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3M Separation and Purification Sciences

# 3M™ Zeta Plus™ Depth Filters

## High Performance, Scalable, Single-Use System

# 3M™ Zeta Plus™ Encapsulated System

## The System of Choice for Single-Use Depth Filtration

## High Performance Filter Media

The 3M™ Zeta Plus™ Encapsulated System utilizes the high performing Zeta Plus depth filter series media, including the single and dual layer.

- Positive charge is capable of reducing negatively charged DNA, endotoxins and other host cell proteins
- The 3M™ Zeta Plus™ dual layer media enhances the contaminant holding capacity of the filter media. This allows for larger particles to be trapped in the upstream zone of the more open filter media and smaller particles to be trapped in the downstream zone, reducing premature plugging and helping extend service life of the media.
- Can be used for post fermentation cell culture clarification or downstream impurity removal
- Can be employed independently or in conjunction with centrifugation or tangential flow filtration (TFF)
- Activated carbon and lipid removal media also available

## 3M™ Zeta Plus™ Depth Filter Quick Start Guide

| Application | Stage / Product | |
|---|---|---|
| | First Stage | Second Stage |
| Two Stage Operations | 05SP01<br>10SP02 | 90ZB08<br>90SP08<br>60ZB05<br>60SP05 |
| Single Stage Operations | 60SP02 | |
| Post Centrifuge Operations | Centrifuge | 90ZB08<br>90SP08<br>60ZB05<br>60SP05 |

## Media Series

| SP Media | LA Media | ZB Media |
|---|---|---|
| Widest Range | Cleanest | Highly Charged |
| SP has the widest nominal pore size range relative to other 3M Zeta Plus media offerings, including a greater number of grades as well as grades with larger nominal pore sizes than LA or ZB media. | LA is the cleanest 3M Zeta Plus media family offered. 3M™ Zeta Plus™ LA series low aluminum (LA) filter media are designed to provide low levels of extractables, especially aluminum. | ZB media offers a higher charge level than SP or LA media, and offers single layer and dual layer grades with a smaller nominal pore size than either the SP media family or the LA media family. |

## Sizing Guide

**Pore Size Options: 3M™ Zeta Plus™ SP, LA and ZB Media**

| | Media Family | | | |
|---|---|---|---|---|
| Grades | SP | ZB | LA | Application |
| 5 | X | | | Primary |
| 10 | X | | | |
| 30 | X | X | X | |
| 50 | | | X | Secondary |
| 60 | X | X | X | |
| 90 | X | X | X | Centrate |
| 120 | | X | | |

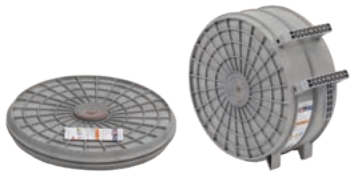
For reference only. Retention ratings may vary depending on application.

# Features & Benefits

## Capsule/Manifold Design

| | |
|---|---|
| Translucent plastic shell (standard capsules, polycarbonate shells) | ▸ Easy detection of the liquid level inside, providing real time monitoring of the filtration process. |
| Fully encapsulated shell around solid core | ▸ Eliminates the need for a stainless steel housing and the cleaning step after filtration. |
| Self guiding locking mechanism | ▸ Fast and reliable capsule-to-capsule connectivity. |
| Lenticular style capsule design | ▸ Consistency between single-use and conventional depth filtration. |

**3M™ Zeta Plus™ Capsules: Encapsulated Standard Capsule with Polycarbonate Shells**



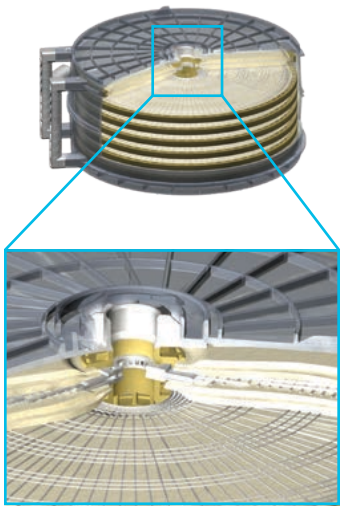
**3M™ Zeta Plus™ Capsules: Encapsulated Capsule with Alkaline Resistant* Polyphenylene Oxide/Polystyrene**

**3M™ Zeta Plus™ Capsule Family**

**Self Guiding Locking Mechanism Enables Fast and Reliable Capsule-To-Capsule Connection**

## 3M™ Zeta Plus™ Filter Media

**Model# 16EZB**



- Both single and dual layer Zeta Plus filter media are available.
- Excellent performance in throughput and filtration efficiency with proper media selection and sizing.
- The 3M™ Zeta Plus™ Encapsulated System is a single use depth filtration system
- The complete system is comprised of a holder, two manifolds and the desired number of capsules
- The polycarbonate capsules feature a translucent shell that allows for easy fluid level observation
- A self-guiding locking mechanism ensures fast and reliable connections between capsules

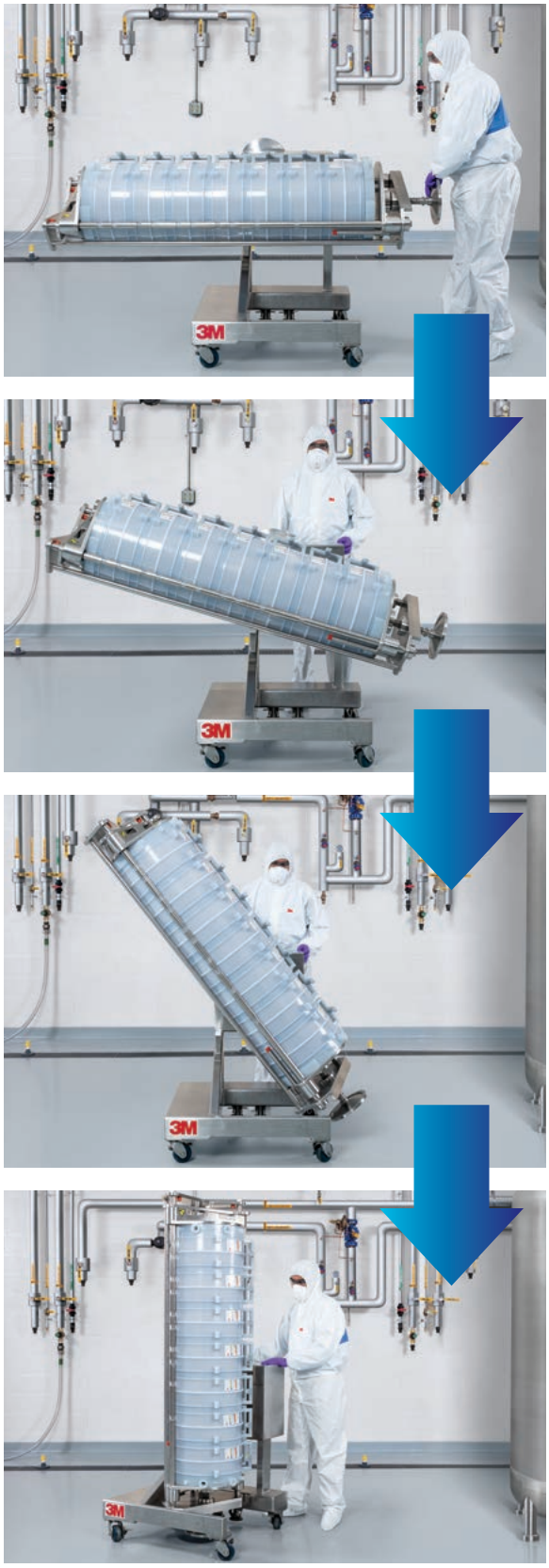
* Based on testing with 1M NaOH and 5% NaClO (Bleach).

# 3M™ Zeta Plus™ Encapsulated System

## The System of Choice for Single-Use Depth Filtration

## Ergonomically Designed Large Filter Holders

Traditional depth filtration systems utilize lenticular style cartridge filters and a vertical filtration flow path to allow easy access to process liquids and efficient utilization of filter media. However, stacking cartridges from bottom to top can be cumbersome, and dismantling the spent cartridges is often labor intensive.




## Features & Benefits

| Ergonomically Designed Holder System | |
|---|---|
| 3M™ Encapsulated System Holder, Large (Model #16EZB): holder is pivoted between horizontal and vertical positions | ▸ Enables loading and unloading at waist height.<br>▸ Central inlets and outlets minimize fluid spills during post use handing.<br>▸ Holder and capsule design allows the combination of multiple 3M Zeta Plus media types or even multiple 3M filtration products in a single holder. |
| Vertical flow path | ▸ Reduced footprint during operation. |

Recognizing the need for a depth filtration system that is fast, easy and clean, 3M designed filter holders (Model# 16EZB) that can be pivoted between the horizontal position for loading and unloading the capsules and manifolds, and the vertical position for filtration. Allowing loading and unloading at waist height eliminates the need for operators to lift capsules above their heads and reduces the risk of fluid spills when handling spent capsules. The use of the vertical flow path allows for full media utilization and a small system footprint during filtration.

### 3M™ Encapsulated System Holders, Small (Model# 16EZA)

The small holder is available for laboratory and pilot scale-up studies, in addition to low volume production filtration. The 1-high holder can accommodate from one to four 0.23 m² capsules, or one 1.6 m² (dual layer) or 2.5 m² (single layer) capsule. The 2-high holder can accommodate up to two 1.6 m² (dual layer) or 2.5 m² (single layer) capsules. The 3 high holder can accommodate up to three 1.6 m² (dual layer) or 2.5 m² (single layer) capsules. Either single stage or two-stage depth filtration can be performed within the same holder. The 1-high small holder has a built-in torque limiter that will signal the operator when the holder assembly is properly sealed. All small holders have been designed to be fully autoclavable for applications where that may be required.

### 3M™ Encapsulated System Holders, Large (Model# 16EZB)

The large holder can accommodate up seven 1.6 m² (dual layer) or 2.5 m² (single layer) capsules. This holder is best suited for use in small to large production scale purification processes. However, this holder can also accommodate a single 1.6 m² (dual layer) or 2.5 m² (single layer) capsule should choose to use it for scale up studies.

### Two Stage Operations

For two stage purification operations a second pair of manifolds is required between each stage of multistage operations. Manifold and capsule materials should always be the same.


**Figure 1. 3M™ Zeta Plus™ Encapsulated System**

# Innovative Capsule/Manifold Design

Two capsule configurations are available for use with the 3M™ Zeta Plus™ Encapsulated System.

- Single cell and multicell capsules are available
- Single cells have 0.23 $m^2$ of filtration media
- Multicells have 1.6 $m^2$ of dual layer media or 2.5 $m^2$ of single layer media
- Alkaline resistant capsules available
- Dual stage filtration can be performed in the same holder by using an additional set of manifolds

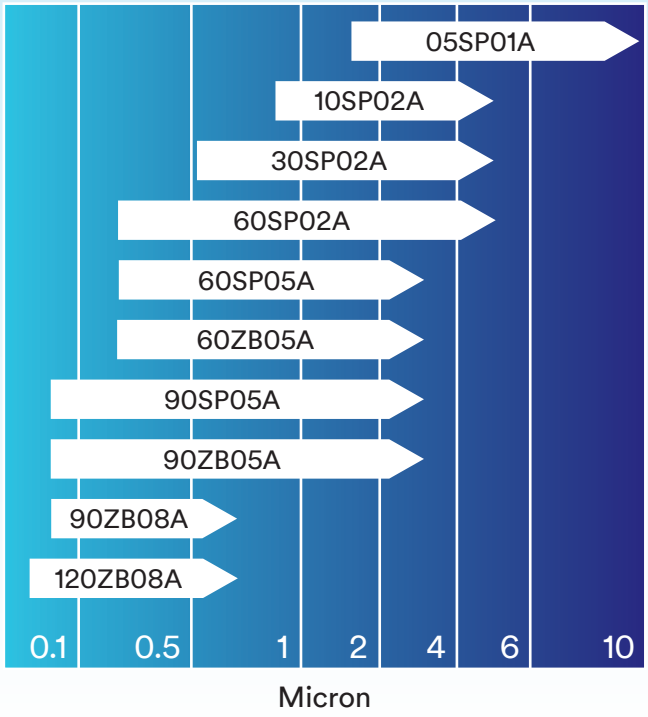



**Figure 2. Nominal Retention Ratings for 3M™ Zeta Plus™ Dual Layer Grades**
(For reference only. Retention ratings may vary depending on application.)

*Based on testing with 1M NaOH and 5% NaClO (Bleach).

## Additional Formats Available

### In addition to the 3M™ Zeta Plus™ Encapsulated system, cartridge and sheet options

### Zeta Plus Cartridges:

- Produced in 8 inch, 12 inch and 16 inch sizes
- Multiple lenticle and construction configurations
- Dual Layer cartridges are available in SP, ZB and LA media families
- Stainless steel housings for each size available
- Uses the same media as encapsulated systems

## Scalability

The 3M™ Zeta Plus™ Encapsulated System retains the lenticular filter design and vertical flow path that are characteristics of traditional depth filtration systems. A full range of 3M™ Zeta Plus™ capsules is available from benchtop to production scale, which allows for lab scale, pilot testing and scale-up with the same filtration media.

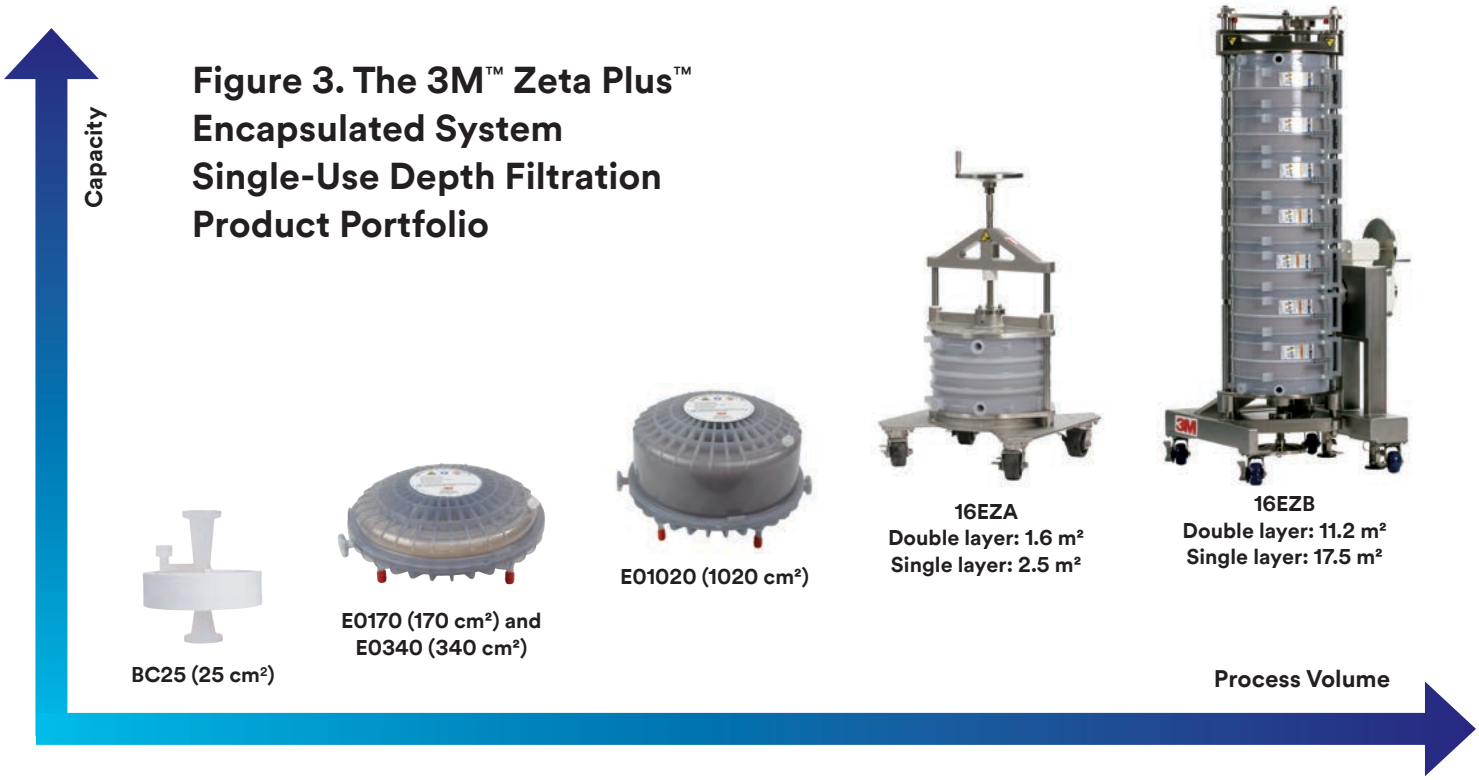
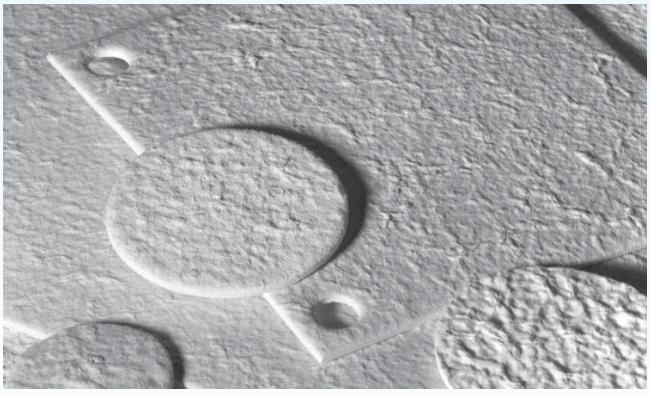



**Figure 3. The 3M™ Zeta Plus™ Encapsulated System Single-Use Depth Filtration Product Portfolio**

**are also available in most media types and grades.**

### Zeta Plus Sheets:

- Available in SP, ZB and LA media families
- Activated carbon and lipid removal media available on request
- May be die cut to match specific requirements
- Designed for use with commercially available filter presses



**Contact your local sales rep for additional information about these formats.**

## Table 2a. 3M™ Zeta Plus™ Laboratory Capsules: Filter Specifications

| | BC25, Luer | BC25, Sanitary |
|---|---|---|
| **Dimensions** | | |
| Single Layer (height by diameter) | 6.5 cm × 7.6 cm (2.6 inches × 3 inches) | 7.9 cm × 7.6 cm (3.1 inches × 3 inches) |
| Dual Layer (height by diameter) | 6.9 cm × 7.6 cm (2.7 inches × 3 inches) | 8.3 cm × 7.6 cm (3.3 inches × 3 inches) |
| **Weight** | | |
| Dry - Single Layer | ≈ 60 g | ≈ 64 g |
| Dry - Dual Layer | ≈ 69 g | ≈ 75 g |
| Wet Post Blow-Down - Single Layer | ≈ 70 g | ≈ 75 g |
| Wet Post Blow-Down - Dual Layer | ≈ 86 g | ≈ 93 g |
| **Materials of Construction** | | |
| Shells | Polypropylene | |
| Ring Seal (dual layer media) | Polypropylene | |
| Edge Seal Overmold | Glass Fiber Filled Polypropylene | |
| Luer Cap & Luer-barb Connector | Polypropylene | |
| **Volume** | | |
| Capsule Fill Volume[1] - Single Layer | ≈ 17 mL | |
| Capsule Fill Volume[1] - Dual Layer | ≈ 25 mL | |
| Post Blow-Down Hold-up Volume[2] - Single Layer | ≈ 11 mL | |
| Post Blow-Down Hold-up Volume[2] - Dual Layer | ≈ 17 mL | |
| **Miscellaneous** | | |
| Effective Filtration Area | 25 cm² | 25 cm² |
| Connector | Luer | Can accommodate both ½" and ¾" Sanitary Style |

[1] Volume of liquid required to fill capsule (experimentally measured).

[2] Capsule Post blow-down hold-up volume. Estimated volume of residual preconditioning flush liquid after air/gas blow-down, using water as the flush fluid and calculated by post-blow-down weight and flush fluid density. Actual amount depends upon exact blow-down conditions, media type in capsule, the number of capsules in the system, the process fluid, and loading level of the capsule.

## Laboratory Capsule Filter Schematics


**BC-25 Sanitary Lab Capsule**


**BC-25 Luer Lab Capsule**

## Table 2b. 3M™ Zeta Plus™ Scale-Up Capsules: Filter Specifications

| | | 170 cm² Capsule | 340 cm² Capsule | 1020 cm² Capsule |
|---|---|---|---|---|
| **Dimensions** | | | | |
| Height × Diameter | | 4.1" × 8.5" (10.3 cm × 21.6 cm) | | 6.0" × 8.5" (15.2 cm × 21.6 cm) |
| **Weight** | | | | |
| Dry - Single Layer | | 1.0 kg (2.2 lb) | 1.0 kg (2.2 lb) | 1.4 kg (3.0 lb) |
| Dry - Dual Layer | | 1.0 kg (2.2 lb) | 1.0 kg (2.3 lb) | 1.6 kg (3.5 lbs) |
| Wet Post Blow-Down - Single Layer | | 1.1 kg (2.4 lb) | 1.1 kg (2.5 lb) | 1.8 kg (4.0 lb) |
| Wet Post Blow-Down - Double Layer | | 1.2 kg (2.6 lb) | 1.3 kg (2.9 lb) | 2.4 kg (5.2 lb) |
| **Materials of Construction** | | | | |
| Capsule Shells | | Polysulfone | | |
| Separator, Spacer, Vent Cap | | Polypropylene | | |
| O-ring | | Fluorocarbon | | |
| Endcap & Edge Seals | | Thermoplastic Elastomer | | |
| **Hold-up Volume** | | | | |
| Capsule Fill Volume[1] | Single Layer | ≈ 0.67 L (≈ 1.5 gal) | ≈ 0.69 L (≈ 1.5 gal) | ≈ 1.7 L (≈ 3.7 gal) |
| | Dual Layer | ≈ 0.63 L (≈ 1.4 gal) | ≈ 0.65 L (≈ 1.4 gal) | ≈ 1.6 L (≈ 3.5 gal) |
| Post Blow-Down Hold-up Volume[2] | Single Layer | ≈ 0.12 L (≈ 0.26 gal) | ≈ 0.16 L (≈ 0.35 gal) | ≈ 0.46 L (≈ 1.0 gal) |
| | Dual Layer | ≈ 0.15 L (≈ 0.34 gal) | ≈ 0.26 L (≈ 0.58 gal) | ≈ 0.80 L (≈ 1.8 gal) |
| **Miscellaneous** | | | | |
| Effective Filtration Area | | 170 cm² (0.18 ft²) | 340 cm² (0.37 ft²) | 1020 cm² (1.10 ft²) |
| Connector | | 1/2" Sanitary Style | | |

[1] Volume of liquid required to fill capsule (experimentally measured).

[2] Capsule Post blow-down hold-up volume. Estimated volume of residual preconditioning flush liquid after air/gas blow-down, using water as the flush fluid and calculated by post-blow-down weight and flush fluid density. Actual amount depends upon exact blow-down conditions, media type in capsule, the number of capsules in the system, the process fluid, and loading level of the capsule.

**IMPORTANT NOTICE:** Always operate the filter system within the maximum differential pressure of 2.4 bar (35 psig).

## Scale-Up Capsule Filter Schematics


**170 cm² & 340 cm² Capsules**


**1020 cm² Capsule**

## Table 2c. 3M™ Zeta Plus™ Production Capsules: Filter Specifications

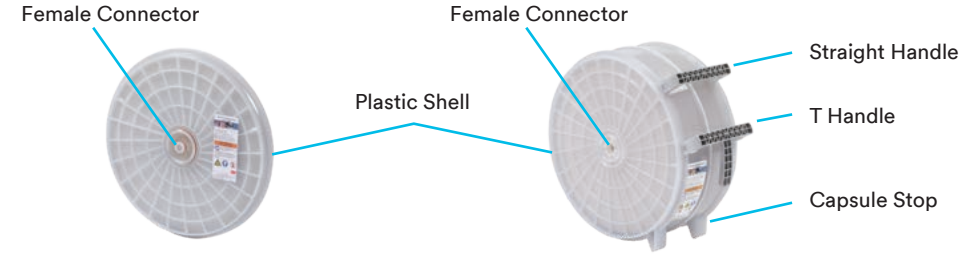
| | | Configuration | | | |
|---|---|---|---|---|---|
| | | Single Cell Capsule | | Multi-Cell Capsule | |
| | | Standard | Alkaline Resistant[1] | Standard | Alkaline Resistant[1] |
| **Dimensions (Height × Diameter)** | | 5.7 cm × 45.2 cm (2.2" × 17.8") | | 20.3 cm × 45.2 cm (8.0" × 17.8") | |
| **Weight** | | | | | |
| Dry | | 3.3 kg (7 lbs) | 3.4 kg (8 lbs) | 10.0 kg (22 lbs) | 10.7 kg (24 lbs) |
| Wet (post Blow-Down) | | 4.4 kg (10 lbs) | 4.8 kg (11 lbs) | 19.3 kg (43 lbs) | 19.7 kg (43 lbs) |
| **Materials of Construction** | | | | | |
| Filter Media | | Filter aids, cellulose, binding resin | | Filter aids, cellulose, binding resin | |
| Outer Shell | | Polycarbonate | Polyphenylene oxide / Polystyrene | Polycarbonate | Polyphenylene oxide / Polystyrene |
| O-rings | | Silicone | | Silicone | |
| Separators, Spacers and Connectors | | Polypropylene | | Polypropylene | |
| Edge Seals | | Thermoplastic Elastomer | | Thermoplastic Elastomer | |
| Handles | | N/A | | Nylon | |
| **Hold-up Volume** | | | | | |
| Capsule Fill Volume[2] | Single Layer | E16E01 & E16R01: ≈ 3.8 L (≈ 1.0 gal) | | E16E11 & E16R11: ≈ 18.8 L (≈ 5.0 gal) | |
| | Dual Layer | E16E01 & E16R01: ≈ 3.4 L (≈ 0.9 gal) | | E16E07 & E16R07: ≈ 18.1 L (≈ 4.8 gal) | |
| Post Blow-Down Hold-up Volume[3] | Single Layer | E16E01 & E16R01: ≈ 0.7 L (≈ 0.2 gal) | | E16E11 & E16R11: ≈ 7.5 L (≈ 2.0 gal) | |
| | Dual Layer | E16E01 & E16R01: ≈ 1.3 L (≈ 0.4 gal) | | E16E07 & E16R07: ≈ 9.0 L (≈ 2.4 gal) | |
| **Maximum Operating Line Pressure** | | 3.4 bar (50 psig) | | 3.4 bar (50 psig) | |
| **Maximum Differential Pressure** | | | | | |
| Forward | | 2.4 bar (35 psid) | | 2.4 bar (35 psid) | |
| **Effective Filtration Area** | | 0.23 m² (2.4 ft²) | | Double layer: 1.6 m² (17.2 ft²)<br>Single layer: 2.5 m² (27.0 ft²) | |

[1] Based on testing with 1M NaOH and 5% NaClO (Bleach).

[2] Volume of liquid required to fill capsule (experimentally measured).

[3] Capsule Post blow-down hold-up volume. Estimated volume of residual preconditioning flush liquid after air/gas blow-down, using water as the flush fluid and calculated by post-blow-down weight and flush fluid density. Actual amount depends upon exact blow-down conditions, media type in capsule, the number of capsules in the system, the process fluid, and loading level of the capsule.

## Single-Use Capsule Filter Schematic



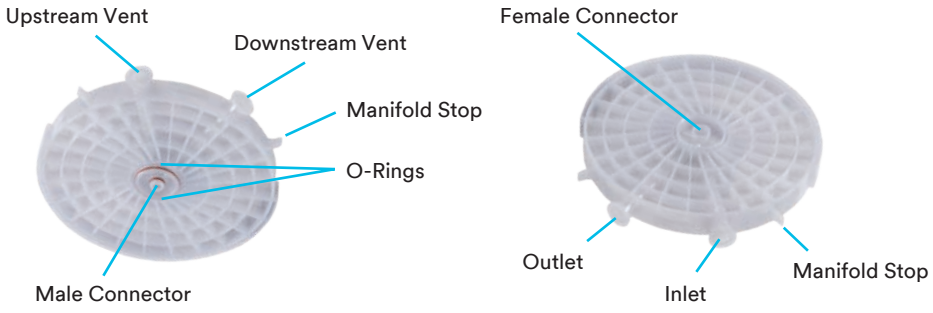

**E16 Single-Cell Capsule**
0.23 m² Capsule
(with double layer or single layer media)

**E16 Multi-Cell Capsule**
1.6 m² Capsule
(with double layer media)
2.5 m² Capsule
(with single layer media)

## Table 2d. 3M™ Encapsulated System Manifold Specifications

| | Configuration | |
|---|---|---|
| | Standard | Alkaline Resistant[1] |
| **Dimensions (Height × Diameter)** | 5.2 cm × 45.2 cm ( 2.0" × 17.8" ) | |
| **Connector** | 1.5" Sanitary Style | |
| **Material** | Polycarbonate | Polyphenylene oxide / Polystyrene |
| **Weight** | 4.4 kg (9.6 lbs) | 4.7 kg (10.4 lbs) |
| **Hold up Volume Per Set** | < 250 mL (<0.07 gal) | |

## Single-Use Manifold Filter Schematic




## Table 3. 3M™ Encapsulated System Holder Specifications

| | Holder Model | |
|---|---|---|
| | Small Holder (Model# 16EZA) | Large Holder (Model# 16EZB) |
| **Maximum Operating Pressure** | 5.2 cm × 45.2 cm ( 2.0" × 17.8" ) | |
| **Materials of Construction** | | |
| Frame | 304 Stainless Steel | 304 Stainless Steel |
| End Plates | 304 Stainless Steel | 304 Stainless Steel |
| Support Rods | 440 Stainless Steel | 316 Stainless Steel |
| Stand | 304 Stainless Steel | 304 Stainless Steel |
| Hand Wheels | 300 Series Stainless Steel | 300 Series Stainless Steel |
| Gear Box | N/A | Epoxy Coated Cast Iron Cover Shrouded in 304 Stainless Steel |
| Locking Bar | N/A | 304 Stainless Steel |
| Casters | Stainless Steel | Stainless Steel |
| Wheels | Phenolic | Polyurethane |
| **Material** | | |
| Standard | Mechanical Polish Finish (4552601) | Mechanical Polish Finish (6123502) |
| Special | Electropolish Finish (4552602) | N/A |

## Table 4. 3M™ Encapsulated System Holder Capacity

| Model | Single Stage | | Two Stage | |
|---|---|---|---|---|
| | E16E01 Capsule | E16E07/E16E11 Capsule | E16E01 Capsule | E16E07/E16E11 Capsule |
| 16EZA | 4 | 1 | 2 | N/A |
| 16EZB | N/A | 7 | N/A | 6 |

## Table 4a. 3M™ Single Cell Capsule Capacities

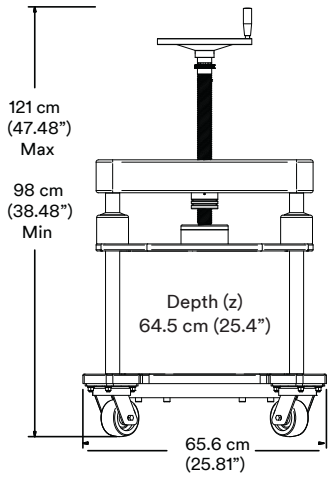
| Holder | Single Cell Capsules (E16E01, E16R01, BV800) | |
|---|---|---|
| | Single Stage Filtration (one set of manifolds) | Two Stage Filtration* (two sets of manifolds) |
| Small, 1-high (Part #4552601) | up to 4 | 2 to 3 |
| Small, 2-high (Part #4552603) | up to 9 | 5 to 8 |
| Small, 3-high (Part #4552604) | up to 11 | 6 to 9 |
| Large (Part #6123502) | 4 to 26 | 2 to 23 |

## Table 4b. 3M™ Multi-Cell Capsule Capacities

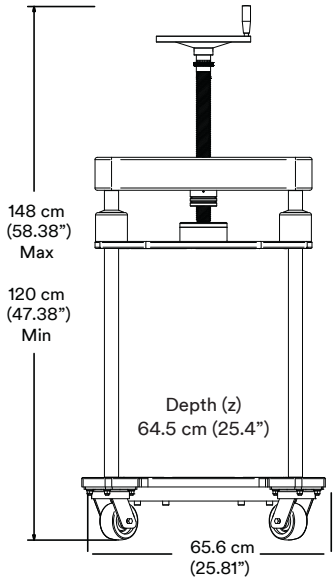
| Holder | Multi-Cell Capsules (E16E07, E16R07, E16E11, E16R11, BV5600) | |
|---|---|---|
| | Single Stage Filtration (one set of manifolds) | Two Stage Filtration* (two sets of manifolds) |
| Small, 1-high (Part #4552601) | 1 | n/a |
| Small, 2-high (Part #4552603) | 2 | 2 |
| Small, 3-high (Part #4552604) | 3 | 2 |
| Large (Part #6123502) | up to 7 | 2 to 6 |

*Number of 3M production capsules which will fit in a 3M holder along with two sets of 3M manifolds. For example, 2 single cell production capsules in the first stage followed by 1 single cell production capsule in the second stage meets the maximum of 3 single cell production capsules for Part Number 4552601.

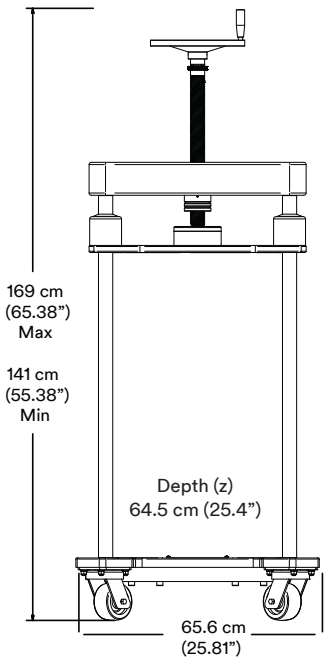
## Figure 9. Small Holder Family (Model# 16EZA) Dimensions




3M™ Encapsulated System Holder, Small, One-High Part #4552601

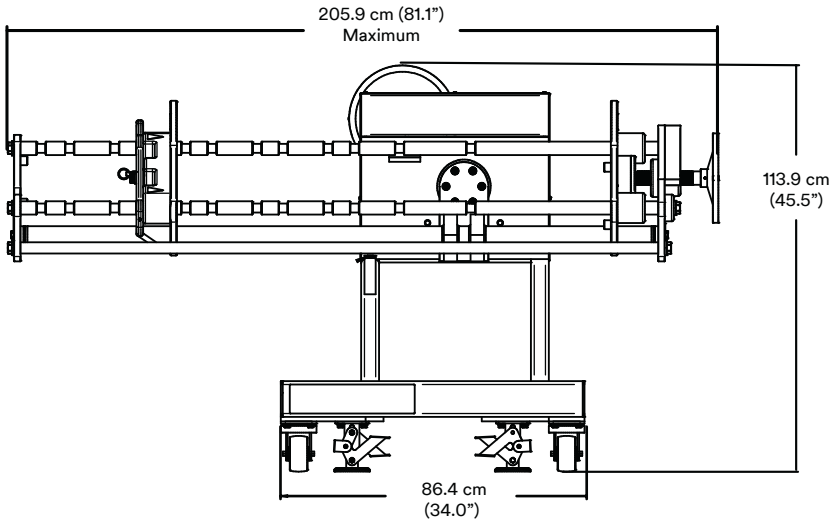



3M™ Encapsulated System Holder, Small, Two-High Part #4552603

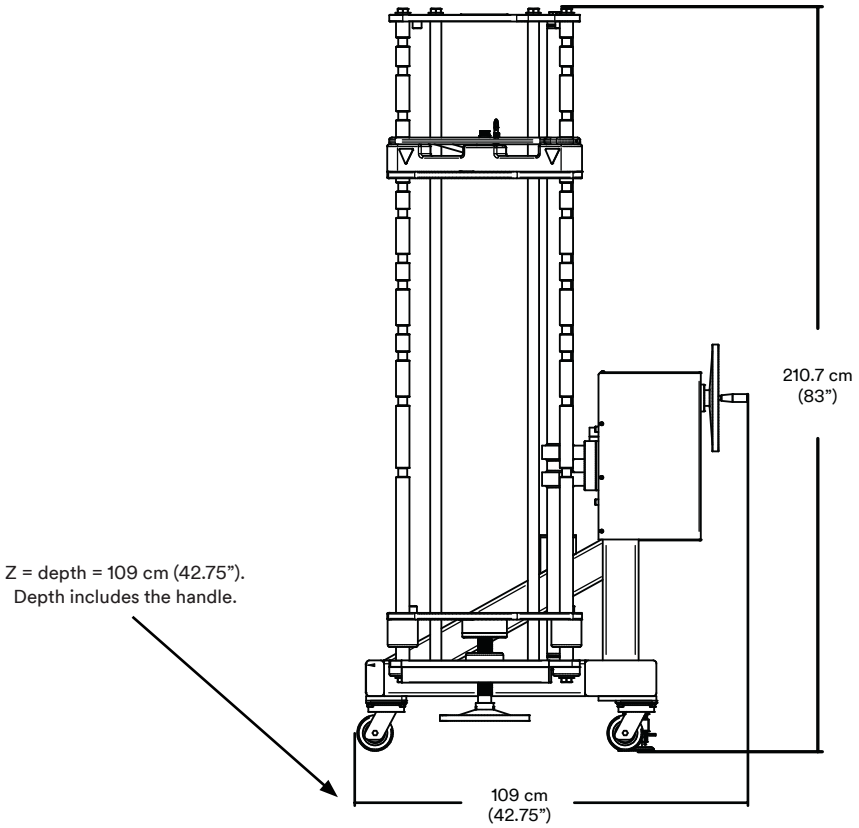



3M™ Encapsulated System Holder, Small, Three-High Part #4552604

## Figure 10. Large Holder (Model# 16EZB) Dimensions




Horizontal Position

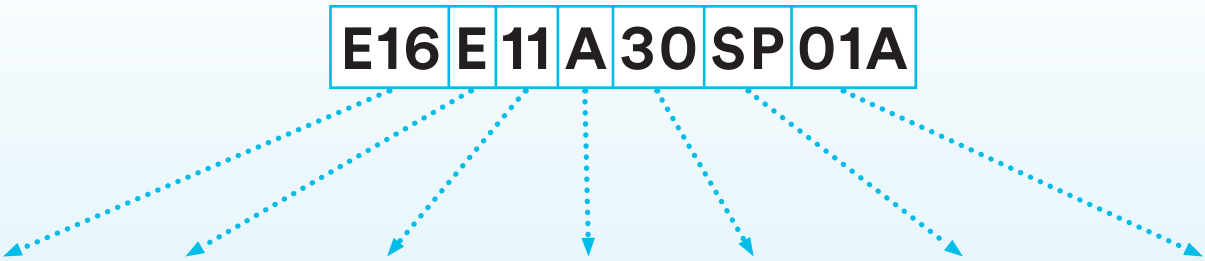



Vertical Position

**3M™ Encapsulated System Holder, Large, Part #6123502**

# Capsule Ordering Guide

## Capsule Product Naming Convention




| Diameter | Configuration | Number of Cells | Gasket Material | Grade | Media | Second Layer |
|---|---|---|---|---|---|---|
| 16" Production | E - Standard<br>R - Alkaline Resistant | 1, 7 or 11 Cells<br>1 or 11 = Single<br>1 or 7 = Dual | A-Silicone | 05, 10, 30, 50, 60, 90 are available for SP | SP, ZB, LA, DELI or DELP | 01A, 02A, 03A, 05A indicate grade of second layer |

### Capsule Filter Ordering Information - Double Layer (U.S. Customers)

| Catalog Number | Configuration | Number of Cells | Gasket Material | Grade | | | |
|---|---|---|---|---|---|---|---|
| **E16** | E - Standard<br>R - Alkaline Resistant* | 01 - 1 Cell<br>07 - 7 Cell | A-Silicone | 05SP01A<br>10SP02A<br>30SP02A<br>30SP03A<br>60SP01A | 60SP02A<br>60SP03A<br>60SP05A<br>90SP05A<br>90SP08A<br>60LA05A<br>90LA05A<br>90LA08A | 120ZB05A<br>120ZB08A<br>120ZB10A<br>60ZB05A<br>90ZB05A<br>90ZB08A | DELP08A |

### Capsule Filter Ordering Information - Single Layer (U.S. Customers)

| Catalog Number | Configuration | Number of Cells | Gasket Material | Grade | | |
|---|---|---|---|---|---|---|
| **E16** | E - Standard<br>R - Alkaline Resistant* | 01 - 1 Cell<br>11 - 11 Cell | A-Silicone | 30LA<br>60LA<br>90LA | 10SP<br>30SP<br>50SP<br>60SP<br>90SP | 30ZB<br>60ZB<br>90ZB<br>120ZB<br>DELP |

## Manifold Ordering Information

| Manifold Part | 3M PI Part Number | 3M ID |
|---|---|---|
| Manifold Set (Standard) | 6128901 | 70020256221 |
| Manifold Set (Alkaline Resistant*) | 6129001 | 70020262369 |

## Filter Holder Ordering Information

| Model Name | 3M Catalog ID (U.S. Customers) | Description | 3M ID |
|---|---|---|---|
| 16EZA | 4552601 | 3M™ Encapsulated System Holder, Small, One-High | 70020310846 |
| | 4552603 | 3M™ Encapsulated System Holder, Small, Two-High | 70020310861 |
| | 4552604 | 3M™ Encapsulated System Holder, Small, Three-High | 70020310879 |
| 16EZB | 6123502 | 3M™ Encapsulated System Holder, Large | 70020252899 |

## Scale-Up Capsules - Dual Layer

| 3M Catalog ID (U.S. Customers) | EFA $cm^2$ | Material Code | Grade | | |
|---|---|---|---|---|---|
| E | 0170<br>0340<br>1020 | FSA | 05SP01A<br>10SP02A<br>30SP02A<br>30SP03A<br>60SP01A<br>60SP02A<br>60SP03A<br>60SP05A<br>90SP05A<br>90SP08A | 60LA05A<br>90LA05A<br>90LA08A<br>60ZB05A<br>90ZB05A<br>90ZB08A<br>120ZB05A<br>120ZB08A<br>120ZB10A | DELI08A<br>DELP08A |

## Scale-Up Capsules - Single Layer

| 3M Catalog ID (U.S. Customers) | EFA $cm^2$ | Material Code | Grade | | |
|---|---|---|---|---|---|
| E | 0170<br>0340<br>1020 | FSA | 05SP<br>10SP<br>30SP<br>50SP<br>60SP<br>90SP | 30LA<br>50LA<br>60LA<br>90LA | 30ZB<br>60ZB<br>90ZB<br>120ZB<br>DELI<br>DELP |

*Based on testing with 1M NaOH and 5% NaClO (Bleach). See Chemical Compatibility Guide (70-0202-2023-5/LITPHG03) for more information.

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3M

**3M Separation and Purification Sciences Division**
400 Research Parkway
Meriden, CT 06450 USA

Phone: 1-800-243-6894
1-203-237-5541
Web: www.3M.com/bioprocessing