



Zeta Plus[®] Filter Media

for the **Pharmaceutical,
Biological & Bioprocessing** industries



CUNO is part of the 3M Corporation, a multinational organization, and is serving the unique separation requirements of the pharmaceutical and bioprocessing industries with quality filtration products. Global manufacturing together with trained stocking distributors, market specialists and state-of-the-art laboratory support bring quality solutions to existing and challenging new separations.

SCIENTIFIC APPLICATIONS SUPPORT SERVICES (SASS)

CUNO's 90+ years of experience are synonymous with quality, performance and high level technical support. The cornerstone of CUNO's philosophy is service to customers, not only in product quality and prompt delivery, but also in validation, in applications support and in the sharing of scientific information. CUNO's Scientific Applications Support Services group works closely with customers to solve difficult separation problems and to recommend the most economical and efficient filter systems. SASS specialists routinely work with third-party contract laboratories to validate Zeta Plus® filters for viral clearance applications. Contact CUNO's SASS group for more details on viral validation support.

ZETA PLUS® CARTRIDGE SYSTEMS

Zeta Plus® Depth Filter Systems

Zeta Plus® is a family of advanced cellulose based depth filtration media designed to retain contaminants by both mechanical straining and electrokinetic adsorption. For over three decades, CUNO has manufactured Zeta Plus® multicell cartridge filtration systems which combine high efficiency separations with unmatched filter life in a totally enclosed environment. Zeta Plus® systems are used worldwide in pharmaceutical and bioprocessing applications providing safe, reliable, and cost effective filtration.

The Features:

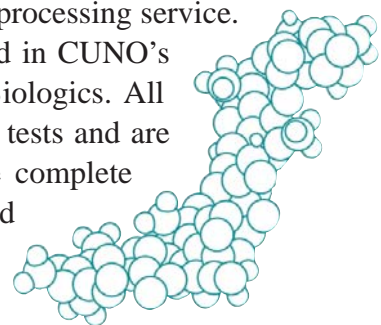
Scaleability from laboratory capsules to pilot-scale cartridges to full production systems, to meet any flow rate requirements.

- New sanitary housings with ultrafine Ra (roughness average) and electropolished surface finish options, improved sealing systems and built-in accessories.
- Advanced cartridge and housing designs with test procedures to ensure system integrity.
- An extended range of depth filtration media for today's separation requirements, including lipid removal, DNA removal, depyrogenation, viral reduction and decolourisation.

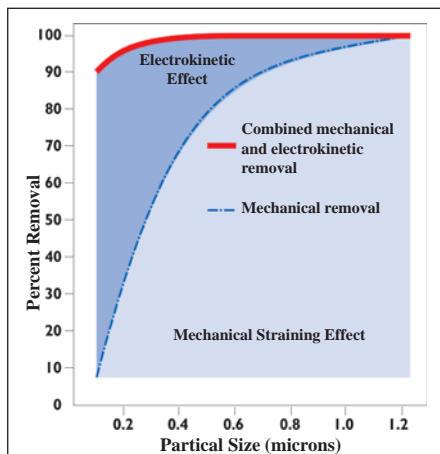
Zeta Plus® Optimization

CUNO™ Zeta Plus® systems are optimised for pharmaceutical and bioprocessing service.

Filter media and cartridges are manufactured to procedures prescribed in CUNO's Drug Master Files on record with the FDA Bureau of Drugs and Biologics. All components meet the requirements of USP Class VI biological safety tests and are compliant with CFR 21. Pharmaceutical grade cartridge filters have complete traceability of all raw materials through to the finished products. Rigid quality assurance standards and procedures ensure reliability and consistent performance. Certification of analysis and performance is available.



What is Zeta Plus® ?



Zeta Plus® Performance

Zeta Plus® is a family of patented filtration media composed of industry-accepted filter aids embedded in a cellulose fibre matrix. During the manufacturing process, molecules carrying a positive charge are chemically bonded to the matrix components permanently forming an interconnected, rigid filter sheet with positively-charged electrokinetic capture sites. The resulting porous filter structure is a tortuous network of charge-enhanced flow channels capable of retaining bacteria, endotoxins, cellular debris and submicronic contaminants to a level which mechanical screening alone cannot achieve. The grade density construction and the charge-enhanced internal adsorptive capacity of Zeta Plus® provide high-efficiency submicron filtration to out-perform pleated prefilters and competitive depth filters.

Zeta Plus® Media Choices

Zeta Plus® is available in a wide range of media and removal ratings, optimised and tested for pharmaceutical and bioprocessing separations.

- **Zeta Plus® SP** - Medical designed for most pharmaceutical and bioprocessing applications, including DNA reduction.
- **Zeta Plus® LP** - Specially formulated and tested for sensitive LAL procedures and pyrogen removal.
- **Zeta Plus® LA/SA/CA** - Media with extremely low extractable levels.
- **Zeta Plus® DELIPID** - Specifically formulated for triglyceride and lipid removal.
- **Zeta Plus® ZetaCarbon®** - Activated carbon media optimised for decolourisation and the removal of trace organics.
- **Zeta Plus® ZA** - Activated carbon media optimised for decolourisation and the removal of trace organics.
- **Zeta Plus® VR** - Media specifically formulated for virus retention.
- **Zeta Plus® Maximizer® EXT**- Dual Zone media construction to increase throughput.

The Advantage of Zeta Plus Cartridges vs. Plate and Frame Filters:

The Zeta Plus® cartridge system has a number of advantages over conventional plate and frame filters. Since the cartridge system utilises a totally enclosed housing, there is no product leakage and no exposure of the filter to external contamination allowing for effective use of the media, high throughputs and low operating costs. The plate and frame filter press design is open to the environment making both filter media and product susceptible to external contamination. The “open” design requires more frequent media change-out cycles, typically every few days. Plate and frame filter are labour intensive, requiring two people four to eight hours to change out the media. Zeta Plus® cartridges are easy to install and remove, usually taking about 15 minutes, resulting in significant labour cost reductions. Coupled with the floor space reduction of the vertical Zeta Plus® housing design and a typical 50% or greater decrease in initial capital cost when compared to a comparable plate and frame filter, the savings become substantial.



Zeta Plus® cartridge systems permit direct and predictable scale-up from laboratory to pilot plant to full scale-production. Shown in the picture are laboratory scale disposable BioCap™ capsules (right), 8", 12" and 16" diameter cartridges (left).

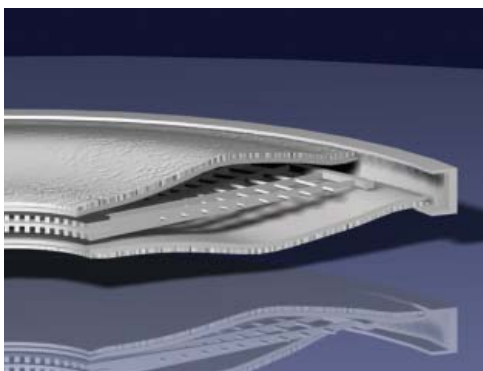
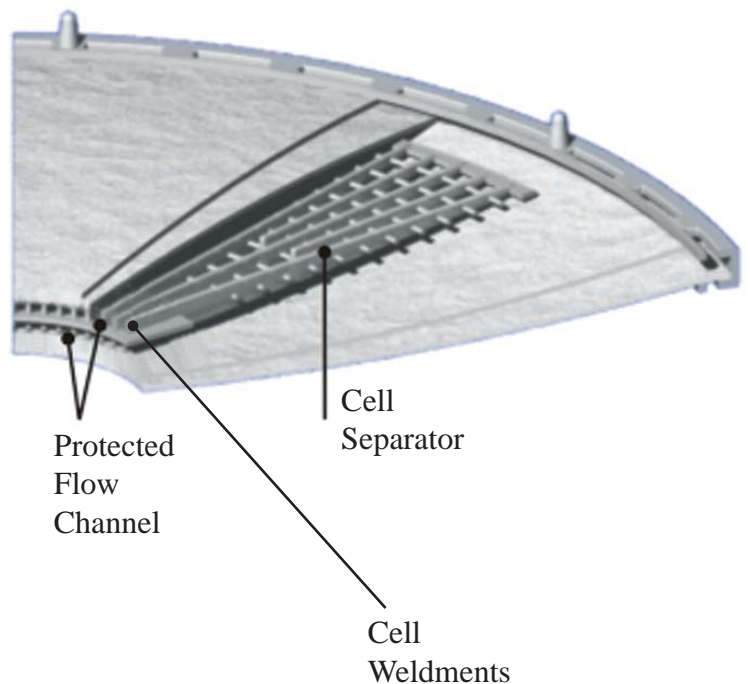
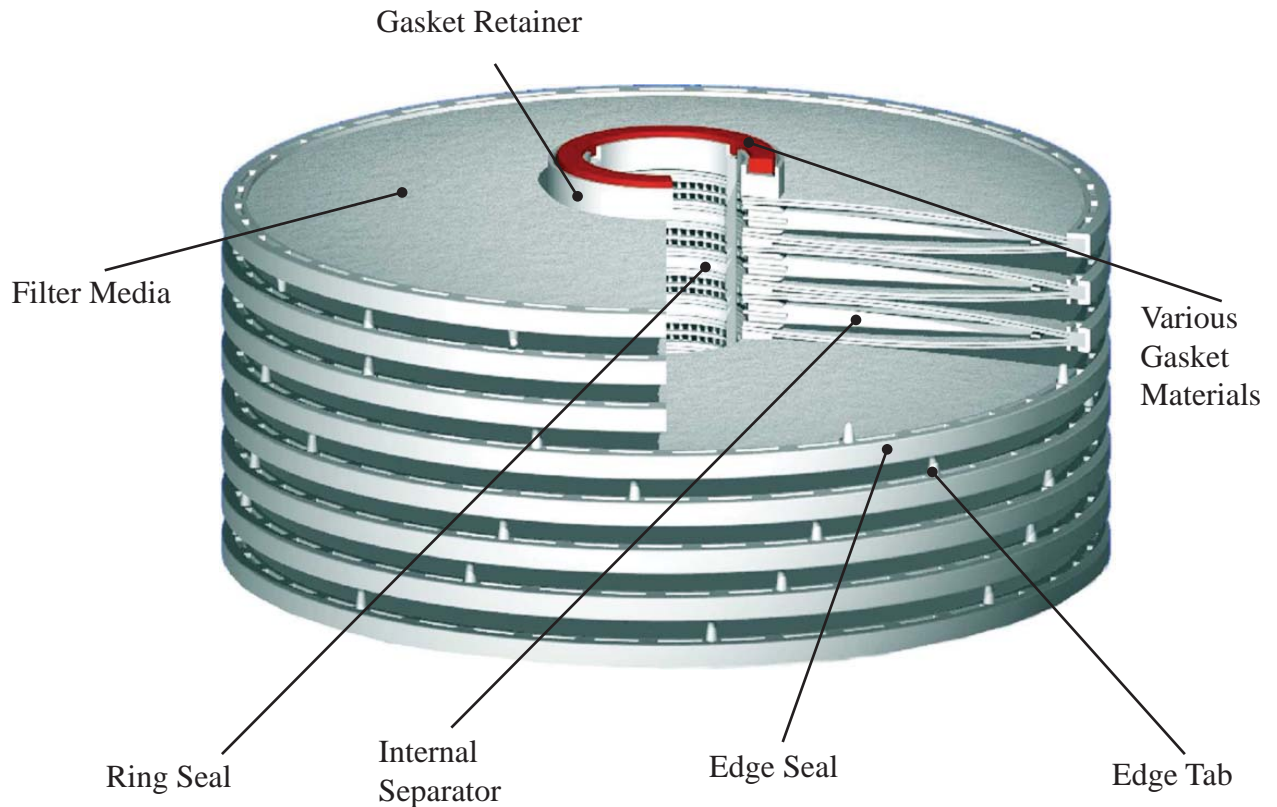


Zeta Plus® Cartridge System

The next level of advanced engineering

Zeta Plus® Cartridge Construction

Zeta Plus® cartridges are constructed from individual cells. Each cell is constructed using polypropylene molded edge seals and internal separators for high performance. The cells are assembled into a cartridge under a predetermined compression and made into a single unit by three 316 stainless steel bands with polypropylene cell separators. Various gasket materials are available depending upon application. Filter cartridges are available in 8, 12 and 16-inch diameters. .



Zeta Plus® System

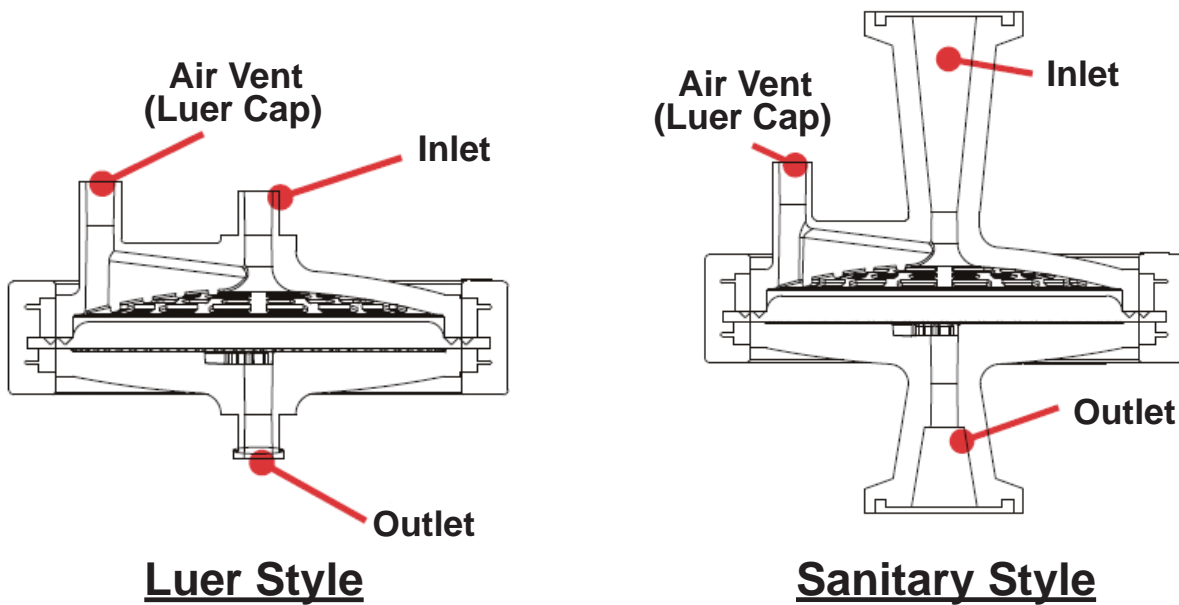
BioCaps®

The Zeta Plus® Scale-up Progression

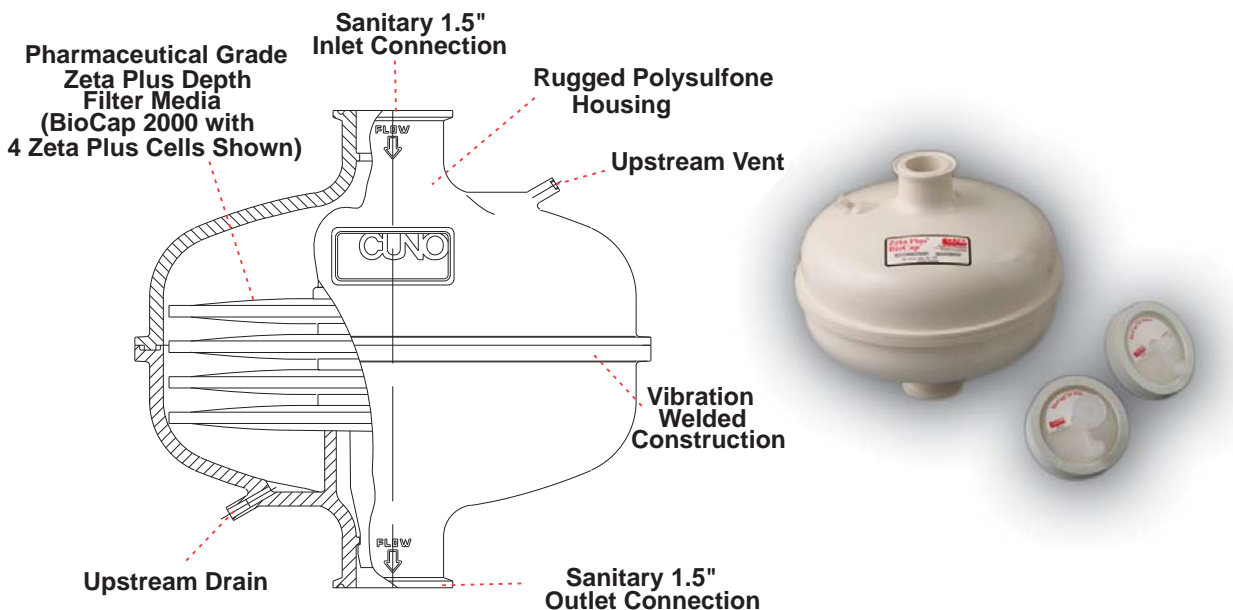
BioCap™ disposable capsules are ideal for scale-up evaluation as process volumes move from the laboratory (bench-scale) to pilot plant scale to manufacturing scale operations.

BioCap™ filtration performance is directly scaleable to production or cGMP manufacturing scale operations with Zeta Plus® 12-inch and 16-inch diameter cartridge systems, designed to fit CUNO's range of sanitary design stainless steel cartridge housings. BioCap™ disposable capsules utilize the same Zeta Plus® filter media offered in 12 and 16-inch diameter filter cartridges enabling linear and predictable scale-up as batch volumes increase.

BioCap® 25 Construction



BioCap® 1000/2000 Construction



Zeta Plus® System

Applications

Bioprocessing Operations

Zeta Plus® filter systems remove cultured cells, cell debris, bacteria, endotoxins and even DNA from cell culture harvest fluids. Zeta Plus® cartridge systems provide low shear clarification of fermenter harvest fluids and can be scaled up from small bench and pilot scale fermentations to production scale processes of several thousand litres.

Blood Fractionation Processes

Specialized Zeta Plus® media with low extractables and high surface area provide high efficiency submicronic filtration. Zeta Plus® Delipid media is optimised for lipid removal from albumin and other protein solutions. Zeta Plus® cartridge systems are utilized worldwide in a variety of blood fractionation processes.



Depyrogenation

Endotoxins are a major concern in the production of parenteral drugs. Zeta Plus® has consistently demonstrated a high degree of pyrogen adsorption from small and large volume parenterals; Zeta Plus® media are designed specifically for enhanced pyrogen removal in purified water and Water for Injection applications.

Membrane and Column Protection

Zeta Plus® is the most cost effective prefilter for removal of high levels of contaminant that would otherwise plug membrane filters and reduce service life. Zeta Plus® also provides the most effective protection for process chromatography systems.



Media Selection

Media Zeta Plus®	Application											
	Blood Fractions	Cell Debris Removal	Depyrogenation	Membrane Protection	Lipid Removal	Serum and Tissue Culture Media	Antibiotic Decolourisation	Oral Liquids	Antibiotic Solvents	DNA Removal	DE or Active Carbon Fines Retention	Virus Retention
SP		✓	✓	✓		✓		✓	✓	✓	✓	
LP	✓		✓	✓		✓				✓	✓	
LA/SA/CA	✓	✓	✓	✓						✓	✓	
Delipid	✓				✓	✓						
ZA			✓							✓		
ZetaCarbon	✓		✓				✓		✓			
VR												✓
Maximizer® EXT	✓	✓	✓	✓		✓		✓				





Zeta Plus® System

- Totally enclosed systems for safety and convenience
- Integrity testable
- Positive pressure sealing for total system integrity
- Filter media for every application
- Sterilisable in-situ
- Sanitary housings with electropolished and ultrafine Ra surface finish options
- Scaleable from bench-top to full production
- CUNO reliability and service

Important Notice

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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 unauthorised 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.



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