

LENNTECH

info@lenntech.com Tel. +31-152-610-900

www.lenntech.com Fax. +31-152-616-289

Zeta Plus™ ZB Series Filter Media

Zeta Plus™ ZB series filter media is an advanced depth filter media designed to provide clarification of bioprocess, biological and pharmaceutical fluids. Zeta Plus ZB series filter media is composed of pre-extracted inorganic filter aid, cellulose and a resin system that imparts a strong positive charge to the filter matrix, aiding its adsorption of negatively charged contaminants. This premium-grade media has been specifically designed for processes that require a high degree of filtration and low metal ion extractables.

Applications

Zeta Plus ZB series filter media is optimized for clarification of bioprocess cell culture fluids and for the reduction of negatively charged contaminants. In solution, cells and cellular debris, endotoxins and contaminating nucleic acids (DNA, RNA) carry a negative charge. 3M's application of positive zeta potential to Zeta Plus ZB series filter media creates a filter matrix that enhances the capture of negatively charged contaminants. The strong positive charge over a broad pH range makes Zeta Plus ZB series filter media ideal for cell broth clarification and for protection of downstream membrane filters.

Superior Particle Reduction

Zeta Plus ZB filter media offers advantages in contaminant reduction because of its strong electrokinetic properties. In addition to the mechanical exclusion of particles by its depth loading feature, Zeta Plus ZB filter media adsorbs contaminants too small for reduction by mechanical straining. Because most particles in suspension are negatively charged, virtually all contaminants can be reduced with proper grade selection.



Applications

Clarification of cell culture process fluids

Clarification of bacteria and yeast cell lysates

Protection of downstream processes including membrane (0.2, 0.1 micron) filters, TFF systems and chromatography columns

Endotoxin and nucleic acid reduction

Clarification of colloidal and haze forming contaminants

Features & Benefits

Broad pH range of strong, positively charge-modified depth filter media.

- Economical, efficient reduction of negatively charged contaminants such as cell debris, colloidal material, endotoxin, DNA, RNA, and bacteria.

Pre-extracted inorganic filter aid.

- Low extractables, fast flush-up.

FDA Drug Master File and USP Class VI Biological Safety.

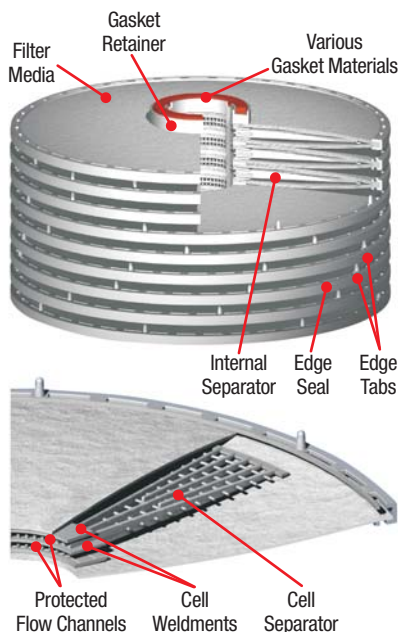
- Eases validation and regulatory submissions by providing vital documentation and data traceability.
- Regulatory documents include reference to USP <87> and <88> Class VI Biological Reactivity Tests.

Full range of cartridge and capsule configurations.

- Full range of scaleable configurations from benchtop to production.

Easy to install filter cartridges.

- Easy to use, reduces labor costs, positive sealing mechanism.

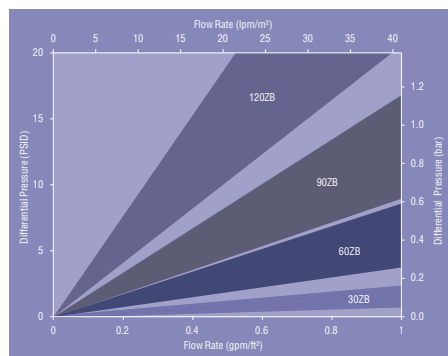


Above: Individual cells of Zeta Plus™ ZB Series filter media is constructed using polypropylene molded edge seals and separators for high performance.



Above: Zeta Plus™ Scale-Up Capsule filters are ideal for pilot scale and low volume applications.

Graph 1: Flow vs. Differential Pressure



Cartridge Construction

Zeta Plus™ cartridges are designed for use with Zeta Plus sanitary style stainless steel filter housings. Cartridges are constructed from individual cells of Zeta Plus ZB series filter media assembled together with polypropylene separators under predetermined compression and unitized by three, 316 stainless steel bands. Each cell is constructed using thermoplastic elastomer or polypropylene molded edge seals and separators for high performance. Various gasket materials are available depending upon application. Filter cartridges are available in 8", 12", and 16" diameters, with surface area ranging from 650 cm² (0.7 ft²) to 3.9 m² (42.2 ft²) per cartridge.

Capsule Construction

Zeta Plus ZB series filter media are available in ready to use, single-use, Scale-Up capsules, as well as Zeta Plus Encapsulated System capsule filters. The Zeta Plus Scale-Up capsules are completely encapsulated disposable filters for small volume biological, bioprocess and pharmaceutical filtration. Scale-Up capsules are autoclavable and available in three sizes [170 cm² (0.18 ft²), 340 cm² (0.37 ft²), 1020 cm² (1.10 ft²) filtration area] to provide a high degree of application flexibility. The Zeta Plus Encapsulated System includes capsule filters with effective filtration areas at 0.23 m² (2.4 ft²), and 2.5 m² (27.0 ft²). For more information on the Zeta Plus Encapsulated System, please refer to 3M Purification literature 70-0202-3967-2.

Flow Rates

Graph 1 displays flow rates obtained with 21°C clean water. Optimum flow rates vary by application, but in general, lower flux rates often result in longer service life, greater throughputs and superior system economics.

Grade Selection

Zeta Plus ZB series filter media are available in four grades. Chart 1 is provided as a guide to proper grade selection based on nominal retention ratings and can be used in conjunction with the recommendations in Table 1 to determine the appropriate filter grade for your application. Operating conditions and the fluid being filtered, impact retention performance. 3M Purification recommends small-scale pilot runs with Scale-up capsules to confirm grade selection prior to scale-up. 3M's technical staff can assist in grade selection as well as assist in on-site evaluations. Filter system optimization can also be conducted at 3M Purification Inc.'s laboratory facilities.

Table 1: Application Recommendations

Application	Recommended Grades
Mammalian cell separation	30ZB, 60ZB, 90ZB, 120ZB
Bacteria, yeast cell separation	30ZB, 60ZB
TFF, membrane protection	30ZB, 60ZB
Endotoxin, nucleic acid reduction	60ZB, 90ZB, 120ZB
General clarification	30ZB, 60ZB

Table 1 is intended as a guide. Grade selection and performance should be confirmed with small-scale pilot trials.

Table 2: Recommended Operating Parameters

Maximum Operating Pressure	BC25 Capsules	2.8 bar (40 psig) maximum inlet pressure, 2.4 bar (35 psid) maximum capsule pressure drop
	Standard Zeta Plus™ Cartridges	2.4 bar (35 psid) maximum cartridge pressure drop
Maximum Operating Temperature	BC25 Capsules	40°C (104°F)
	Standard Zeta Plus™ Cartridges	82°C (180°F)
Recommended Pre-use Flush	All products	54 l/m² (1.3 gal/ft²)
Sterilization Parameters	BC25 Capsules	autoclave, 30 minutes @ 121°C (250°F) (1 cycle)
	Standard Zeta Plus™ Cartridges	autoclave or <i>in situ</i> steam sterilization, 1 hour @ 121°C (250°F)

Chart 1: Nominal Retention Ratings

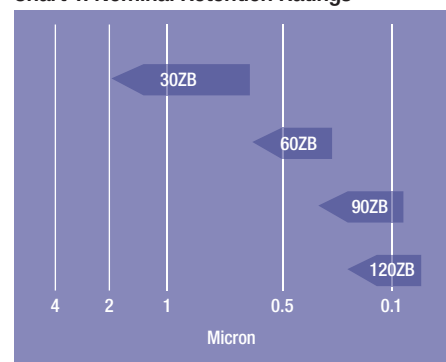


Table 3: Effective Filtration Area

Cartridge Configuration	Surface Area
BC25 Capsule	25 cm² (3.9 in²)
45109 (8" diameter cartridge, 8-cell)	0.26 m² (2.8 ft²)
45167 (8" diameter cartridge, 7-cell, o-ring plug-in)	0.23 m² (2.4 ft²)
Z8FA2NPX2 (8" diameter, 2-cell plug-in)	650 cm² (0.7 ft²)
Z8FA4NPX2 (8" diameter, 4-cell plug-in)	1300 cm² (1.4 ft²)
45237 (12" diameter cartridge, 12-cell)	1.1 m² (12.3 ft²)
45245 (12" diameter cartridge, 16-cell)	1.5 m² (16.4 ft²)
Z16P (16" diameter cartridge, 14-cell)	3.2 m² (34.7 ft²)
Z16H* (16" diameter cartridge, 17-cell)	3.9 m² (42.2 ft²)

*60, 90 grades only

Sanitary Housings

3M provides a wide array of standard and specially designed sanitary filter housings to hold Zeta Plus™ filter cartridges. All housings are designed with the pharmaceutical and bioprocessing industries in mind and feature 316L mirror-polished surfaces and easy-to-clean components, along with accessories such as CIP spray-balls and the innovative Zeta Plus Lifting Device.



Zeta Plus™ ZB Series Filter Media Ordering Guide

8" Diameter Cartridges

Catalog Number	Gasket Material	Grade
45109 (8" 8-cell)	11 - Nitrile 13 - Fluorocarbon 14 - EPR 22 - Silicone	30ZB 60ZB 90ZB
45167 (8" 7-cell, o-ring, plug-in)	01 - Nitrile 02 - EPR 03 - Fluorocarbon 04 - Silicone	

12" Diameter Cartridges

Catalog Number	Geometric Variation	Gasket Material	Grade
45244 (12" 9-cell) 45237 (12" 12-cell) 45245 (12" 16-cell)	01 - Standard polypropylene	A - Silicone B - Fluorocarbon C - EPR D - Nitrile	30ZB 60ZB 90ZB

BC Capsules

Catalog Number	Grade
BC0025L (Luer) BC0025S (Sanitary)	30ZB 60ZB 90ZB 120ZB

8" Diameter Cartridges

Catalog Number	Gasket Material	Package Code	Grade
Z8FA2NP (8" 2-cell plug-in) Z8FA4NP (8" 4-cell plug-in)	A - Silicone B - Fluorocarbon C - EPR D - Nitrile	2	30ZB 60ZB 90ZB

16" Diameter Cartridges

Catalog Number	Gasket Material	Grade	Opt. Lifting Handle*
Z16P (16" 14-cell)	A - Silicone B - Fluorocarbon C - EPR D - Nitrile	30ZB 60ZB 90ZB	H
Z16R (16" 14-cell) Hastelloy® bands			
Z16H (16" 17-cell)	A - Silicone B - Fluorocarbon C - EPR D - Nitrile	30ZB (16 cells) 60ZB (17 cells) 90ZB (17 cells)	H
Z16T (16" 17-cell) Hastelloy® bands			

*Omit "H" from part number if lifting handle is not required

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 INC. BE RESPONSIBLE FOR DAMAGES OF ANY NATURE WHATSOEVER RESULTING FROM THE USE OF OR RELIANCE UPON INFORMATION.**

It is your responsibility to determine if additional testing or information is required and if this product is fit for a particular purpose and suitable in your specific application.

3M PURIFICATION INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Limitation of Liability

3M Purification Inc. will not be liable for any loss or damage arising from the use of the Product(s), whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.



3M Purification Inc.

3M is a trademark of 3M Company.
Zeta Plus is a trademarks of 3M Company used under license.
All other trademarks are the property of their respective owners.
© 2013 3M Company. All rights reserved.
70020308840
Rev 0713

Your Local Distributor:

LENNTECH

info@lenntech.com Tel. +31-152-610-900
www.lenntech.com Fax. +31-152-616-289