

Zeta Plus™ LP Series

Depth Filter Cartridges & Capsules

Zeta Plus™ LP Series filters are a depth filter composed of inorganic filter aid and cellulose, extremely low in extractables, and designed specifically for the pharmaceutical industry. The Zeta Plus LP Series filter media is constructed with highly purified cellulose to minimize β -glucan extractables and false positive LAL test results. The positive charge exhibited by Zeta Plus LP Series filter media results in increased particle removal efficiency. The high contaminant capacity of the filter medium prolongs final filter life when Zeta Plus LP Series filter media is used as a prefilter. Exacting quality controls assure maximum product performance for each production lot.

Zeta Plus LP Series filter media is manufactured to procedures described in 3M Purification's Drug Master file on record with the FDA. Zeta Plus LP Series filter cartridges are manufactured in accordance with a strict quality assurance program. Each media lot is tested for flow, density, charge capacity, organic and inorganic extractables, and pyrogenicity (LAL Clot Tests). In addition, Zeta Plus LP Series filter cartridge packaging is labeled with lot identification number to provide complete traceability from the media batch to the finished product.

Characteristics

Superior Particle Removal

Zeta Plus LP Series filter media offers unique advantages in contaminant removal because of its strong electrokinetic properties. In addition to the mechanical exclusion of particles by its depth loading feature, Zeta Plus LP Series filter media adsorbs contaminants too small for removal by mechanical straining. Since most particles in suspension have been shown to be negatively charged, virtually all contaminants can be removed with proper grade selection.



Applications

Blood Products	Antibiotics	Diagnostics
Intravenous Solutions	Growth Media	Pharmaceutical & Bioprocess Fluids

Features & Benefits

Low LAL Reactivity.

- LP Filter Medium is non-pyrogenic, and is less likely to cause false positive results.

Depth filtration media designed to retain contaminants by mechanical entrapment and electrokinetic adsorption.

- High contaminant holding capacity for economical filtration and reliable particle removal.

Full range of scaleable capsule and cartridge filter configurations.

- Allows pilot testing and scale-up with the same materials that will be used in full-scale systems.

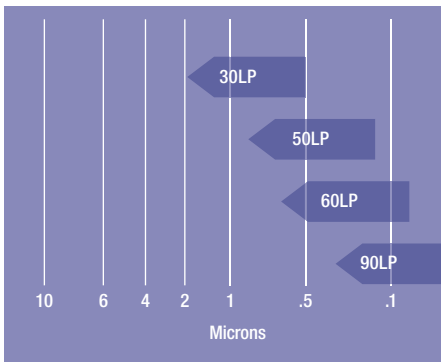
FDA Drug Master File and USP Class VI Biological Safety.

- Eases validation and regulatory submissions by providing vital documentation and traceability.

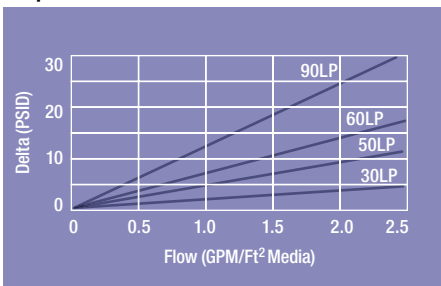
Self-contained, single-use disposable capsule and cartridge modules.

- Reduced labor time for changeouts and elimination of cleaning validation.

Chart 1: Grade Selection



Graph 1: Water Flow Rate



Grade Selection

The Zeta Plus LP Series filter media is available in four grades. Mechanical straining alone is indicated by grade in Chart 1. Chart 1 is intended for use as a guide to nominal micron rating. Particles smaller than the rated pore size will be removed by Zeta Plus LP Series filter media due to electrokinetic adsorption. Actual operating conditions and the product to be filtered should be considered in grade selection. Technical support in optimal grade selection is provided by your local distributor or 3M Purification Inc. The optimal filtration system for your particular application can be determined by on-site test equipment or sample evaluation in our Applications Laboratory.

Flow Rates

Graph 1 depicts the flow rate for clean water. Although the flow rates decrease when fluids higher than 16 cps are filtered, an efficient flow rate can be achieved with proper media type selection. (A maximum flow rate of 1 GPM/ft² is recommended to ensure optimal filter life and efficiency.)

Pyrogenicity

The Zeta Plus LP Series filter media is tested for pyrogenicity using the LAL Clot method. All grades contained <0.25 EU/ml, indicating that the Zeta Plus LP Series filter medium is non-pyrogenic and is less likely to cause false positive results.

Extractables

Zeta Plus LP Series filter medium is designed to be extremely low in extractables. A 3M Purification Inc. Regulatory Support File, available on request, provides the typical inorganic extractions from the Zeta Plus LP Series filter medium. For more information contact your local 3M Purification Inc. representative.

Cartridge Construction

Zeta Plus LP Series filter media is available in both flat stock (sheets) and cartridges. Cartridges are constructed from individual cells. Each cell is constructed with a molded polypropylene edge seal and internal separator. 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.

Filter Sheets and Discs

Zeta Plus LP Series filter media is available in die-cut discs and sheets for use in plate and frame filter presses. Because of the higher flow capabilities and greater contaminant retention of Zeta Plus LP Series filter media as compared to other types of filter sheets, it is often possible for filter press users to reduce their filter sheet usage by 20 to 50 percent in processing equivalent volumes of products. Because our filters may be used with a wide range of solutions and under varying filtration conditions, the extractable levels and other test data presented here should be used as a guide only.

Extractable levels and other filter properties should be determined and compared with existing standards of acceptance for the particular application in which the filters will be used.

Cartridge Configurations

Zeta Plus LP Series filter cartridges are available in various sizes and number of cells. For faster and easier trial runs, Zeta Plus LP Series filter media is available in BC Capsules, self-contained, disposable filter devices. Consult your local distributor for information and ordering.

Figure 1: Zeta Plus LP Series Configurations

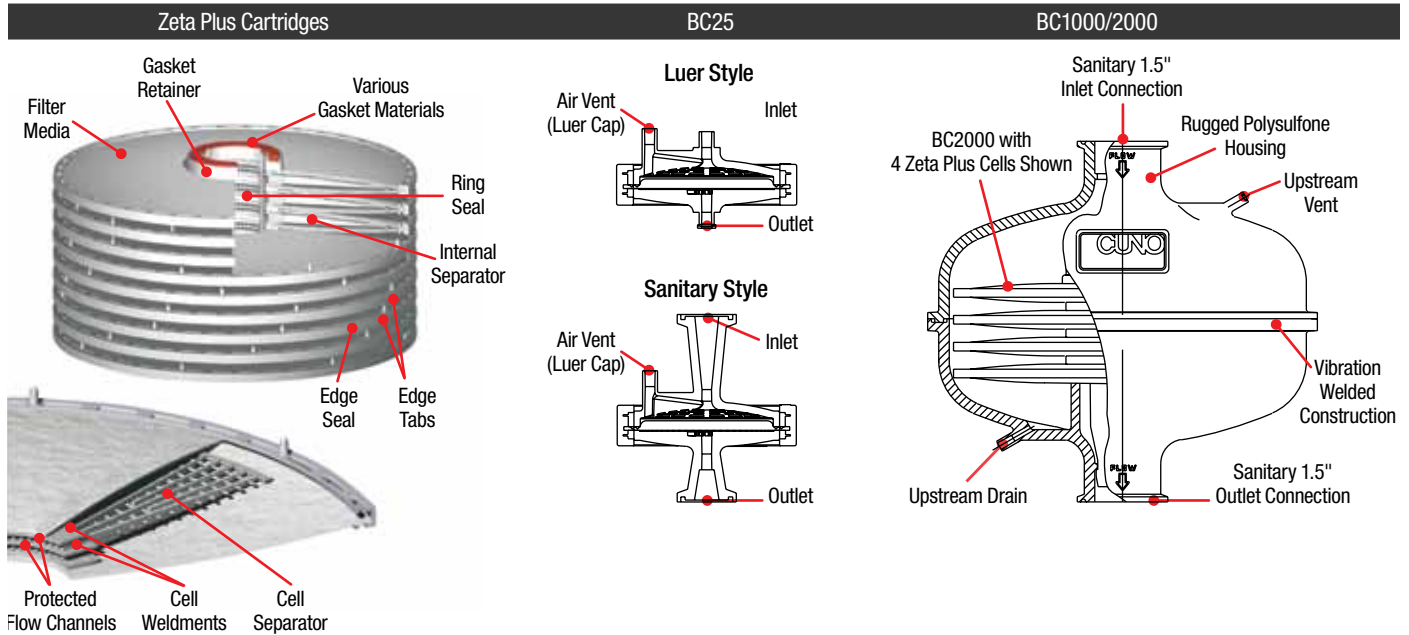


Table 1: Zeta Plus LP Series Materials of Construction

Configuration	Component	Material
BC 25 Capsule	Capsule Shell, Vent & Inlet Cap	Polypropylene
	Capsule Overmold (Edge Seal)	Glass Filled Polypropylene
BC 1000 & 2000 Capsules	Capsule Shell	Polysulfone
	Cartridge Support, Cell Separators, Edge Seal & Vent Cap	Polypropylene
Zeta Plus LP Cartridges	Cartridge Support, Cell Separators & Edge Seal	Polypropylene
	Compression Bands	316 Stainless Steel

Cartridge Configurations	Effective Filtration Area
BC25 Capsule	3.9 in ² (25 cm ²)
BC1000 Capsule	0.7 ft ² (650 cm ²)
BC2000 Capsule	1.4 ft ² (1300 cm ²)
45109 (8 diameter cartridge, 8-cell)	2.8 ft ² (0.26 m ²)
45167 (8 diameter cartridge, 7-cell, o-ring plug-in)	2.5 ft ² (0.23 m ²)
Z8FA2NPX2 (8 diameter cartridge, 2-cell plug-in)	0.7 ft ² (650 cm ²)
Z8FA4NPX2 (8 diameter cartridge, 4-cell plug-in)	1.4 ft ² (1300 cm ²)
45237 (12 diameter cartridge, 12-cell)	12.3 ft ² (1.1 m ²)
45244 (12 diameter cartridge, 9-cell)	9.2 ft ² (0.85 m ²)
45245 (12 diameter cartridge, 16-cell)	16.4 ft ² (1.5 m ²)
Z16P (16 diameter cartridge, 14-cell)	34.7 ft ² (3.2 m ²)
Z16H (16 diameter cartridge, 16-cell)	39.7 ft ² (3.7 m ²)
Z16H (16 diameter cartridge, 17-cell)	42.2 ft ² (3.9 m ²)

Recommended Operating Parameters

Maximum Operating Pressure	BC25 Capsules: 40 psig max. inlet pressure, 35 psi max. capsule pressure drop. BC1000/2000 Series Capsules: 80 psig at 25°C, 40 psig at 60°C, max. inlet pressure; 35 psi max. capsule pressure drop. Standard Zeta Plus Cartridges: 35 psi max. cartridge pressure drop.
Maximum Operating Temperature	BC25 Capsules: 40°C BC1000/2000 Capsules: 60°C Zeta Plus Cartridges: SA & LA 82°C (180°F), CA 60°C (140°F)
Recommended Pre-use Rinse	1.3 gal/ft ² at 0.5 gpm/ft ² , 50 l/m ² at 20 lpm/m ²
Sterilization Parameters*	BC25: Autoclave 30 min. at 121°C (1 cycle). BC1000/2000: Autoclave 30 min. at 121°C (up to 3 cycles). Standard Zeta Plus Cartridges: Autoclave or <i>In-situ</i> steam sterilize 1 hr. at 121°C.
Recommended Flow Rates	BC 25 Capsule: 3 - 30 ml/min. BC 1000 Capsule: 0.1 gpm (0.4 lpm) BC 2000 Capsule: 0.2 gpm (0.8 lpm) Standard Zeta Plus Cartridges: 0.25 gpm/ft ² (10.2 lpm/m ²)

*Steam or autoclave sterilization not recommended for CA Series.

Zeta Plus™ LP Series Ordering Guide

BC Series

Catalog Number	Configuration	Grade	Media
BC0025	L - Luer S - Sanitary	30 60 50 90	LP - Inorganic Filter Aid & Cellulose Pharmaceutical
BC1000 (8" 2 cell) BC2000 (8" 4 cell)	A - Single Pack B - 3 Pack		

8" Diameter Cartridges

Cartridge Design	Gasket Material	Media Grade	Media Formulation	Control Grade
45109 (8" 8 cell)	11 - Nitrile 13 - Fluorocarbon 14 - EPR 22 - Silicone	30-50-60-90	L - Inorganic Filter Aid & Cellulose	P - Pharmaceutical
45167 (8" 7 cell with O-ring plug in)	01 - Nitrile 02 - Fluorocarbon 03 - EPR 04 - Silicone	30-50-60-90	L - Inorganic Filter Aid & Cellulose	P - Pharmaceutical

Catalog Number	# Cells	Configuration	Material	Gasket	Pkg. Code	Media Grade
Z8FA (8" plug in)	2 - 2 cells 4 - 4 cells	N - None	P - Polypropylene	A - Silicone B - Fluorocarbon C - EPR D - Nitrile K - PTFE Encapsulated Fluorocarbon	2 - Standard	30LP 50LP 60LP 90LP

12" Diameter Cartridges

Cartridge Design	Geometric Variation	Gasket Material	Media Grade	Media Formulation	Control Grade
45237 (12" 12 cell) 45244 (12" 9 cell) 45245 (12" 16 cell)	01 - Unfilled Polypropylene Edge Seal 02 - Talc filled Polypropylene Edge Seal	A - Silicone B - Fluorocarbon C - EPR D - Nitrile	30-50-60-90	L - Inorganic Filter Aid & Cellulose	P - Pharmaceutical

16" Diameter Cartridges

Catalog Number	Configuration	Gasket Material	Media Grade	Grade	Opt. Lifting Handle
Z16	P - 14 cell H - High Area** R - 14 cell (Hastelloy® bands) T - High Area (Hastelloy® bands)	A - Silicone B - Fluorocarbon C - EPR D - Nitrile E - PTFE	30-50-60-90	LP	H - With Handle

*Omit "H" from part number if lifting handle is not required. Bodyfeed cartridge available, please order 45802 (16" 9 cell). **High Area Cell Count - 30LP & 50LP 16 cell; 60LP & 90LP 17 cell.

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