevASSURE BNA020 series filters for any given flow rate.

Features	Benefits
<ul style="list-style-type: none"> ■ 0.2 µm rated membrane 	<ul style="list-style-type: none"> ■ Reliable, high LRV microorganism control
<ul style="list-style-type: none"> ■ Asymmetric polyether sulfone (PES) membrane 	<ul style="list-style-type: none"> ■ Exceptionally high capacity and service life resulting in maximum economy
<ul style="list-style-type: none"> ■ Advanced Pleat Technology construction 	<ul style="list-style-type: none"> ■ Allows superior fluid and contaminant access to filter surface area for greatest service life and flow rates
<ul style="list-style-type: none"> ■ 21CFR compliant materials of construction, EEC Directive 2002/72EC tested, USP Biological Reactivity for Class VI Plastics Test, Technical Support Guide 	<ul style="list-style-type: none"> ■ Eases regulatory concerns

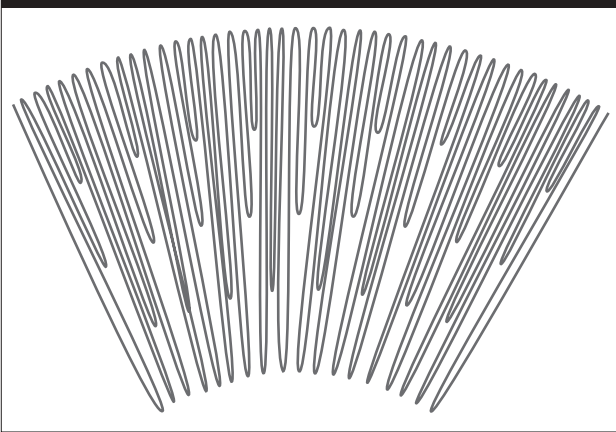
Figure 1. - SEM Photograph Showing BevASSURE BNA020 Membrane



Advanced Pleat Technology Design

BevASSURE BNA020 series filters feature patented* Advanced Pleat Technology (APT) design for extended service life. This design technology maximizes 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 BevASSURE BNA020 series filter provides lower pressure drops, longer service life, and lower overall operational costs.

Figure 2. - Advanced Pleat Technology Design



Novel Media Support Design

BevASSURE BNA020 series filters employ a patent pending design that results in higher beverage flow versus pressure drop compared to competitive filters. This unique CUNO development combines the high flowing PES membrane with special support layers upstream and downstream of the membrane. When combined with the previously mentioned Advanced Pleat Technology, 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 BevASSURE BNA020 series filter’s unique combination of highly asymmetric PES membrane, Advanced Pleat Technology design, and novel upstream/downstream supports all work together to maximize the volume of beverage that can be processed.

Advanced Microbiological Control

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

BevASSURE BNA020	Microorganism	Retention Level
BNA020	<i>Brevundimonas diminuta</i>	LRV > 7
BNA020	<i>Pseudomonas aeruginosa</i>	LRV > 7

Fast Flow Rates at Low Pressure Drops

CUNO has combined three key technological advances to provide the fastest flow rate per unit of pressure drop. These three technologies, Advanced Pleat Technology (APT) design, a novel patent-pending upstream and downstream support design, and a unique, 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)	
CUNO BevASSURE PES BNA020	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)

* US Patent 6,315,130 and other patents pending

As the example above illustrates, the pressure drop at a given flow rate for BevASSURE 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 new 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.

Consider the following example:

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)	
CUNO BevASSURE BNA020	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.

BevASSURE BNA020 Cartridge Construction

Materials of Construction	
Membrane	Polyether sulfone (PES)
Support layers	Polypropylene
Core, Cage, End Caps, Adapters	Polypropylene
Encapsulated Adapter Reinforcing Ring	Polysulfone
O-rings	Various polymers available
Nominal Filter Dimensions	
Effective Filtration Area (EFA)	8.5 ft ² (0.79 m ²)
Filter Diameter	2.75" (70 mm)
Filter lengths	10" (254 mm), 20" (508 mm), 30" (762 mm), 40" (1016 mm)
Operating Parameters	
Typical Water Flow Rate at 25°C	3.1 GPM/psid (17 lpm/100 mbar)
Maximum Differential Pressure (forward)	80 psid @ 77°F (5.5 bar @ 25°C) 25 psid @ 176°F (1.7 bar @ 80°C)
Maximum Differential Pressure (reverse)	10 psid @ 77°F (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)

Automated Integrity Testing - CUNOCheck™ 2

A full range of non-destructive integrity tests can be easily and automatically performed with the CUNOCheck 2 integrity test instrument. The CUNOCheck 2 and MiniCheck integrity test instruments provide fast, reliable and accurate automated integrity testing of BevASSURE BNA020 series cartridges. For more information, see CUNO document LITCCC2.

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. CUNO offers a number of premium prefilter choices: Betafine™ XL pleated filter cartridges, PolyNet™ depth filter cartridges and LifeASSURE™ membrane filter cartridges. Betafine XL filter cartridges (Literature LITCBFXL) feature CUNO's patented Advanced Pleat Technology maximizing the accessible filter area and supplying exceptionally high flow rates. Those preferring depth-style filters can select from CUNO's PolyNet prefilter family (Literature LITCPN1) which employs an advanced media design that enhances flow while extending service life. For additional bioburden control, CUNO's LifeASSURE filter cartridges (Literature LITCLAFB1), featuring dual-zone membrane, are designed to deliver the ultimate in final membrane protection and bioburden reduction.

CUNO 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 they ensure that BevASSURE BNA020 filter cartridges are sealed securely to eliminate the possibility of fluid bypass. All housings are constructed using 316L stainless steel to maximize corrosion resistance. Internal surfaces of the housings are polished to 20 micro-inch Ra to limit microbial adhesion and provide easy cleaning. CUNO 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.

* Data from published product literature

BevASSURE™ BNA020 Filter Ordering Guide

Cartridge Grade	Configuration	Length Inches	End-modification	Gasket/O-ring Material
BNA020 BevASSURE 0.2 µm	F	01 - 10" 02 - 20" 03 - 30" 04 - 40"	B - 226 O-ring & Spear (Code 7) C - 222 O-ring & Spear (Code 8) F - 222 O-ring & Flat Cap (Code 3) J - 226 O-ring & Flat Cap	A - Silicone B - Fluorocarbon C - EPR D - Nitrile

Example; The part number for a 30" BevASSURE BNA020 Filter, 0.2 micron retention rating, 226 silicone O-ring connector with locating spear, would be: **BNA020F03BA**.

BevASSURE BNA020 Filter Disc Ordering Guide

Part Number	Size / Packaging
NM04708 BNA020	47 mm disc / 40 box

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Cuno Incorporated

400 Research Parkway
Meriden, CT 06450, U.S.A.
Tel: (800) 243-6894
(203) 237-5541
Fax: (203) 630-4530
www.cuno.com