

# 3M Purification

Food and beverage markets



## LifeASSURE™ BA Series cartridge filters

Robust Nylon 6,6 membrane filters  
for beverage microbiological stability

- ☑ New name for CUNO BevASSURE II cartridges
- ☑ More cost-effective filtration with multi-zone microporous membrane technology
- ☑ Higher flow with lower pressure drop
- ☑ Advanced cartridge construction and 40% more surface area
- ☑ Designed for more sanitation and chemical cleaning cycles





## LifeASSURE BA Series filter cartridges with a multi-zone microporous membrane

### Advances in membrane technology

LifeASSURE™ BA filter cartridges, formerly known as CUNO BevASSURE II, incorporate 3M Purification's multi-zone microporous membrane technology that allows casting of an integral membrane onto a variety of substrates. The result is a membrane with characteristics, such as an increased flow and reduced pressure drop, tailored to provide ideal performance for the intended application.

### Enhanced cartridge design

This membrane technology is combined with a cartridge design construction to provide enhanced mechanical and thermal resistance. This superior construction allows longer service life even under the most demanding process conditions and enables full use of the multi-zone microporous membrane advantage.

### LifeASSURE BA cartridge filters reduce your final filtration costs by 50% or more in three ways:

#### I. Longer life from greater surface area

The current LifeASSURE BA filter has 40% more surface than the previous LifeASSURE BA filter and 20 to 50% more surface area than competitive filters. Cartridge filter life is directly proportional to filter area and inversely proportional to face velocity (flow rate per filter area). For most beverages, when the filter area is doubled at the same flow rate, the throughput is increased by two and half times. The LifeASSURE BA filter area is 20 to 50% higher than competitive filters, so the face velocity can be lower and throughput greater.



#### II. Longer life from repeated alkaline regeneration

LifeASSURE BA cartridges and LifeASSURE BLA prefilter cartridges are both manufactured to withstand a mild alkaline flush after each day's run (typically 30 minutes of forward recirculation of 2 to 5% NaOH at 60 °C). Throughputs are improved from 3 to 10 times for most beverages depending on when the cleaning cycles are started.

#### III. Longer life from enhanced hot water stability

Hot water sanitation and warm water flushing to dissolve accumulated contaminants are common practices in beverage plants. Longer hot water stability means longer filter life. The LifeASSURE BA filter cartridge is constructed with a nylon membrane optimised for enhanced thermal stability to ensure more hot water cycles (50 cycles for 30 minutes held at 80 °C) than any competitive filter<sup>1</sup>.

## Saving with LifeASSURE BA Series filters

### I. More surface area

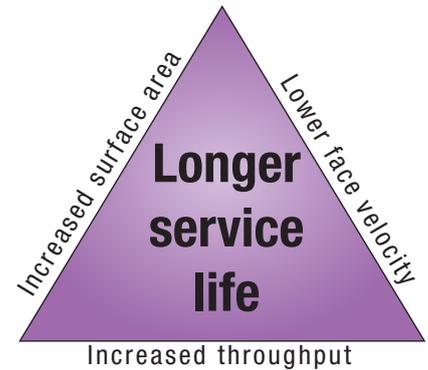
The LifeASSURE BA filter, when compared to a competitive filter at the same flow rate, provides immediate benefits by improving throughput, a direct result of the LifeASSURE BA filter's greater surface area (see graph 1) and lower face velocity (flow per unit area of membrane).

With 40% more surface area than the previous LifeASSURE BA filter and most competitors, current LifeASSURE BA provides a 40% reduction in face velocity.

Longer life from increased surface area = 40% or more

Longer life from lower face velocity = 10% more<sup>2</sup>

Total life improvement factor = 50% or more



### II. Cleanable - Caustic compatible

Mild alkaline flushing for regeneration can improve throughputs by a factor of 3 to 10 times compared to cartridge filter life without regeneration. (This benefit is enhanced if LifeASSURE BLA prefiltration is also used because the prefilter can also be cleaned and the throughputs for both filters will be improved.)

Assume: 2% NaOH regeneration improves throughput threefold

Lifetime improvement factor = 3 times

#### Combined lifetime improvement

By combining the increased throughput provided by the greater surface area with the increased throughput resulting from filter regeneration, LifeASSURE BA filters can increase system service life by over 100% to even 300% or more.

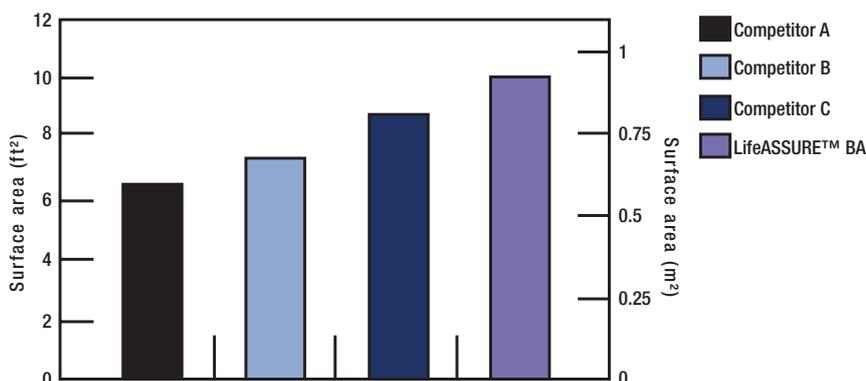


#### Smaller housings

For a new bottling line, installing LifeASSURE BA filters instead of a competitive final filter would save hardware costs in proportion to the extra area in the LifeASSURE BA cartridge. Where a competitor would recommend ten 30" cartridges, LifeASSURE BA filters provide the same flow rate/pressure relationship with only five to eight 30" cartridges. A smaller housing can be used and the capital costs are less.

### III. Longer service life - Hot water sanitation

For very clean beverages, the LifeASSURE BA filter's 50 hot water sanitation cycle specification means that the filter needs to be changed less frequently than competitive cartridges<sup>1</sup>.



Graph 1 - LifeASSURE™ BA filters provide the maximum surface area to reduce initial differential pressure, providing longer filter life and minimise overall filtration cost.

<sup>2</sup> Meier, et al., Proc. 23rd Convention of the Institute of Brewing, Asia Pacific Section, 1994.



## LifeASSURE BA Series filter cartridges . . .

### Quality, economy and consistent performance

Membrane filtration is the premier method of achieving microbiological stability in the container without the use of chemicals or heat. The organoleptic properties are completely preserved until the product is opened, be it weeks, months or years after filling.

The LifeASSURE BA 0.65 µm rated filter removes contaminating yeast, molds and most spoilage bacteria from liquids. The LifeASSURE BA 0.45 µm rated filter removes not only yeast and molds, but even the smallest spoilage bacteria such as *Oenococcus oeni*, *Lactobacillus brevis* and *Pediococcus damnosus*.

### Longer life with caustic cleaning

Reports<sup>3</sup> show that most beverage membranes are fouled and plugged not by accumulated particulates and microorganisms, but by soft colloids of glucans, proteins and tannins that result from processes inherent in beverage manufacture. Removal of these deposits before significant build up results in longer filter life and improved process economies. Cleaning agents such as sodium hydroxide (long used by beverage bottlers) can effectively reduce the impact of colloidal material on filter life. Advances in LifeASSURE BA membrane and cartridge construction have resulted in a filter design that is cleanable using a dilute caustic solution. Laboratory studies conducted on plugged membranes showed 3 to 10 times more throughput by regular use of the caustic cleaning regime outlined in the table above after each bottling cycle.

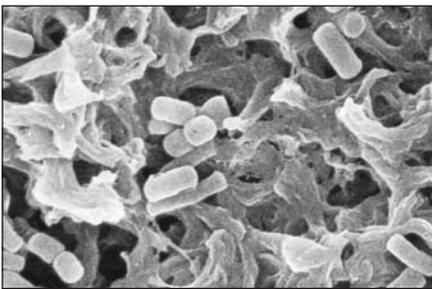
### Superior bacteria retention

In bacteria challenge studies, LifeASSURE BA 0.45 micron rated membranes consistently provided log reduction values (LRV's) of > 9 for *Lactobacillus brevis*, > 8 *Serratia marcescens* and > 7 for *Oenococcus oeni* (formerly *Leuconostoc oenos*) at a minimum challenge level of  $1 \times 10^7$  CFU/cm<sup>2</sup> of membrane surface area. LifeASSURE BA 0.65 micron rated membranes provided complete retention of the spoilage yeast *Dekkera intermedia* (formerly *Brettanomyces*) at a concentration of  $1 \times 10^5$  CFU/cm<sup>2</sup> of membrane surface area. **These challenge levels are considerably higher than those commonly encountered in actual beverage filtration.**

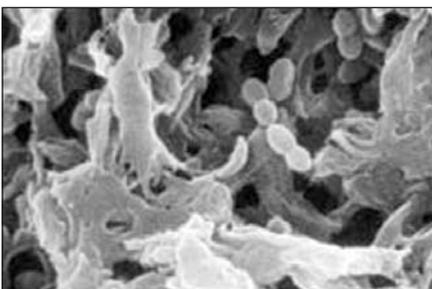
### Integrity testing

LifeASSURE BA filters can be integrity tested *in situ* by users. Bubble point pressure, diffusion flow or pressure hold procedures can be performed while filters are in the housing, thus providing assurance of the filter's efficiency to remove spoilage microorganisms on-line. A guide to integrity testing LifeASSURE BA systems is available from 3M Purification.

Recommended cleaning parameters	
NaOH conc.	2 - 3% by weight
Temperature	60 °C
Flow rate	> 4 lpm/10" filter
Duration	30 minutes



**Figure 1** - Scanning electron micrograph of the beer spoilage organism, *Lactobacillus brevis*, trapped on LifeASSURE™ BA 0.45 µm membrane.



**Figure 2** - Scanning electron micrograph of the secondary fermentation organism, *Oenococcus oeni* (formerly *Leuconostoc oenos*), trapped on LifeASSURE™ BA 0.45 µm membrane.

<sup>3</sup> Meier, et al, MBAA Technical Quarterly V32 1995.

## LifeASSURE BA Series cartridge specification

LifeASSURE BA filter cartridges are constructed of a single-layer reinforced, Nylon 6,6 microporous membrane pleated with polypropylene upstream and downstream support materials. The cage, core and end cap adapters are made of polypropylene. Multiple length 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. Cartridges are manufactured under an ISO certified quality system using the most advanced thermoplastic welding techniques to ensure filter integrity. LifeASSURE BA filters are 100% integrity tested after manufacture to ensure quality.

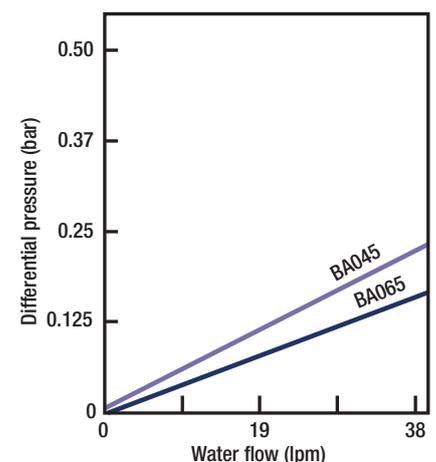
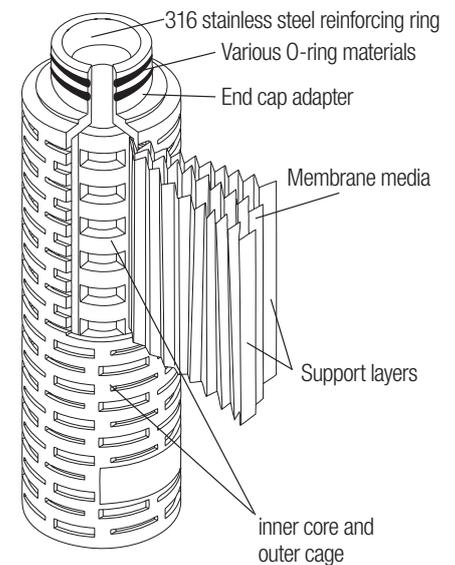
Recommended operating parameters		
Short term maximum operating temperature	80 °C at < 2.4 bar	
Maximum operating differential pressure at 25 °C	Forward:	5.5 bar
	Reverse:	3.4 bar
Recommended flow rate per 10" filter	Water - 11 lpm	
	Wine - 8 lpm	
	Beer - 4 lpm	
Recommended change-out differential pressure	2.4 bar	
Hot water sanitation (50 cycles)	80 °C, 30 min.	
Steam sterilisation (20 cycles)	121 °C, 30 min.	
Cartridge filter surface area per 10" filter	0.95 m <sup>2</sup>	
Integrity test parameters		
	045 Grade	065 Grade
Forward flow diffusion	< 15 cc/min at 1.4 bar	< 15 cc/min at 0.9 bar
Minimum bubble point	1.7 bar	1.1 bar
<b>Note:</b> Integrity tests should be performed at ambient temperature with a regulated supply of compressed air or N <sub>2</sub> and a water-wet cartridge.		
Regulatory compliance		
 LifeASSURE™ BA Series filter cartridges comply with the requirements of Regulation (EC) 1935/2004 for their intended food contact applications. All materials of construction are listed in the FDA CFR Title 21. Contact 3M Purification for further information.		

## Prefiltration

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 Purification offers two premium prefilter choices: Zeta Plus™ HT Series depth filter cartridges and LifeASSURE BLA multi-zone microporous membrane filter cartridges. Zeta Plus HT filters have long been used in clarifying fine wine in both cellar operation and in-line to the bottler. Customers preferring cylindrical prefilters can select from 3M Purification's LifeASSURE BLA prefilter family. Containing a dual-zone version of the nylon multi-zone microporous membrane, LifeASSURE BLA filters are designed to deliver excellent throughputs with high flow rates, while providing the ultimate in final membrane protection.

Recommended LifeASSURE™ BLA prefilter selections		
	Regular service	Greater protection
Prefilter for LifeASSURE™ BA 045BA (0.45 µm)	LifeASSURE™ BLA065	LifeASSURE™ BLA045
Prefilter for LifeASSURE™ BA 065BA (0.65 µm)	LifeASSURE™ BLA080	LifeASSURE™ BLA065

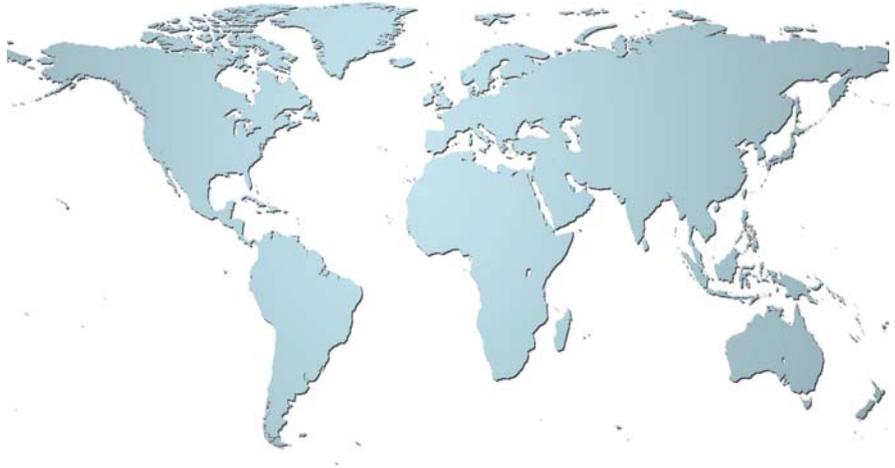
## Standard cartridge construction



Graph 2 - Clean water flow rate vs. differential pressure for one 10" equivalent cartridge length at 25 °C

3M Purification, formerly known as CUNO, is a world leader in the design, manufacture and manufacturing of filtration products for the separation, clarification and purification of fluids and gases. Its products are widely used throughout the global healthcare, industrial and water markets.

## 3M Purification: a world leader in fluid filtration



3M Purification, part of the 3M Company, has manufacturing facilities with ISO registered quality systems located in the United States, Brazil, Europe, China, Japan and Australia and sales offices around the world. Global manufacturing, together with trained stocking distributors and state-of-the-art laboratory support, bring quality solutions to beverage separations.

3M Purification's leadership in fluid purification has expanded by continually providing superior products and services. 3M Purification filtration systems are designed and manufactured to the most stringent industry standards. This assures reliability of 3M Purification systems which beverage manufacturers around the world have come to expect.



### Scientific Applications Support Services (SASS)

The cornerstone of 3M Purification'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.

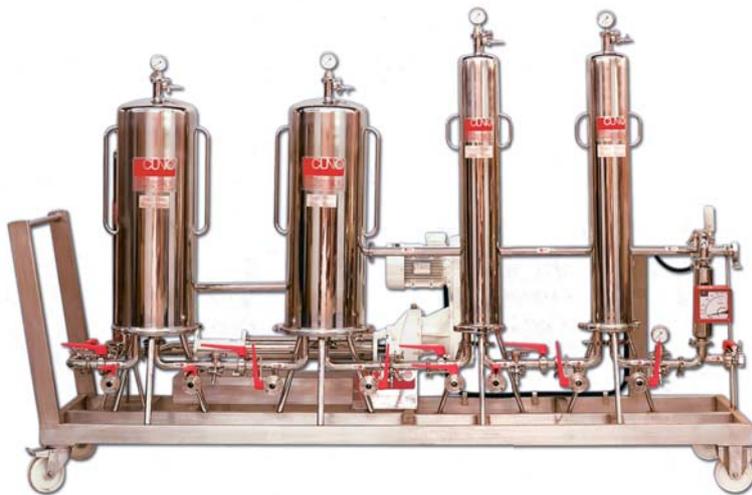
The Scientific Application Support Services (SASS) group is a market-oriented group of scientists and engineers who work closely with customers to solve difficult separations problems and aid in the selection of the most effective and economical filtration systems.

SASS provides a vital link between 3M Purification and users of 3M Purification filter systems. SASS specialists are skilled in performing on-site Vmax testing (a predictive method for filter 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 considerable experience with countless beverage installations provides the knowledge and insight to resolve problems promptly and efficiently in a cost-effective and confidential manner.

## Completing the beverage filtration system

A specialised range of filter housings is available to meet the needs of the beverage industry. They provide easy access for filter change-out and the greatest assurance that LifeASSURE BA filter cartridges are sealed securely, thus eliminating the possibility of fluid bypass.

All housings are constructed using 316L stainless steel to maximise corrosion resistance. All internal surfaces are polished to 20 micro-inch Ra to limit microbial adhesion and provide easy cleaning.



In addition to a full range of filter housings, 3M Purification designs and manufactures skid-mounted filtration systems to suit the specific requirements of your operation.



### IW Series filter housings

The 3M Purification IW series of filter housings are for high volume beverage filtration applications requiring multiple LifeASSURE™ BA cartridges.

### 3M Purification filter housings

Housing IW specifications	01 IWN / 03 IWN / 05 IWN / 08 IWN	12 IWN	18 IWN / 24 IWN
Design code	AD Merkblätter 95		
Housing material (in contact)	316L (1.4404) stainless steel		
Surface finish	Mechanical polish < 0.8 micron Ra		
Closure	Clamped	Bolted	Bolted
Number of cartridges	1 - 3 - 5 - 8	12	18 -24
Standard gasket material	Silicone (others on request)		
Cartridge height	1, 2, 3 and 4 high		3 and 4 high
Connection sizes	<ul style="list-style-type: none"> <li>• Threaded male DIN 11851</li> <li>• Triclover</li> </ul>	<ul style="list-style-type: none"> <li>• DIN 2633 flanges</li> <li>• MACON</li> </ul>	
Vent connections	½" TC		
Max. operating pressure	10 bar g	9 bar g	8 bar g
Max. operating temperature	150 °C		
PED 97/23/CE	Category I		Category I (18 IWN) Category II (24 IWN)
ATEX 94/9/CE	II-2-G/D-T5		

This table is intended as a guide. Grade selection and performance should be confirmed with small-scale pilot trial.

## LifeASSURE™ BA Series filter cartridges - Ordering guide

Filter type	Rating	Configuration	Length	End modification	O-ring/gasket material
BA	045 – 0.45 µm 065 – 0.65 µm	A	01 - 10" 02 - 20" 03 - 30" 04 - 40"	B - 226 bayonet lock with O-rings and spear C - 222 O-rings and spear D - Double open end, flat gasket (10" multiples) E - Double open end, flat gasket (9 ¾" multiples) F - 222 O-rings and flat cap J - 226 bayonet lock with O-rings and flat cap T - 222 with spear (S code 28, not available with support ring)	A - Silicone (MVQ)* B - Fluorocarbon (FPM)* C - EPR (EPDM)* D - Nitrile (NBR)* H - Colourless Silicone

\* ISO Designation

**Note:** LifeASSURE BA is the new name for CUNO BevASSURE II cartridges.

Example: The part number for a 30" LifeASSURE BA Filter, 0.45 micron retention rating, 226 silicone O-ring connector with locating spear, would be: BA045A03BA.

### 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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