

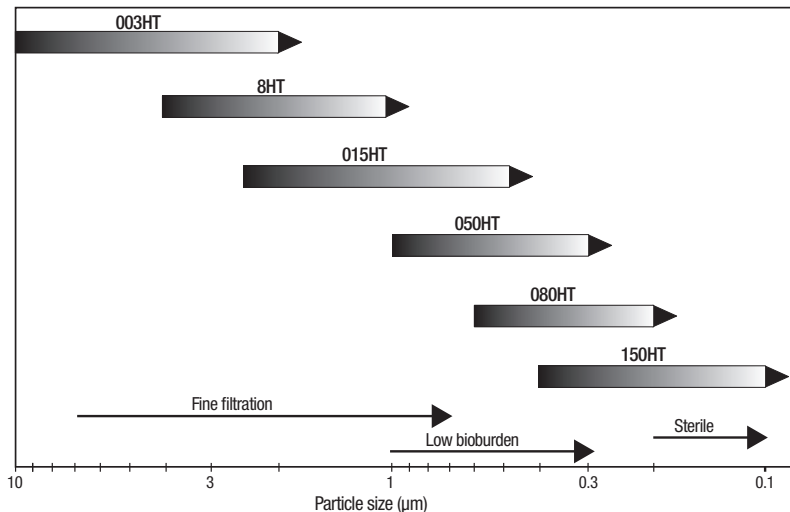
Zeta Plus™ HT Series

Lenticular depth filter cartridges

The Zeta Plus™ HT Series filter cartridge is a charge-modified depth filter constructed with high-tensile strength media to perform efficiently even under operating conditions requiring elevated operating temperatures or repeated hot water sanitation cycles. Zeta Plus HT filter media is made from inorganic filter aids, refined cellulose and cationic resin.

Grade selection

The Zeta Plus HT filter media are available in several grades, that meet the different filtration needs required by your applications. Nominal filtration ratings are given in the following table for the various grades. The optimal filtration system for your particular application can be determined by on-site testing or by sample evaluation by a member of our Scientific Application Support Services group (SASS).



Graphic 1: Zeta Plus™ HT grade selection

Features and benefits

More than three times the strength of competitive media to withstand multiple steaming and hot water sanitation cycles

- Extended filter life resulting in high throughputs, fewer cartridge change-outs and reduced operating costs

Combined depth filtration and electro-kinetic adsorption

- Efficient haze and particle removal at micron ratings smaller than the mechanical rating alone

Easy-to-install cartridges for rapid change-out

- Reduced labour cost

Totally enclosed, sanitary systems and housings

- Zero edge leakage and external contamination

Variety of cartridge sizes and filtration surface areas

- Flexible options for all flow requirements

Approved for food contact use

-  Complies with European and US regulations



Picture 1: Zeta Plus Family

Applications

Food and beverages

- Alcoholic beverages
- Syrups
- Dairy products
- Flavour concentrates
- Edible oils

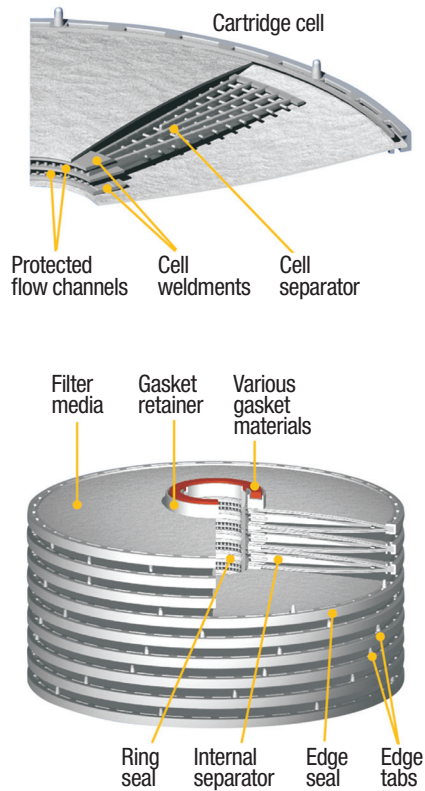
Fine chemicals

Oral products

Cosmetics

Water treatment

Figure 1: Zeta Plus™ cartridge construction



Cartridge construction

Zeta Plus™ HT filter cartridges are constructed from individual cells. Each cell is constructed using polypropylene moulded edge seals and internal separators for high performance. The cells are made into a single unit by three 316 stainless steel bands in the core of the cartridge with polypropylene cell separators. Various gasket materials are available depending upon application. Filter cartridges are available in 8", 12" and 16" diameters.

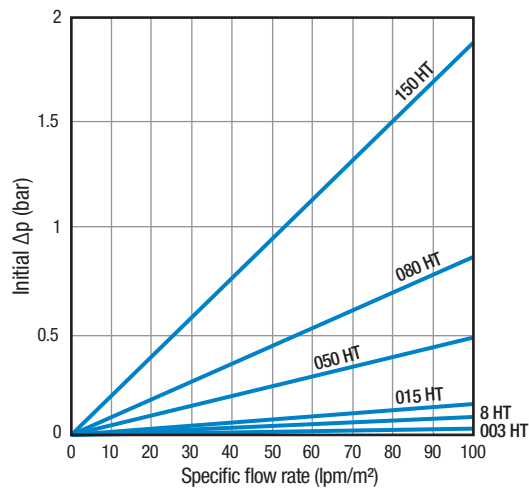
Zeta Plus cartridge system vs. plate and frame filter economics

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 media to external contamination allowing for effective use of the media, higher 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. This results in lower throughputs and higher operating costs.

Plate and frame filters 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.

Flow rates characteristics

The graph shows initial Δp values for Zeta Plus HT filter media versus specific flow rates (lpm/m²), obtained with clean water.



Graphic 2: Zeta Plus™ HT flow rate graph
Differential pressure vs. flow rate water at 24 °C

Quality control

The Zeta Plus HT filter cartridges are manufactured following an ISO quality certified assurance scheme. All the cartridges are labelled with a lot identification number to provide complete traceability. Moreover, each cartridge is graved with its lot number and grade assuring total traceability.

Compatibility

The gaskets compatibility with different chemicals is indicated in table 1. It is advisable to test a product under service conditions simulating service conditions. *These recommendations are intended as a guide only.*

Chemicals	HT	Gaskets			
		Nitrile	Fluorocarbon	Ethylene propylene	Silicone
Acetic acid 5%-20%	G	G	G	G	G
Acetone 100%	G	P	G	G	G
Benzene	G	P	F	P	F
Carbon tetrachloride	G	F	G	P	F
Chloroethylene	G	P	G	P	F
Chloroform - dry	G	P	G	P	F
1.4 - dioxane	G	P	P	P	P
Ethanol 10% and 50%	G	G	F	G	G
Ethyl acetate	G	P	P	P	F
n-heptane	G	G	G	P	F
Hexane	G	G	G	P	F
1.1.1 - trichloroethane	G	P	G	P	F
Methanol	G	G	P	G	G
Methyl ethyl ketone (MEK)	G	P	P	G	G
Methyl isobutyl ketone (MIBK)	G	P	P	G	G
Sodium hydroxide 20%	F-P	F	G	G	G
Toluene	G	P	G	P	F
Water (25 °C and 82 °C)	G	G	G	G	G

Explanation of ratings:
G = Satisfactory - to maximum 82°C (unless restriction is noted). F = Fair P = Not recommended

Extractables

Table 2 gives as an example values for calcium and iron in 3 different extracting solutions due to soak testing. Moreover, specific rinsing procedures can be developed on-site for special applications.

Micro-organisms retention

Test conditions: specific flow rate: 635 l/h/m², initial micro-organism concentration: 10⁸ organisms/cm² of media. The results in table 3 show the retention efficiency of Zeta Plus™ HT series filter.

Operating parameters

	Maximum operating pressure	Maximum operating temperature	Recommended flush	Sterilisation parameters	Maximum flow rate (flux) (in lpm/m ²)
Standard and special pre-coat Zeta Plus™ cartridges	2.4 bar	82 °C	54 l/m ² at 20 lpm/m ²	autoclave or <i>in situ</i> steam sterilisation for 1 hour at 121 °C	1.2 to 12

Regulatory compliance

Zeta Plus HT Series filter cartridges comply with the requirements of Regulation (EC) 1935/2004 for their intended food contact applications. All materials of construction comply with the requirements of the Food and Drug Administration's (FDA) Code of Federal Regulations (CFR), Title 21 parts 170-199 for contact with food. The filters meet the requirements of USP for the Biological Test for Plastics, Class VI. Contact 3M Purification for further information.

Table 2: Zeta Plus™ HT extractables

		Grade				
		8 HT	015 HT	050 HT	080 HT	150 HT
Deminer-alised water	Ca (ppm)	0.18	0.09	0.12	0.13	0.15
	Fe (ppb)	<5.0	<5.0	<5.0	<5.0	5.27
Ethanol 8%	Ca (ppm)	0.26	0.09	<0.08	<0.08	0.09
	Fe (ppb)	<5.0	<5.0	<5.0	<5.0	<5.0
Ethanol 50%	Ca (ppm)	0.10	<0.08	<0.08	<0.08	<0.08
	Fe (ppb)	<5.0	<5.0	<5.0	<5.0	<5.0

Table 3: Micro-organisms retention

Zeta Plus™ HT	Microorganisms used for challenge	Retention efficiency (%)
015 HT	<i>Saccharomyces cerevisiae</i> (ATCC - 36026)	> 99.99
050 HT		> 99.99
080 HT		> 99.99
080 HT	<i>Enococcus oeni</i> (ATCC - 23279)	> 99.99
150 HT		> 99.99
080 HT	<i>Brevundimonas diminuta</i> (ATCC - 19146)	> 99.99
150 HT		> 99.99

Zeta Plus™ HT Series filter cartridges - Ordering guide

Zeta Plus™	Diameter (inch)	Cartridge design	Gasket type	Grade	Formulation
Z	08	P = Plug-in 7 cells (0.23 m ²)	Standard A = Silicone (MVQ)*	003 8 015 050 080 150	HT
		D = Standard 8 cells (0.26 m ²)	Standard D = Nitrile (NBR)*		
	12	C = 9 cells / small (0.85 m ²)	Options A = Silicone (MVQ)* B = Fluorocarbon (FPM)* C = EPR (EPDM)*		
		B = Special pre-coat 12 cells (1.1 m ²)			
		D = Standard 16 cells (1.5 m ²)			
		S = Special 7 cells (0.7 m ²)			
	16	M = Standard diffusion netting 14 cells (3.2 m ²)	* ISO Designation		
		D = Standard 15 cells (3.4 m ²)			
		S = Special precoat 9 cells (2.1 m ²)			

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.

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