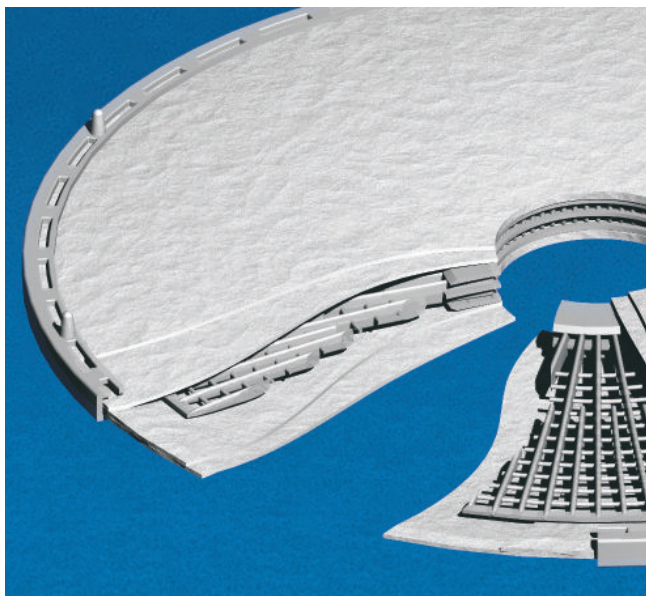


Zeta Plus™ MH Series

Dual Zone Depth Filter Cartridges & Capsules



Zeta Plus™ MH Series are a family of advanced, dual zone depth filters designed to provide optimal clarification and prefiltration in Food & Beverage applications. The Zeta Plus MH Series 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 optimize performance.

Superior Particle Removal

Zeta Plus MH Series filter medium offers unique advantages in contaminant removal by combining mechanical entrapment with electrokinetic 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 MH Series filter media.

Applications

The Zeta Plus MH 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.

- Beer
- Wine
- Spirits
- Syrups
- Edible Oils
- Flavor Concentrates
- Nutraceuticals
- High Fructose Corn Syrup

Features & Benefits

MH Series dual-zone filter media construction.

- Higher throughput, lower processing costs, smaller filter assemblies.
- Potential to condense two stages of filtration into one.

Wide range of upstream/downstream combinations.

- Customizable to meet product needs.

High tensile strength media.

- Withstands the rigors of hot water, steam and chemicals for longer service life.

Full range of cartridge and capsule configurations.

- Scalable from laboratory to full production.

Totally enclosed system.

- Eliminates leakage and external contamination common with filter sheets.

Product	Compatibility
Acetic Acid up to 20%	Satisfactory
Ethanol up to 98%	Satisfactory
Hypochlorite	Not recommended
Hydrogen Peroxide*	Satisfactory
Nitric Acid	Not recommended
Peracetic Acid*	Satisfactory
Sodium Hydroxide 2%	Not recommended
Sugar solution 10%	Satisfactory
Water up to 90°C	Satisfactory

*As found in commonly used sanitizing agents. Contact your local 3M Purification representative for advice on maximum recommended concentration.

Chemical Compatibility

Compatibility with various chemicals is indicated in the table at left. It is recommended that Zeta Plus MH Series filter media be tested in the product under standard process conditions to confirm compatibility prior to use. All tests have been carried out at ambient temperature (20°C) unless otherwise indicated.

Cartridge Construction

Zeta Plus MH Series cartridges are designed for use with Zeta Plus sanitary style stainless steel filter housings. Cartridges are constructed from individual cells of Zeta Plus MH Series filter medium assembled together with polypropylene separators under predetermined compression and unitized by three, 316 stainless steel bands. Each cell is constructed using polypropylene molded edge seals and separators for high performance. Various gasket materials are available depending upon the application. Filter cartridges are available in 12 and 16-inch diameters, with surface area ranging from 1.5 m² to 3.2 m² per cartridge. All components are listed in 21CFR as safe for food contact.

Figure 1: ZP MH Series Flow vs. Differential Pressure

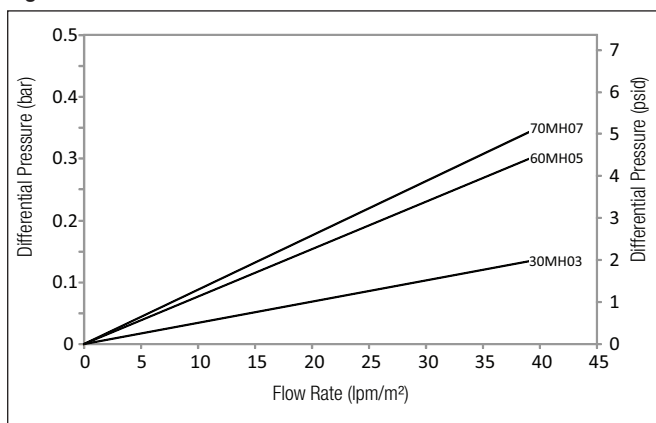
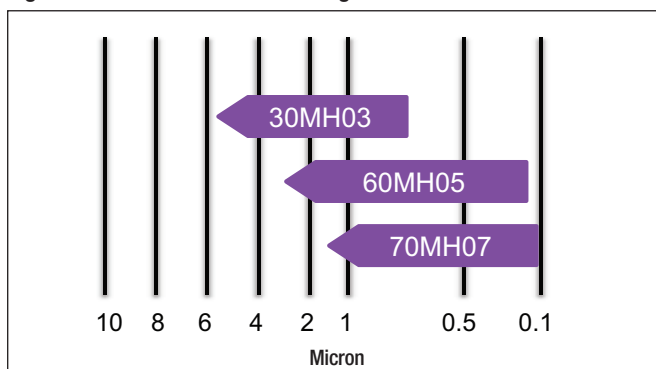


Figure 2: Nominal Retention Ratings



Flow Rates

The graphs below display flow rates obtained with 20°C clean water. Optimum flow rates vary by application, but in general, the flow rate per unit area (flux) should not exceed 10 lpm/m² of filter media in beer and 20 lpm/m² in wine or similar beverage for best performance. Lower flux rates often result in longer service life, greater throughputs and superior system economics.

Grade Selection

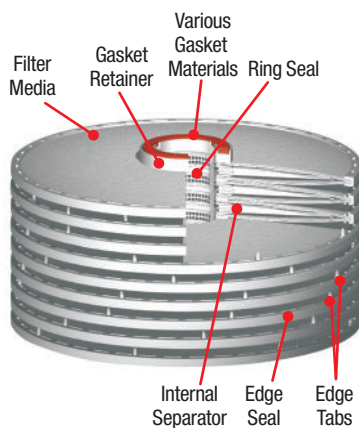
Zeta Plus MH Series filter media are available in three standard grade combinations. The chart below is provided as a guide to correct grade selection based on nominal retention ratings and can be used in conjunction with the recommendations in Table 1 to determine the appropriate filter grade for your 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 optimization can also be conducted at 3M Purification's laboratory facilities.

Table 3 references the nominal effective filtration area of Zeta Plus MH Series capsules and cartridges. For scale-up evaluations, it is strongly recommended that customers contact 3M Purification Scientific Application Support Services (SASS) for assistance.

Table 1: Application Recommendations

Application	Recommended Grades
Rough clarification (particles, haze)	30MH03
Rough clarification (yeast, haze)	30MH03
Polishing clarification/membrane prefiltration (yeast, haze, bacteria)	60MH05, 70MH07,

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



3M Purification's unique dual zone filter media and cell separator ensure fast flow rates, lower pressure drops, and greater throughputs.

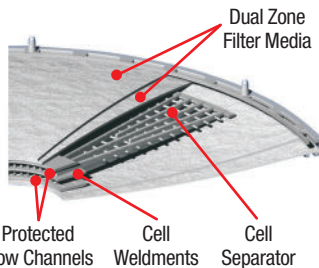


Table 2: Recommended Operating Parameters

Maximum Temperature	80°C (176°F)
Hot Water Sanitization	90°C (194°F)
Change-out Differential Pressure	2.4 bar (35 psid)
Recommended Flow Rate*	10 - 20 lpm/m ² (0.25 - 0.5 gpm/ft. ²)
Maximum Flow Rate	40 lpm/m ² (1.0 gpm/ft. ²)
Rinse Volume	50 litres/m ² (1.25 gallons/ft. ²)

*Consult 3M Purification for the best flow rate for your application.

Sanitary Filter Housings

3M Purification provides a wide array of standard and custom designed sanitary filter housings to accommodate Zeta Plus MH 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. 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.



Zeta Plus™ MH Series Ordering Guide

12" Diameter Cartridges

Part Number	Catalogue Number	Geometric Variation	Gasket Material	Grade
AK200127012 AK200127038 AK200125271	Z12DD70MH07-LH Z12DD30MH03-LH Z12DD60MH05-LH	Z12D (12" 16-cell) Z12D (12" 16-cell) Z12D (12" 16-cell)	D - Nitrile	70MH07 30MH03 60MH05

16" Diameter Cartridges

Part Number	Catalogue Number	Geometric Variation	Gasket Material	Grade
AK200127004 AK200127020 AK200125263	Z16MD70MH07 Z16MD30MH03 Z16MD60MH05	Z16M (16" 14-cell) Z16M (16" 14-cell) Z16M (16" 14-cell)	D - Nitrile	70MH07 30MH03 60MH05

*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. TO THE EXTENT PERMITTED BY LAW 3M PURIFICATION MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY NATURE HEREUNDER WITH RESPECT TO THE INFORMATION OR THE PRODUCT TO WHICH THE INFORMATION REFERS. 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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