

3M Purification

Zeta Plus™ A Series

Filter Media, Cartridges & Capsules



Applications

Acids	Brines	Chemicals
Cleaning Compounds	Dielectric Oils	Diagnostic Serums
Detergents	Fuels	Hydraulic Fluids
Inks	Insecticides	Lubrication Oils
Machine Oil	Machine Cutting Tool Oil	Photographic Solutions
Plastics	Plating Solutions	Quenching Oil
Solvents	Turbine Oil	Varnishes

Zeta Plus™ A Series filter media was developed to meet the requirements of industrial, chemical, and utility process applications. The composition of the various grades offer efficient filtration in applications requiring the retention of particles in the 1 to 20 micron range.

The Zeta Plus 01A grade is an all cellulose, charged media suitable for applications not requiring sub-micron particle removal. This grade is also available as 01AP specifically for pharmaceutical applications that require filters with assigned FDA Drug Master File (DMF) numbers. The non-toxic cellulose composition of the medium and CFR Title 21 listed materials of construction provide a compatible prefilter for pharmaceutical and cosmetic production applications.

Characteristics

Since our filters may be used with a wide range of solutions and under various filtration conditions, the extractable levels and/or other test data presented here should be used as a guide only. Extractable levels and/or other filter properties should be determined and compared with existing standards of acceptance for the particular application in which the filters will be used.

Superior Particle Removal

Zeta Plus A Series filter media offers unique advantages in contaminant removal because of its positive electro-kinetic properties. In addition to the mechanical sieving of particles by its depth loading feature, Zeta Plus A Series filter media removes contaminants too small for mechanical exclusion by taking advantage of the particle's charge. Since most particles in suspension have been shown to be negatively charged and Zeta Plus has a positive charge, virtually all contaminants can be removed by adsorption (attaching the negative particle to the positive charge site on the medium) and proper grade selection.

Features & Benefits

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 & 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 (01AP only).

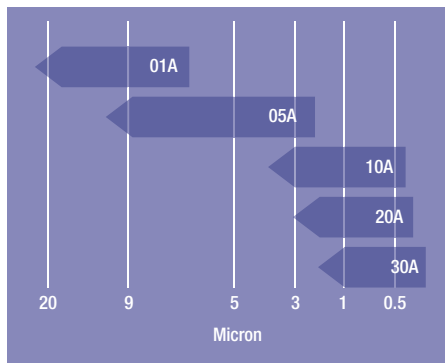
- Eases validation and regulatory submissions by providing vital documentation and traceability.

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

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



Chart 1: Media Grade Selection Guide



Grade Selection

Chart 1 provides nominal micron ratings, determined by the products mechanical sieving ability, for the Zeta Plus A Series grades. This chart serves as a guide only, since the additional contaminant removal provided by electro-kinetic adsorption is not considered. Compatible processing conditions and proper grade selection will result in the removal of particles smaller than the nominal rating.

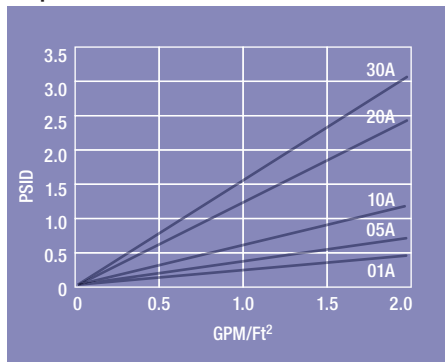
Flow Rates

Graphs 1 and 2 show the clean water and 100 SSU oil flow capability of the Zeta Plus A Series filter media, other viscosity fluid flows will vary. For optimal filtration performance, it is recommended that the flow rate not exceed 1 gal/minute/ft² (40.7 liters/minute/m²) of filter area for all grades.

Extractables

Table 1 lists the extractables resulting from a 24-hour static soak of Zeta Plus A Series media in the test solvent.

Graph 1: Water Flow vs. Differential Pressure



1 gpm/ft² = 40.7 lpm/m²
1 bar = 100 kPa

Extraction tests were performed using 100 ml of fluid per 30 cm² of media. Inorganic extractables were quantified using atomic absorption analytical techniques. Organic materials were evaluated using infrared and ultraviolet spectrophotometric analytical methods. Figures are reported as milligrams per gram of media weight.

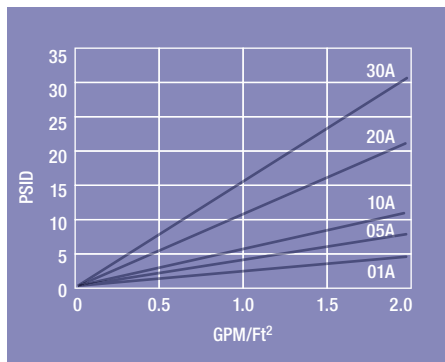
Wet Strength

Table 2 lists the wet tensile strength of Zeta Plus A Series filter media. The high wet strength exhibited by this media facilitates media change-out and indicates resistance to bursting or erosion.

Filter Sheets and Discs

Zeta Plus 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 the Zeta Plus 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 up to 50% in processing equivalent volumes of product.

Graph 2: 100 SSU Oil Flow vs. Differential Pressure



1 gpm/ft² = 40.7 lpm/m²
1 bar = 100 kPa

Since Zeta Plus filters may be used with a wide range of solutions and under varying conditions the extractable levels and/or other test data presented here should be used as a guide only.

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

Table 1: Extractables

Solvents	Na	K	Ca	Mg	Fe	Heavy Metals	Organics
Water (Amb)	.88	.18	.02	.01	<.001	<.001	.018
Ethanol (10%)	.94	.15	.04	.01	<.001	<.001	<.001
Ethanol (50%)	.92	.07	.02	.01	<.001	<.001	<.001
Acetic Acid	.85	.24	.24	.10	.02	<.001	.058
n-Heptane	.02	<.001	.01	<.001	<.001	<.001	<.001

< = Limit of Detection. Note specific extractable level may vary from sample to sample as the raw materials are natural products.

Table 2: Wet Tensile Strength

Grade	Tensile Strength (kg/in)
01A	> 1.5
05A	> 2.0
10A	> 2.5
20A	> 1.5
30A	> 1.0

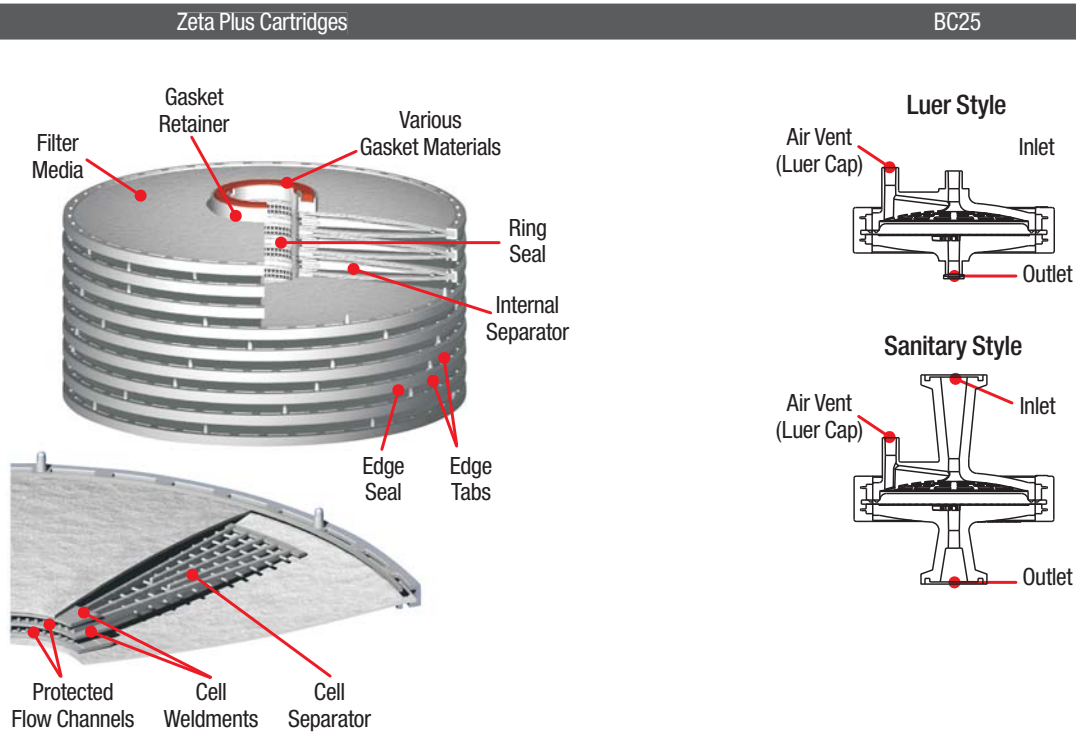
Cartridge Construction

Zeta Plus A Series media is available in cartridges of various size and configuration. Cartridges are constructed from individual cells of Zeta Plus filter media assembled with preset compression (Figure 1). The cells are unitized by three 316 stainless steel bands with polypropylene separators and cell edge seals. Various gasket or o-ring materials are available to ensure application compatibility (see ordering guide).

Operating Parameters

Max. Operating Temp.	140°F (60°C) in water
Max. Differential Press.	30-35 psid (2.1-2.5 bar)
Rec. Rinse Volume	50 L/m ² of media

Figure 1: Zeta Plus A Series Configurations



Zeta Plus Series A Specifications

Configuration	Capsule & Cartridge Materials of Construction	Effective Filtration Surface Area
BC25 Capsule	Polypropylene capsule shell, glass filled polypropylene over-mold	25 cm ²
BC1000 Capsule	Polysulfone capsule shell, polypropylene cartridge support and vent cap	650 cm ²
BC2000 Capsule		1300 cm ²
45109 (8" diameter cartridge, 9-cell)	Polypropylene cartridge support and edge seal	0.26 m ²
45167 (8" diameter cartridge, 7-cell plug-in)		0.23 m ²
45113 (12" diameter cartridge, 18-cell)		1.7 m ²
45114 (12" diameter cartridge, 10-cell)		1.0 m ²
Z16P (16" diameter cartridge, 14-cell)		3.2 m ²
Z12F (12" diameter cartridge, 18-cell)		1.65 m ²

Table 3: Cartridge Configurations

Catalog Number	Nominal Diameter (Inches)	Height (mm)	Number of Cells	Standard Packaging Units/Carton
45109	8	169.9	9	15
45167	8	168.3	7	8
45113	12	273.0	18	2
45114	12	195.3	10	2
Z16P	16	273.0	14	1

Zeta Plus™ A Series Ordering Guide

Zeta Plus BC Series Ordering Guide

Catalog Number	Configuration	Media Grade
BC0025	L - Luer S - Sanitary	01AP

12" Diameter Cartridges

Catalog Number	Gasket Material	Media Grade
45113 (12" 18 cell DOE) 45114 (12" 10 cell DOE)	01 - Nitrile 02 - Neoprene* 03 - Fluorocarbon 04 - EPR 05 - Cork* 11 - Silicone	01AP 01A 05A 10A 20A

*Not available with 01AP

16" Diameter Cartridges

Catalog Number	Configuration	Gasket Material	Media Grade	Optional Lifting Handle
Z16	P - 14 cell R - 14 cell with Hastelloy® bands	A - Silicone B - Fluorocarbon C - EPR D - Nitrile E - Expanded PTFE F - Neoprene**	01AP 01A 05A 10A 20A 30A	H - with Handle

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

** Not available with 01AP

8" Diameter Cartridges

Catalog Number	Configuration	Media Grade
45109 (8" 9 cell DOE)	11 - Nitrile 13 - Fluorocarbon 14 - EPR 22 - Silicone 23 - Expanded PTFE	01AP 01A 05A 10A 20A
45167 (8" 7 cell plug-in)	01 - Nitrile 02 - EPR 03 - Fluorocarbon 04 - Silicone 09 - PTFE Encapsulated Fluorocarbon	

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.

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.

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