

LifeASSURE[®]

Cartridge Filters for Beverage Service

New FlexN[™] Multi-Zone Membrane Design

Combined with the Innovative
Advanced PleatTechnology[™]
Construction

- ✓ Exceptional protection of downstream membranes
- ✓ Extended service life for lower running costs
- ✓ Enhanced flexibility in prefiltration selection



LifeASSURE® Cartridge Filters

LifeASSURE filter cartridges are CUNO's latest advance in membrane filter technology. Encompassing two leading-edge processes, FlexN membrane manufacture and Advanced Pleat Technology™ (APT)¹ construction, the LifeASSURE series of filters offers unmatched protection of final membrane filters, as well as exceptionally long service life. Designed with pleated Nylon 66 membrane in an all-polypropylene cartridge construction, LifeASSURE filters are ideally suited for a wide range of pre-filtration and clarification applications in the beverage industry.

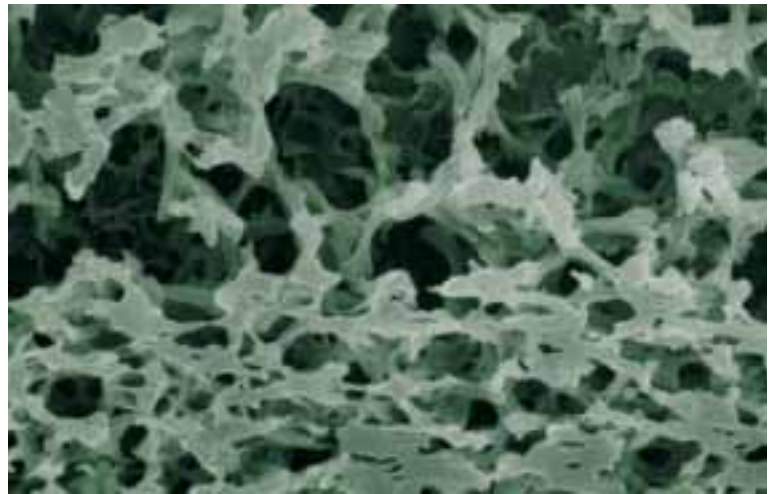
Optimal System Performance

Used as a prefilter, LifeASSURE filters protect and extend the service life of CUNO's BevASSURE® II, Zetapor®, and SterASSURE™ final filters, as well as other membrane filters. LifeASSURE filters will:

- increase final filter life substantially, often by 10 times or more,
- decrease filter change-outs, greatly reducing filter costs, and
- significantly reduce effluent microorganism content

FlexN™ Membrane Technology

LifeASSURE cartridge filters incorporate CUNO's advanced FlexN membrane technology². It allows unmatched flexibility in creating a multi-zone membrane that offers the maximum in contaminant holding capacity while maintaining high retention efficiency. The SEM photograph at right shows that the *single layer* LifeASSURE membrane consists of an "open" zone on the upstream side of the membrane and a "tighter" zone on the downstream side. In effect, the open zone acts as a pre-filter by capturing larger particles and colloids while the tighter zone provides the retention of smaller contaminants. This multi-zone structure eliminates dual-layer membrane construction to provide a larger surface area, significantly increased contaminant holding capacity, and longer service life.



Features	Benefits
■ Multi-zone, FlexN Nylon membrane	■ Increased contaminant capacity ■ Extended service life ■ Maximum membrane protection ■ Lower total filtration costs
■ Advanced Pleat Technology construction for extremely high surface area	■ Higher throughputs and longer service life ■ Lower total filtration costs
■ 100% Integrity tested in manufacturing and <i>in situ</i>	■ Ensures proper installation and operation
■ True membrane construction	■ Significant reduction of microorganisms
■ Constructed with CFR 21 listed materials	■ Safe for food contact

¹US Patent 6,315,130 ² US Patents 6,090,441; 6,204,044; 6,280,791; and 6,513,666

Advanced Pleat Technology™ Construction

LifeASSURE cartridge filters also feature CUNO's innovative Advanced Pleat Technology (APT) construction for extended service life. This design technology maximizes the useful surface area of the filter while maintaining proper flow paths between media pleats. By employing as much as 50% more effective surface area* than competitive filters (see chart 1), the LifeASSURE filter provides lower pressure drops, longer service life, and lower overall filtration costs.

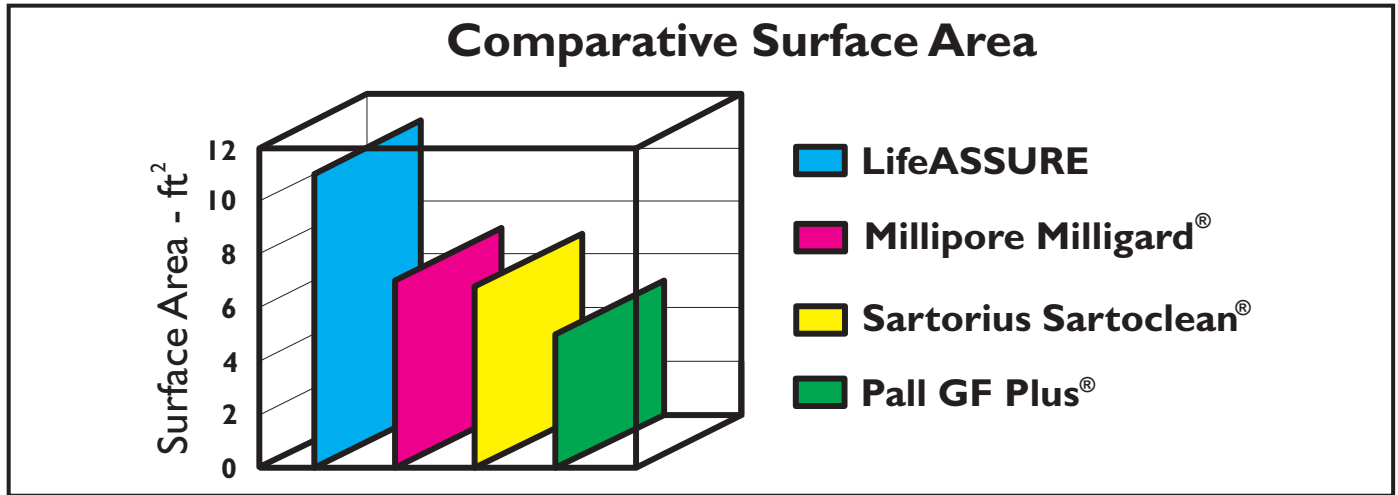


Chart 1. - Surface Area Comparison

Significant Microorganism Reduction

CUNO LifeASSURE filters consistently exhibit a greater reduction of microorganisms than competitive filters that are either constructed of glass or polypropylene fibers, or filters that are constructed with non-integral membranes. For effective prefiltration and clarification of beverages, microorganism reduction is a critical parameter resulting in economical, reliable filter systems.

In tests with *Brevundimonas diminuta*, (considered one of the smallest bacteria) LifeASSURE BLA020 grade filters exhibited an average log reduction value** (LRV) of 7.3 and the LifeASSURE BLA045 grade filters exhibited an average LRV of 3.5.

Products	LRV
LifeASSURE BLA020	7.3
Millipore Milligard CWSS	4.5
LifeASSURE BLA045	3.5
Millipore Milligard CWSC	2.6

Table 1. - Comparative Log Reduction Values

Optimize for Service Life and Effluent Quality

As the data in Charts 2 & 3 demonstrate, LifeASSURE cartridges are designed to provide both enhanced service life and performance. When compared to competitive products, the available grades of LifeASSURE filters allow the user to select equivalent effluent quality with vastly superior life, or improve the effluent quality with reduced, yet competitively superior, service life. Either way, the result is the same, LifeASSURE filters allow significantly more throughput than the competitive filters and provide up to double the service life.

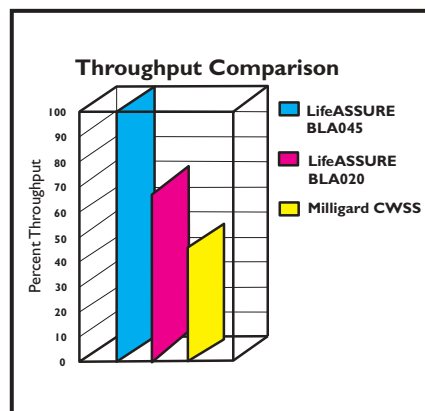


Chart 2. - Throughput comparison of LifeASSURE filters and 0.2 µm nominal filters.

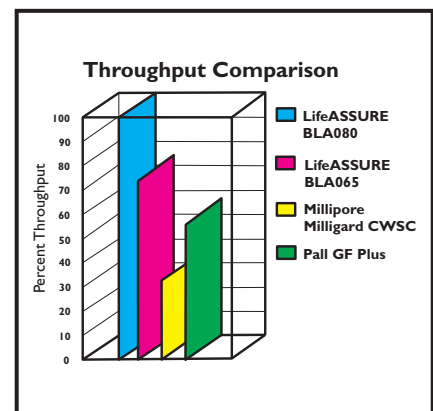


Chart 3. - Throughput comparison of LifeASSURE filters, a 0.5 µm nominal filter, and a 1µm absolute filter.

* Competitive filter surface area data are from the manufacturer's published literature.

** LRV = log10 number of organisms in/number of organisms out.

Milligard® is a registered trademark of Millipore Corporation, Sartoclean® is a registered trademark of Sartorius AG, GF Plus® is a registered trademark of Pall Corporation.

Prefilter Selection

Since beverages encompass a wide range of fluid conditions, CUNO provides an array of LifeASSURE prefilters to meet the needs of filter users.

Prefiltration selection is highly dependent on:

- the nature of the fluid
- the particulate/colloid content of the fluid
- the amount of pretreatment or clarification of the fluid
- the rating of the membrane filter being protected

The table below is provided as a guide to prefilter selection, although actual process conditions may dictate the use of a more open or closed prefilter, than specified below. Prefilter selection can be aided by smaller scale pilot tests or flow decay studies using membrane discs. Consult CUNO's Scientific Applications and Support Services (SASS) or CUNO Technical Sales for more information.

Prefilter Selection Chart

Grade	Upstream Zone	Downstream Zone	Fluid Condition	Prefilter for:
BLA020	0.65µm	0.2µm	Low particulate/colloid content	Zetapor® / SterASSURE 0.20 micron
BLA045	0.8µm	0.45µm	Low particulate/colloid content	Zetapor® / SterASSURE 0.20 micron
				Or BevASSURE® BA045
BLA065	1.2µm	0.65µm	High particulate/colloid content	BevASSURE® BA045
BLA080	2.5µm	0.8µm	High particulate/colloid content	BevASSURE® BA045
				Or BevASSURE® BA065

CUNO Final Filters

BevASSURE® II Filters - Typically employed as the final filter in wine and beer filtration, the BevASSURE II series filter has up to 40% more surface area than competitive filters, is resistant to repetitive hot water sanitation, and provides excellent throughputs for low running costs. Available in both 0.65µm and 0.45µm retention ratings, BevASSURE II cartridges are the filters of choice for discerning brewers and winemakers.

SterASSURE & Zetapor Filters – typically employed as final filters in applications requiring absolute retention of microorganisms at 0.2 µm. Both are qualified for absolute retention of *B. diminuta* (ATCC 19146) following American Society of Testing and Materials (ASTM) methodology at a minimum challenge level of 10⁷ CFU/cm² of filter area, and both are available with Validation Guides. SterASSURE filters contain non-charge modified, double-layer, dual zone, Nylon 66 membrane while Zetapor filters contain positively charge-modified Nylon 66 membrane.



Benefits of Higher Per-Cartridge Flow Rates

The unique LifeASSURE filter construction results in a higher per-cartridge flow rate at the same pressure drop when compared to competitive filters. This can reduce filter costs two ways:

Change-out filters less frequently - For existing applications at a given flow rate, filter cartridges with more surface area per-cartridge have a lower flux (flow per unit surface area) than those filter cartridges with less surface area. Since service life is inversely proportional to flux (lower flux = longer service life) in most applications, LifeASSURE filter cartridges provide longer service life and require fewer cartridge change-outs.

Reduce filter housing costs - For new applications (where filter housing size is selected based on a desired “clean” initial pressure drop), filter cartridges that provide a higher flow rate per-cartridge at a given pressure drop will require fewer cartridges, and hence a smaller filter housing, to complete the task.

Installation Integrity Test

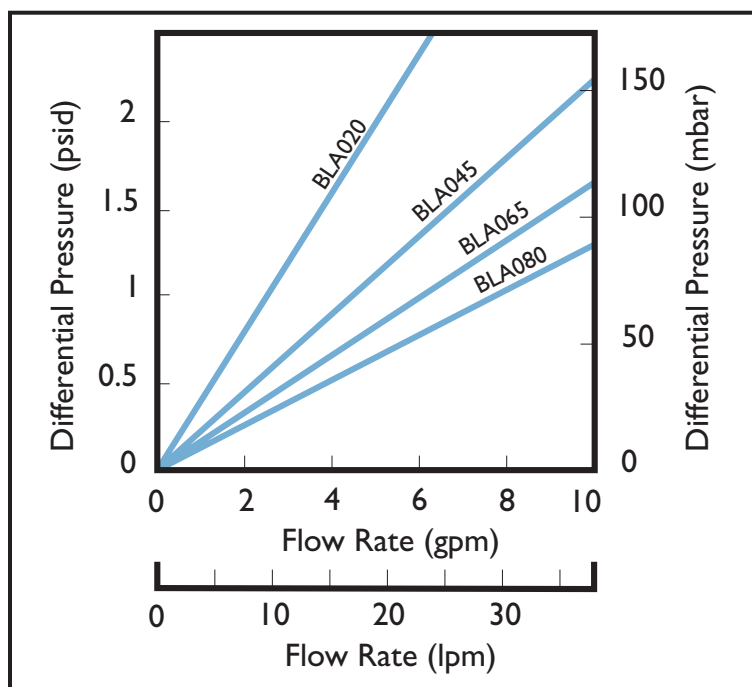
The installation integrity test is a non-destructive measurement of a filter’s ability to function as intended. Conducting an installation integrity test assures the user that the filter is installed and sealed correctly in the filter housing and is ready for service.

Unlike other pre-filters, LifeASSURE filter cartridges are 100% tested for integrity in manufacturing prior to shipment. Additionally, LifeASSURE filter cartridges are integrity testable in situ by the user. For integrity test procedures and values, please consult CUNO document LITTDCO3.

Sanitation and Sterilization

The use of hot water (176°F/80°C) sanitation or steam (250°F/121°C) sterilization are common strategies employed in beverage production to maintain clean systems. LifeASSURE filters are constructed with patented* Nylon 6,6 membrane optimized for thermal stability to ensure resistance to hot water or steam cycles.

Cartridge Flow Rates



LifeASSURE 10” cartridge water flow rates @ 77° (25°C)

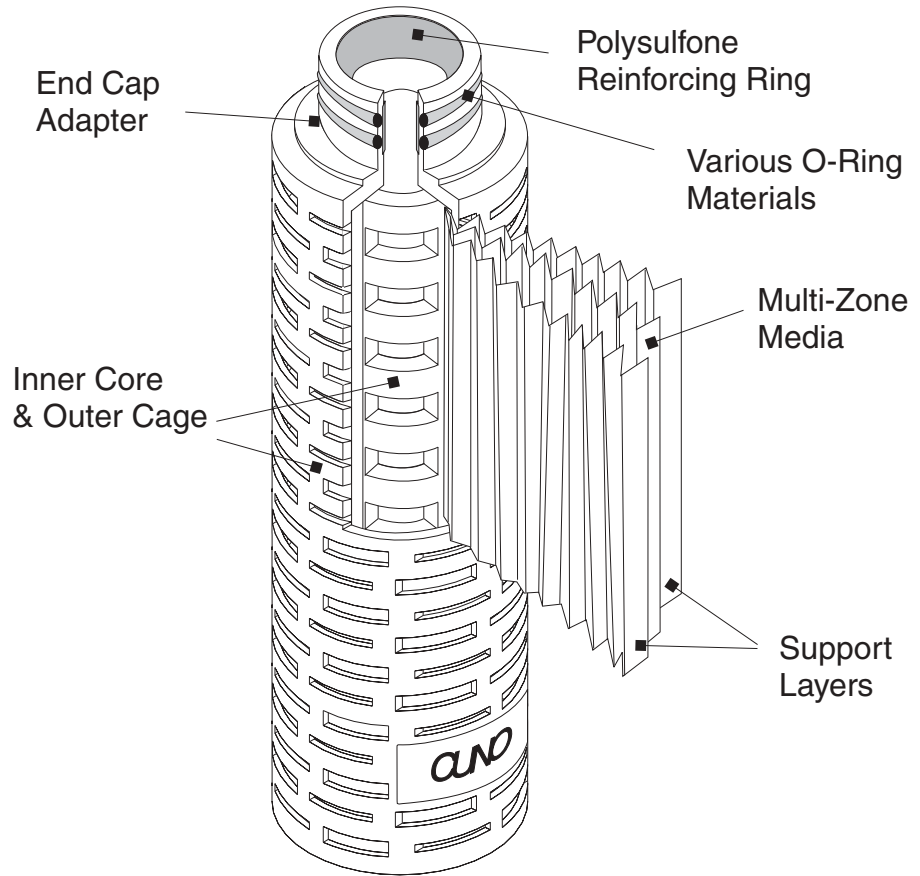
Longer Life with Caustic Cleaning

Cleaning solutions, such as sodium hydroxide, can effectively reduce the impact of beverage colloids in plugging membrane filters. LifeASSURE filters, as with BevASSURE II final filters, can be cleaned with a dilute caustic flush, reducing differential pressure build up and extending service life.

Recommended Cleaning Parameters	
NaOH concentration	2% by weight
Maximum Temperature	140°F/60°C
Flow rate	3 GPM/11 LPM
Duration	30 minutes

LifeASSURE Cartridge Construction

LifeASSURE filter cartridges are constructed of single-layer, patented Nylon 66 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. All materials used in manufacturing are traceable and CFR 21 listed for direct food contact. Cartridges are manufactured under an ISO 9001:2000 Quality Management System (QMS) using the most advanced thermoplastic welding techniques to ensure filter integrity. LifeASSURE filters are 100% integrity tested after manufacture to ensure quality.



Cartridge Component	Material of construction
Cage, Core, End-Caps, and Media Support Layers	Polypropylene
Membrane	Nylon 66
Adapter Support Ring	Polysulfone
Cartridge Dimensions	Dimension
Filtration Surface Area	11ft ² (1m ²)
Outside Diameter	2¾" (7 cm) nominal
Length	Nominal 10, 20, 30, and 40 inches (Nominal 25.4, 50.8, 76.2, and 101.6 cm)
Operating Parameters	Specification
Maximum Operation Temperature	176°F (80°C) for 30 min. sanitation
Maximum Differential Pressure	Forward: 80 psid (5.5 bar) @ 77°F (25°C) 25 psid (1.7 bar) @ 176°F (80°C)
	Reverse: 50 psid (3.4bar) @ 77°F (25°C)
Recommended Filter Change-out Differential Pressure	35 psid (2.4 bar)
Hot Water Sanitation	30 minutes @ 176°F (80°C)
Steam Sterilization	30 minutes @ 250°F (121°C)
Integrity Test Methods	Consult CUNO for appropriate values for the specific filter and housing in use.

Scientific Applications Support Services (SASS)

The cornerstone of CUNO’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. CUNO’s Scientific Applications Support Services 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 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 CUNO’s extensive state-of-the-art laboratory facilities. CUNO’s vast experience with countless beverage installations provides the knowledge and insight to resolve problems promptly and efficiently in a cost-effective and confidential manner.



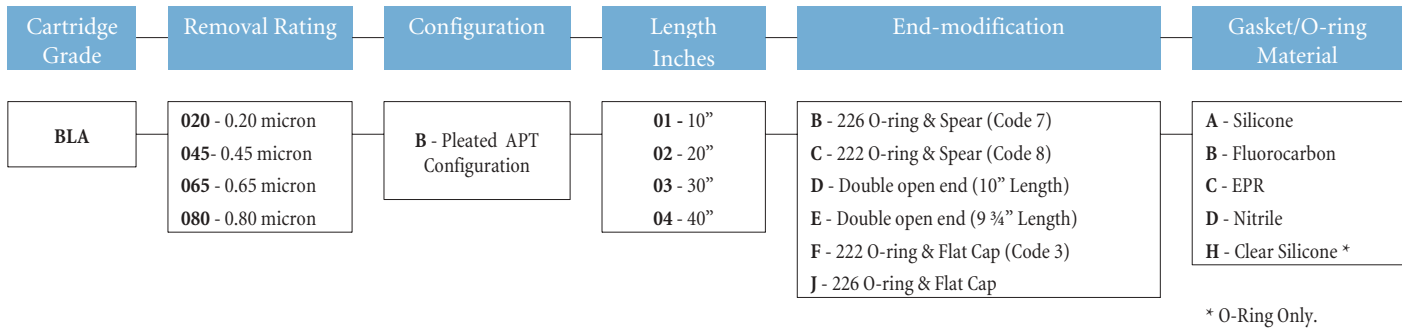
CUNO Filter Housings

A specialized range of filter housings are available to meet the needs of the beverage industry. They provide easy access for filter change-out and the greatest assurance that LifeASSURE filter cartridges are sealed securely, thus eliminating the possibility of fluid bypass. All housings are constructed using 316L stainless steel to maximize corrosion resistance. Internal surfaces of the ZWB & ZWC filter housings are polished to limit microbial adhesion and provide easy cleaning.



CUNO Filter Housings						
	ZWC (Clamp Style Closure)		ZWB (Swing Bolt Closure)		SD (Clamp Style Closure)	
	Model By Cartridge Capacity	Number of Cartridges*	Model By Cartridge Capacity	Number of Cartridges*	Model By Cartridge Capacity	Number of Cartridges*
Base Housing Models	4ZWC	4	4ZWB	4	5SD	5
	8ZWC	8	8ZWB	8	12SD	12
	11ZWC	11	11ZWB	11	22SD	22
	21ZWC	21	21ZWB	21		
Housing Style	t-line Sanitary type connection				NTP & Raised Face Flange	
Cartridge Lengths	10, 20, 30, and 40 inches					
Materials of Construction	316L Stainless Steel					
Literature #	LITZRH.106		LITZRH.106		LITHSSD1	
* Cartridge Lengths from 10" to 40"						

Ordering Guide



WARRANTY

Seller warrants its equipment against defects in workmanship and material for a period of 12 months from date of shipment from the factory under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by Seller and for purposes disclosed in writing at the time of purchase, if any. Any unauthorized alteration or modification of the equipment by Buyer will void this warranty. Seller's liability under this warranty shall be limited to the replacement or repair, F.O.B., point of manufacture, of any defective equipment or part which, having been returned to the factory, transportation charges prepaid, has been inspected and determined by Seller to be defective.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, AS TO DESCRIPTION, QUALITY, MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR USE, OR ANY OTHER MATTER. Under no circumstances shall Seller be liable to Buyer or any third party for any loss of profits or other direct or indirect costs, expenses, losses or consequential damages arising out of or as a result of any defects in or failure of its products or any part or parts thereof or arising out of or as a result of parts or components incorporated in Seller's equipment but not supplied by the Seller.

Your Local CUNO Distributor:



a 3M company

CUNO Filtration Asia Pte Ltd
18 Tuas Link 1 (3rd Floor)
Singapore 638599

CUNO Pacific Pty Ltd
140 Sunnyholt Road
Blacktown, NSW 2148
Australia

CUNO Latina Ltda
Rua Amf Do Brasil 251
18120 Mairinque-Sp
Brazil

Cuno Filtration Shanghai Co, Ltd
No. 2 Xin Miao San Rd,
Xin Miao Town,
Song Jiang District,
Shanghai. China. 201612

CUNO K.K.
Hodogaya Station
Building 6F
1-7 Iwai-cho, Hodogaya-ku
Yokohama 240 Japan

CUNO Ltd
21 Woking Business Park
Albert Drive
Woking, Surrey GU215JY
United Kingdom

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