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Zeta Plus™ MHT Series Lenticular Depth Filter Cartridges

Zeta Plus MHT Series are a family of advanced, dual zone depth filters designed to provide optimal clarification and prefiltration in Food & Beverage applications. The Zeta Plus filter design consists of two distinct layers or “zones” of filter media with the upstream zone more open than the downstream zone.

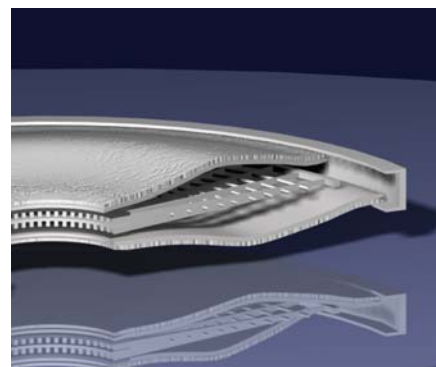
This structure enhances the contaminant holding capacity of the filter media, since larger particles are trapped in the upper zone of the filter media and smaller particles are trapped in the lower zone, reducing premature plugging and extending service life. The two filter zones can be independently selected and combined to optimise performance.

Superior Particle Removal

Zeta Plus MHT filter medium offers unique advantages in contaminant removal by combining mechanical entrapment with electro-kinetic adsorption. Larger particulate and hazes are mechanically entrapped in the depth of the media, while negatively charged particles, such as bacteria, yeast and submicronic hazes, are adsorbed to the positively charged Zeta Plus filter media.

Applications

The Zeta Plus MHT Series is ideally suited for clarification and prefiltration in food and beverage, cosmetic and general applications where the exceptional high wet-tensile strength media, combined with the innovative dual-zone design, provides extended service life. These include aqueous, alcoholic, proteinaceous and acidic solutions.



Picture 1: Zeta Plus MHT

Applications

Beer

Wine

Spirits

Syrups

Edible Oils

Flavor Concentrates

High Fructose Corn Syrup

Nutraceuticals

Features and Benefits

2 grades of filtration combined in one cartridge

- Reduction of capital investment
- Reduction of direct and indirect costs (reduced product loss, reduction in amount of water needed for regeneration, sanitation, rinsing, etc. . .)

“A la carte” media

- Customised filter to match your product needs
- Flexibility of use
- Maximised final membrane protection

Thermal and chemical stability

- Extended life
- Reduced filtration costs due to stability with chemical and thermal sanitation / regeneration

Qualification testing

- System installation integrity testable

High Tensile Strength media (HT)

- Robust and easy to handle cartridge design

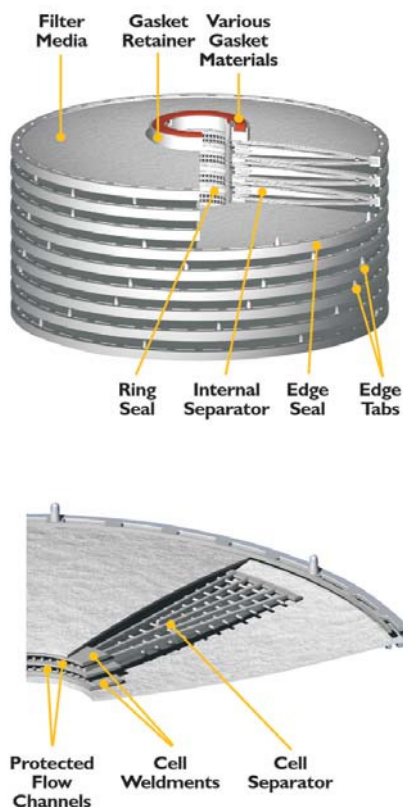
Range of standard cartridges availability (8, 12 and 16”)

- Cost effective sizing

Totally enclosed system

- Secure and hygienic with low product loss

3M



Picture 2: Zeta Plus Cartridge Construction

Table 1: Chemical Compatibility	
Product	Compatibility
Acetic Acid 5 to 20%	Satisfactory
Ethanol 10 to 98%	Satisfactory
Hypochlorate	Not recommended
Hydrogen Peroxide *	Satisfactory
Nitric Acid	Not recommended
Peracetic Acid*	Satisfactory
Sodium Hydroxide 2%	Not recommended
Sugar solution 10%	Satisfactory
Water up to 82 °C	Satisfactory
* As found in commonly used sanitation agents. Contact your local 3M Purification representative for advice on maximum recommended concentration.	

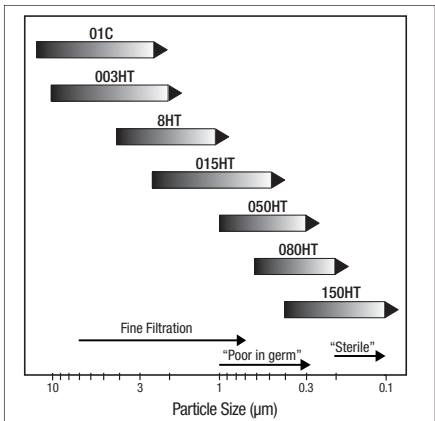


Figure 2: Nominal Retention ratings

Chemical Compatibility

The compatibility with various commonly used chemicals is indicated in Table 1. It is recommended that you test the product under standard conditions of use. All tests have been carried at ambient temperature (20 °C) unless otherwise indicated.

Cartridge Construction

Zeta Plus MHT Series cartridges are designed for use with 3M Purification Zeta Plus sanitary style stainless steel filter housings. Cartridges are constructed from individual cells of Zeta Plus MHT Series filter medium assembled together with polypropylene separators under predetermined compression and unitised by three, 316 stainless steel bands. Each cell is constructed using polypropylene moulded edge seals and separators for high performance. Various gasket materials are available depending upon the application. Filter cartridges are available in 8, 12 and 16-inch diameters, with surface area ranging from 0.23 m² to 1.84 m² per cartridge. All components are listed in 21CFR as safe for food contact.

Flow Rates

Figure 1 gives the initial Delta P values for Zeta Plus MHT as a function of unit area (l/min/m²) with clean filtered water. When sizing, always use the Delta P of the qualifying grade.

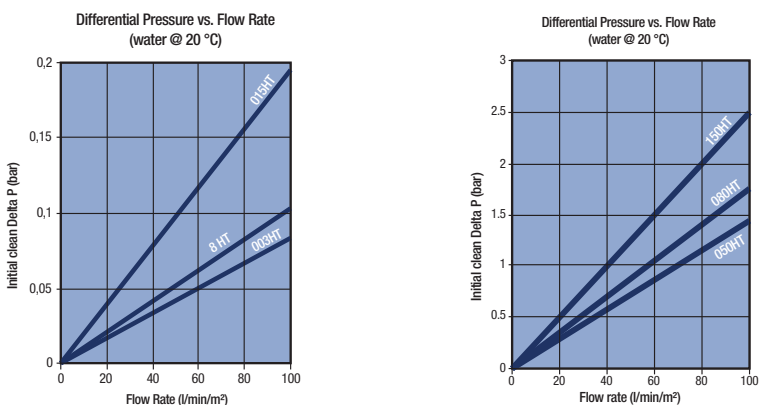


Figure 1: Flow Characteristics

Grade Selection

Zeta Plus MHT Series filter media are available in nine standard grade combinations. Figure 2 is provided as a guide to correct grade selection based on nominal retention ratings and can be used in conjunction with the recommendations in Table 2 to determine the appropriate filter grade for your application. Operating conditions and the fluid being filtered impact retention performance. Small-scale pilot runs with Zeta Plus BC capsule filters can be performed to confirm grade selection prior to scale-up. 3M Purification's Scientific Applications Support Services (SASS) staff can assist in grade selection as well as assist with on-site evaluations. Filter system optimisation can also be conducted at 3M Purification's laboratory facilities.

For scale-up evaluations, it is strongly recommended that customers contact 3M Purification Scientific Application Support Services (SASS) for assistance

Conditions of Use

Zeta Plus MHT cartridges are available in various combination of grades to ideally match your different filtration application needs. The performances of the various media ratings are indicated in the table below. The optimal media combination choice for your application may require determination by an on-site trial or performed in one of our laboratory by our Scientific Application Support Services (SASS) group.

Table 2: Recommended Operating Parameters

	Maximum Operating Pressure	Maximum Operating Temperature	Recommended Flush	Sterilisation Parameters	Maximum Flow Rate (FLUX) (in l/min per m²)
Standard Zeta Plus Cartridges	2.4 bar	82 °C	54 l/m² at 20 l/min per m²	steam sterilisation ** for 1 hour at 121 °C	10 to 20 *
Maximum flow rate: 40 l/min per m² Hot water sanitation: 90 °C					
* Consult 3M Purification for the best flow rate for your application.					
** Except where grade 01C is incorporated.					

Quality Control

Zeta Plus MHT is manufactured using a quality assurance program certified under ISO. Every cartridge is identified with a unique lot number, which allows for total product and components traceability.

Sanitary Filter Housings

3M Purification provides a wide array of standard and custom designed sanitary filter housings to accommodate Zeta Plus MHT Series filter cartridges. All housings are designed with the food and beverage industries in mind and feature 316L mirror-polished surfaces and easy-to-clean components, along with accessories such as CIP spray-balls and the Zeta Plus Lifting Device. Custom design skid systems incorporating Zeta Plus and membrane cartridge filter housings, together with process piping, flow control and complete validation documentation (IQ, OQ), are also available.

Throughput Comparison

Figure 3 is a comparison of throughput volumes for a high particulate load wine (critical application) and low particulate load wine (non critical). Results are compared to throughput values generated on standard HT media and the Competitor P equivalent on a low particulate load wine. The results show a gain of 25% life on a low particulate load wine and up to 42% on a high particulate load wine. In a recent study a customer realised a 31% cost saving during the regeneration and hot water sanitation steps of his process. 25% of his savings was from reduced water usage and 75% from reduced filter usage due to extended life and throughput offered by Zeta Plus MHT.

Table 3: Nominal Effective Filtration Area

Cartridge Configuration	Surface Area
BC0030A (Single Filter)	25 cm²
BC1000A (Single Filter)	650 cm²
BC2000A (Single Filter)	1300 cm²
Z8D (8" diameter, 8 cell)	0.26 m²
Z8P (8" diameter, 7 cell O-ring plug-in)	0.23 m²
Z12C (12" diameter, 9-cell)	0.85 m²
Z12B (12" diameter, 12-cell)	1.1 m²
Z12D (12" diameter, 16-cell)	1.5 m²
Z12S (12", special 7-cell)	0.7 m²
Z16M (16" diameter, 14-cell)	3.2 m²
Z16S (16" diameter, special 7-cell)	2.1 m²

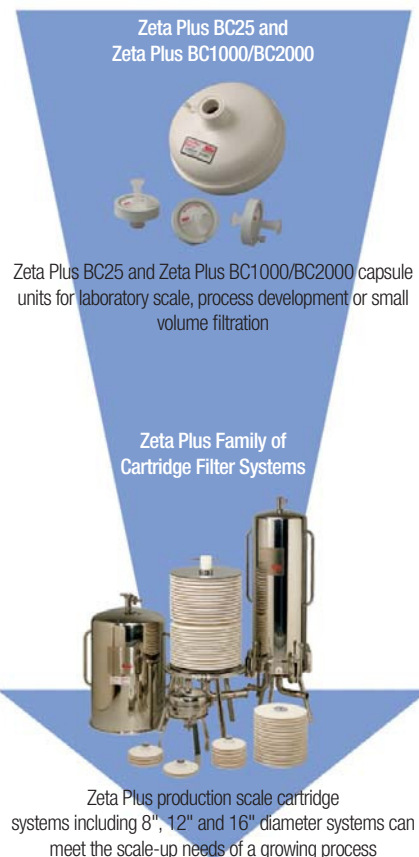


Table 3: Micro-organisms retention

Zeta Plus MHT Qualifying Grade	Challenge Micro-organism	Retention Efficiency (%)
015 HT 050 HT 080 HT	<i>Saccharomyces cerevisiae</i> (ATCC - 36026)	> 99,99 > 99,99 > 99,99
080 HT 150 HT	<i>Deinococcus oenii</i> (ATSS - 23279)	> 99,99 > 99,99
080 HT 150 HT	<i>Brevundimonas diminuta</i> (ATCC - 19146)	> 99,99 > 99,99

Test conditions:
Flow rate: 635 l/h/m² (0.26 gal/min/ft²).
Initial bacterial challenge: 108 organisms per cm² of media.
The results confirm the retention efficiency of Zeta Plus MHT.

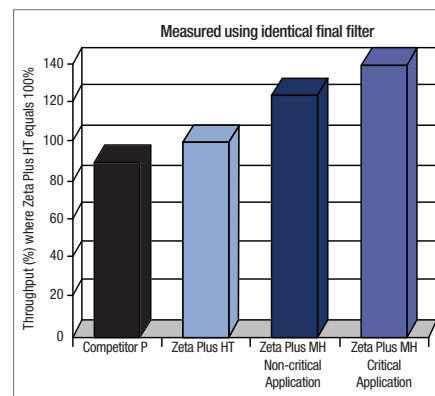


Figure 3: Throughput Comparison

Zeta Plus MHT Series Ordering Guide

1. Cartridges

Zeta Plus	Diameter (inch)	Cartridge Design	Gasket Type	Filter Layer Grade	Formulation	Pre-filtration Grade
Z	08	P = Plug-in 7 cells (0.23 m ²)	Standard A = Silicone (MVQ)*	03 - 003HT 10 - 8 HT 30 - 015HT 50 - 050HT 80 - 080HT 150 - 150HT	MH	01 02 03 05 07 08
		D = Standard 8 cells (0.26 m ²)	Standard D = Nitrile (NBR)*			
	12	C = 9 cells / small (0.85 m ²) B = Special precoat 12 cells (1.1 m ²) D = Standard 16 cells (1.5 m ²) S = Special 7 cells (0.7 m ²)	Options A = Silicone (MVQ)* B = Fluorocarbon (FPM)* C = EPR (EPDM)*			
		M = Standard diffusion netting 14 cells (3.2 m ²) S = Special precoat 9 cells (2.1 m ²)	*ISO Designation			

2. Zeta Plus BC Capsules

Catalogue Number	Grade and Formulation
BC 0025L (Luer) - 25 cm ² area BC 0025S (Sanitary) - 25 cm ² area BC 1000A (single pack) - 650 cm ² area BC 1000B (3 pack) - 650 cm ² area BC 2000A (single pack) - 1300 cm ² area BC 2000B (3 pack) - 1300 cm ² area	10MH01 60MH05 10MH02 70MH05 30MH02 90MH05 30MH03 90MH08 60MH03

Important Notice

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Limited Warranty

3M Purification warrants it this product to be free from defects in material and workmanship during normal use for a period of one (1) year from the date of shipment from the factory. If the Product(s) is (are) defective within this warranty period, your exclusive remedy and 3M Purification's sole obligations shall be, at 3M Purification's option, to replace or repair the Product(s) or refund the original purchase price of the Product(s). This warranty does not apply to failures that result from abuse, misuse, alteration or damage not caused by 3M Purification or failure to properly follow installation and use instructions.

Limitation of Liability: 3M Purification 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.

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