

# 3M Purification

## Betapure™ AU Series Cartridge & Capsules Rigid Filter Media



### Designed for Optimum Filtration Quality

Betapure™ AU series filter cartridges and capsules set the standard for filtration performance. Offering more grades with absolute reduction ratings than competitive filters, the controlled pore size of the Betapure AU series filter matrix allow for absolute distinction between cartridge grades to provide the most accurate and consistent filtration. The Betapure AU series filter provides:

- Precise Contaminant Reduction
- Consistent Effluent Quality
- Superior On-stream Service Life

Betapure AU series filters, available in 18 distinct grades with absolute ratings from 2 to 190 microns to tailor the exact selection of performance characteristics for the greatest filtration economy by providing distinct reduction cut-off points by particle size. Betapure AU series filter manufacturing combines advanced incoming material quality assurance, exacting in-process controls, and extensive final product testing and verification. The result is a filter product that provides consistent filtration lot-to-lot, filter-to-filter.

### Applications

<b>Coatings</b>	Magnetic Media, High Quality Paint, Film Coatings, Resins, and Ink
<b>Food &amp; Beverage</b>	Bottled Water, Pre RO, Blend Water, Wash Water
<b>General Industrial</b>	Desalination, Plating, Machine Tool Coolant, Process Water
<b>Pharmaceutical</b>	Water, Solvents, Chemicals, Pre RO, Antibiotic Intermediate Production
<b>Electronics</b>	Pre RO, Wafer Slurries, Ceramic Slurries, Chemical Mechanical Polishing, Cathode Ray Tube Production, Disc Cleaning
<b>Chemical/Petro-Chemical</b>	Process Water, Pre RO, Amine, Fine Chemicals, and MTBE

### Features & Benefits

#### Absolute Ratings

- Consistent and reproducible contaminant reduction
- To meet demanding filtration quality standards in today's market, absolute ratings will provide product consistency and product yields

#### Rigid Structure

- Reduces cartridge by-pass and unloading to provide consistent filtration from start to finish
- The rigid filter structure retains consistent pore size even under severe process conditions. Changes such as those caused by pump fluctuations, stopping and restarting the system or high differential pressure will have minimal, if any effect on product consistency.

#### Depth Filtration

- Excellent reduction of deformable contaminants for consistent effluent
- Depth filtration removes deformable contaminants to reduce or totally eliminate rework or product quality rejection

#### Gasket Design

- Reduces by-pass from poor to damaged seals

#### Lower Pressure Drop

- Provides long service life while using smaller filter housings

#### Available in standard cartridge and disposable capsules

- Wide range of filter sizes allows more appropriate filter sizing for batch and continuous processes



## The Rigid Construction Advantage

Betapure™ AU series filter manufacturing utilizes state-of-the-art technology to produce a clean, rigid, filter structure with consistent and reproducible filtration characteristics. The filter matrix is constructed using long bicomponent fibers, each fiber having an inner core and an outer sheath (see picture above). Betapure™ AU series filters are available in two bicomponent fiber structures, polypropylene/polyethylene or polyester/co-polyester, to provide the greatest range of process compatibility.

The bicomponent fibers of the filter matrix are thermally bonded by utilizing the difference in melt temperatures of the two fiber components. Heating the matrix to the melt temperature of the polyethylene sheath, but below that of the polypropylene core, causes the fiber-to-fiber bond at every contact point. The high degree of fiber-to-fiber bonding provides a rigid structure that eliminates the need for a core support and any possibility of media migration.

The Betapure AU Series filter ensures that the unwanted particles are removed because:

- The rigid structure maintains its porosity throughout the filter life.
- The depth structure reduces more difficult deformable contaminants.

With 18 distinct grades with absolute ratings from 2 to 190 microns to permit the exact filter performance selection, Betapure AU series filters provide the greatest filtration economy available.

## Enhanced Effluent Consistency

The sole purpose of filtration is to remove contaminants or materials that compromise product quality - throughout the entire service life of the filter. A non-rigid filter's pore structure changes as the system differential pressure increases. The result is changing filtration efficiency and inconsistent performance during the filter service life. This can only be corrected by a filter that retains its pore structure. Betapure AU series filters are manufactured with precise control of the filter porosity coupled with the rigid Betapure AU series structure to maintain its porosity throughout its service life. The result is consistent filtrate quality that is reproducible time after time, week after week, year after year.

## Reduction Ratings

3M Purification uses a Multiple Parameter Characterization (MPC) that, unlike single point evaluations, determines a reduction rating over a range of particle sizes (multi-value) and the filter's service life (multi-point). The parameters measured include particle counts, turbidimetric efficiencies, and reduction efficiencies.

## Comparing Filtration Characteristics

The structure of the Betapure™ AU series cartridge provides filtration characteristics that are more consistent than competitive filter cartridges. The following curves show the filtration characteristics of the Betapure AU series cartridge compared to other polyolefin cartridges, and typical polypropylene melt-blown and string-wound cartridges of equivalent reduction rating.

## Betapure™ AU Series Filter

Note that the Betapure AU series filter exhibits excellent filtration capability during its service life. This is evident by the close proximity of the curves to one another. From start to finish, the filter performance does not vary. The rigid Betapure AU series filter structure resists deformation, particle unloading or filter by-pass, and provides consistently high particle reduction efficiency.

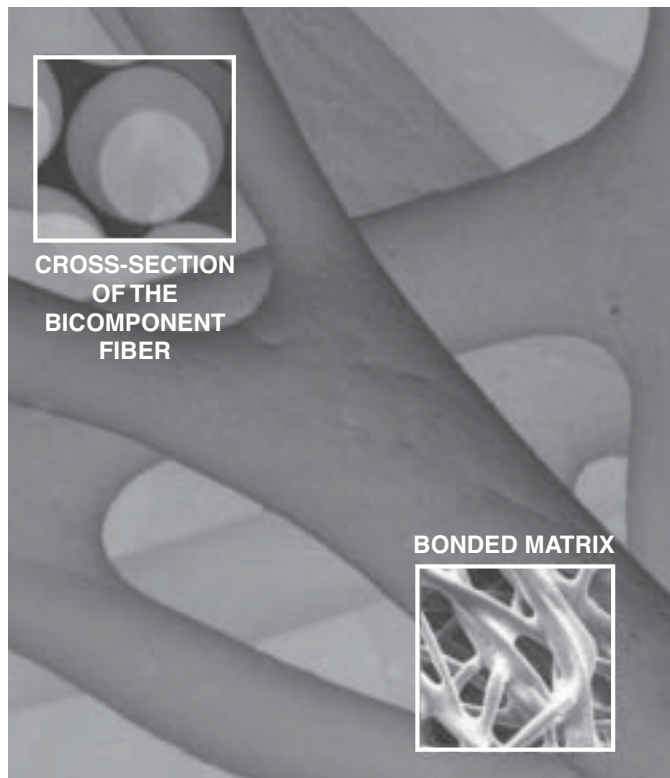


Table 1. – Polyolefin Betapure™ AU Series Ratings

Grade	Rating (µm)		Grade	Rating (µm)	
	Absolute	Nominal		Absolute	Nominal
Z13 - 020	2	0.2	B11	20	5
Z13 - 030	3	0.3	C11	30	10
Z13 - 050	5	0.5	E11	40	20
Z13 - 060	6	0.6	G11	70	30
Z13 - 070	7	0.7	L11	90	50
Z13 - 080	8	0.8	Q11	100	75
Z13 - 100	10	0.9	V11	140	100
Z13 - 120	12	1	W11	160	150
Z13 - 150	15	3	X11	190	175

Table 2. – Polyester Betapure™ AU Series Ratings

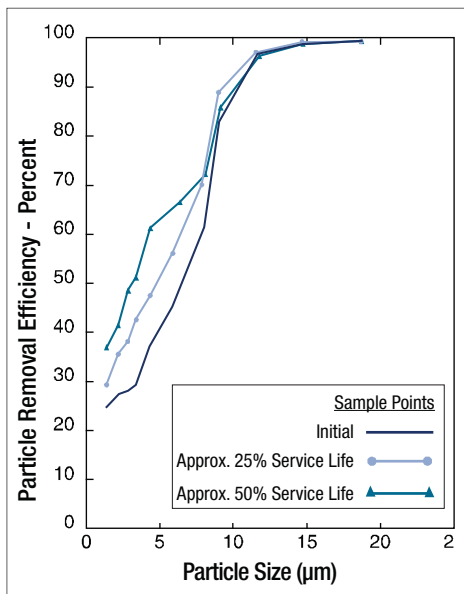
Grade	Rating (µm)	
	Absolute	Nominal
A12	8	3
B12	20	5
C12	30	10
E12	40	20
G12	70	30

### How these tests were conducted...

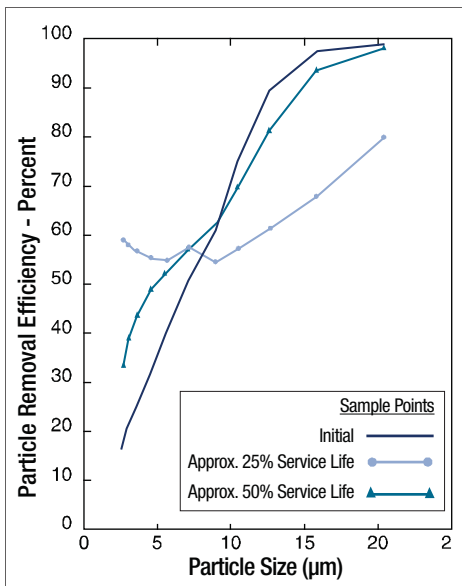
3M Purification uses a Multiple Parameter Characterization (MPC) that, unlike single point evaluations, determines a reduction rating over a range of particle sizes (multi-value) and the filter's service life (multi-point). The parameters measured include particle counts, turbidimetric efficiencies, and reduction efficiencies.

Conditions of Test	
Flow:	11.4 litres / min
Fluid:	Water

### Betapure AU Series Filter



### Other Polyolefin Bi-component Filters



### Scientific Applications Support Services

The cornerstone of 3M Purification Inc.'s philosophy is service to customers, not only in product quality and prompt delivery, but also in validation, application support and in the sharing of scientific information.

3M Purification's Scientific Applications Support Services (SASS) works closely with customers to solve difficult filtration challenges and to recommend the most efficient, economical filter systems. SASS specialists can perform on-site testing and utilize filtration applications expertise to partner with customers. 3M Purification resolves filtration problems promptly and efficiently in a cost-effective, confidential manner with a commercial support group consisting of 3M Purification's in-house customer service staff, application specialists and engineering services. 3M Purification's broad distributor base and sales offices provide worldwide customer service, local inventory, and field support in virtually every major center of manufacturing.

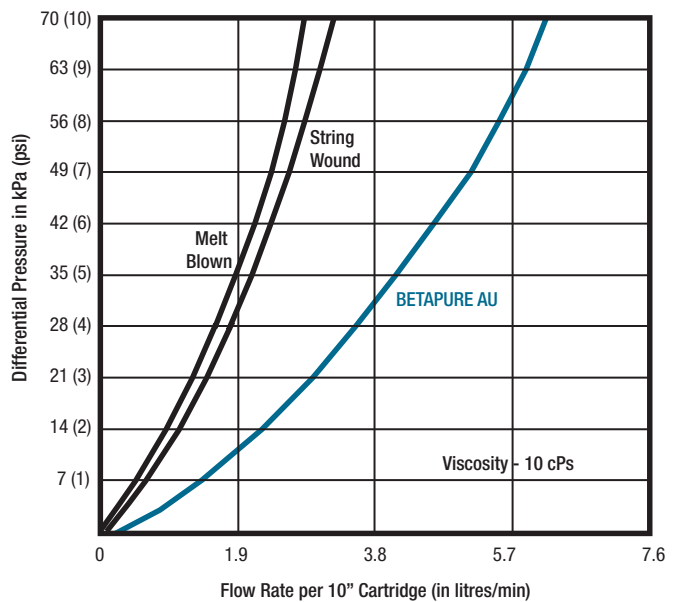
### Other Polyolefin Bicomponent Filters

Other bicomponent filters may look like Betapure AU series cartridges, but they can't match the performance. Note that immediately after the filter is put into service, the efficiency drops but then recovers to the initial efficiency. The inconsistent efficiency exhibited during the service life is reflected in poor effluent and is not reliable enough to satisfy the demand for exceptional product quality.

### Flow Characteristics

Betapure™ AU series exhibits superior flow characteristics for the same removal rating as other polyolefin fiber based cartridges. The curve shows that at a given flow rate the pressure drop across Betapure AU series is considerably lower than competitive products. The benefits of lower pressure drops are:

- Longer cartridge life
- Higher through puts
- Smaller housing requirements
- Lower overall costs



### Chemical Compatibility

Betapure AU series filters are composed of a bicomponent fibers, either polypropylene / polyethylene or polyester / copolyester, both offering broad chemical compatibility. Note that compatibility is always a function of exposure time, operating temperature, and chemical concentration. If compatibility is in question, 3M Purification recommends that the filter be tested.

## Regulatory Compliance

Standard Betapure AU series filters (polypropylene /polypropylene) comply with FDA regulations (CFR 21) for food and beverage applications. Betapure AU series filters have also been USP XXI Class VI (Safety Test for Plastics) tested and have been deemed suitable for pharmaceutical application. Detailed information about application compatibility and samples for testing are available by contacting your local 3M Purification representative.

## Operating Data

Operating Parameter	Description
Polyolefin Betapure™ AU Series	
Maximum Temperature	80 °C
Maximum Differential Pressure*	550 kPa (79 psi) @ 20 °C

Polyester Betapure™ AU Series	
Maximum Operating Temperature *	120 °C
Maximum Differential Pressure*	550 kPa (79 psi) @ 20 °C

\* Betapure AU series's rigid structure will tolerate up to 80 psid. Normally 3M Purification recommends the use of the lowest possible flow rate and filter re-placement at 35 psid to enhance both filter life and filtration efficiency.

**Table 4. – Betapure™ AU Series Filter Flow Information**

Grade	Absolute Rating (µm)	Specific Pressure Drop per 10" Cartridge*
		kPa/lpm
Polyolefin Betapure™ AU Series Filters		
B11	20	0.50
C11	30	0.20
E11	40	0.09
G11	70	0.06
L11	90	0.04
Q11	100	0.02
V11	140	0.01
W11	160	0.01
X11	190	0.01
Polyester Betapure™ AU Series		
A12	8	0.30
B12	20	0.20
C12	30	0.15
E12	40	0.05
G12	70	0.04
Betapure™ AU Series		
Z13-020	2	1.60
Z13-030	3	0.90
Z13-050	5	0.60
Z11-060	6	0.60
Z11-070	7	0.50
Z11-080	8	0.50
Z11-100	10	0.50
Z11-120	12	0.40
Z11-150	15	0.30

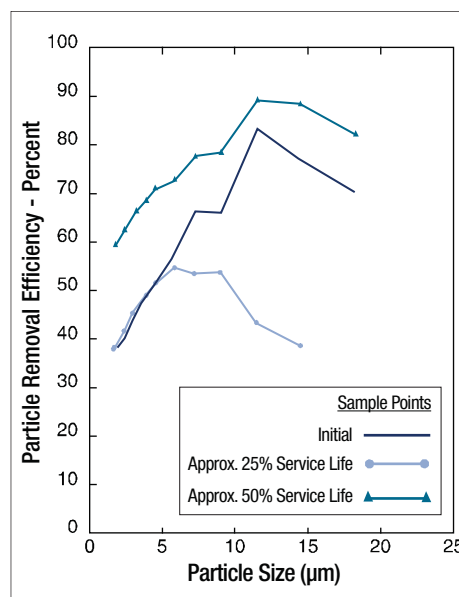
\* For multiple cartridge lengths, divide total flow by the number of single length equivalents.

## Disposal

Betapure™ AU series filter cartridges can be incinerated, shredded or crushed after use to reduce the overall disposal costs. For more information about Betapure AU series disposal, ask your local 3M Purification distributor.

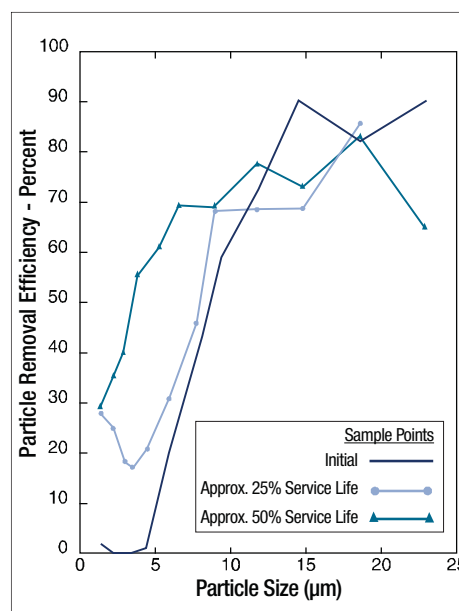
## String-Wound Filter

The competitive cartridge exhibits erratic filtration characteristics that dramatically fluctuate in response to increasing differential pressures.



## Melt-Blown Filter

The compressible structure of a melt-blown filter exhibits wide fluctuations in performance efficiency as the system pressure changes. Such filtration characteristics lead to inconsistent and unpredictable product quality.



### How to Determine Cartridge Flow Rates/Pressure Drop Sizing

Betapure AU series exhibits superior flow characteristics for the same micron rating compared to other fiber based cartridges. This allows for longer cartridge life, higher throughput, and smaller housing requirements. Table 4 provides flow information for Betapure AU series filters in aqueous fluids.

The specific pressure drop values (psid/gpm) per 10" cartridge at 1 centipoise are provided for each filter grade. For fluids other than water, multiply the specific pressure drop value by the viscosity in centipoise. The specific pressure drop values may be effectively used when three of the four variables (viscosity, flow, differential pressure, and cartridge grade) are set.

#### Example 1:

Determine the initial pressure drop for water flowing at 57 lpm per 30" (C11) 30 µm cartridge.

Fluid = Water (1 centipoise)

Flow = 57 lpm

Flow per 10" cartridge =  $57 \div 3 = 19$  lpm

Specific pressure drop from column 3 of Table 4 = 0.12

Calculate:  $0.12 \times 19 = 0.6$  psi initial pressure drop (30" cartridge)

#### Example 2:

Determine the oil flow rate at an initial pressure drop of 2.0 psi per 10" (E11) 40 µm cartridge.

Fluid = 100 centipoise oil

Initial differential pressure = 2.0 psi

Specific pressure drop from column 3 of Table 4 = 0.05

Multiply psi/gpm x viscosity in centipoise =  $0.05 \times 100 = 5$

Calculate:  $2.0$  (psi) x  $5$  (psi/gpm per 10" ctg) =  $0.4$  gpm (10" ctg)

### Cartridge Configurations

All Betapure AU series cartridges are available in continuous multiple lengths up to 60 inches long, with various end treatments to fit your current housing (see ordering guide).

**Table 3. – Betapure™ AU Series Cartridge Parameters**

Parameter	Description
Length*	9 3/4" to 60" (24.8 - 152.4 cm)
Inside Diameter	1.0" (2.54 cm)
Outside Diameter	2.5" (6.35 cm)

\* Other sizes available on request, consult factory

### Special Configurations

Betapure AU series is available in special configurations upon request. The length, inside and outside diameters can be modified for your specific needs. Consult your local 3M Purification distributors for more information.

### Filter Systems

3M Purification manufactures a full line of Betapure AU series compatible filter housings and a wide variety of industrial filter media to meet most application requirements. Housing Models are available for both air and liquid applications in a wide range of construction materials, from plastics to ASME Code Design 316L stainless steel, to suit a variety of application needs. For more information about 3M Purification filter housings and other filter media, consult your local 3M Purification distributor.

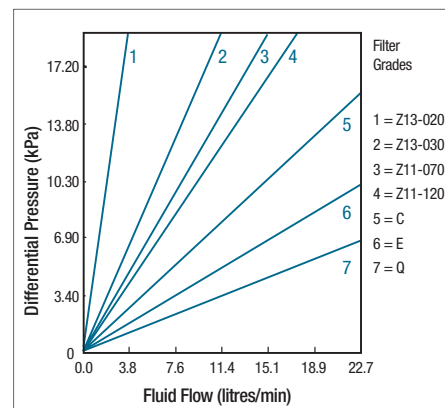
### Betapure™ AU Series Capsules

The Betapure™ AU series capsule is a polypropylene encapsulated filter that eliminates the need for a separate filter vessel. Available in a wide range of configurations (see ordering guide) including sanitary flange and hose barb connections, the 2.5" and 5" capsules are ideal for small batch and filter test applications. The following are typical water flow rates for Betapure AU series capsules with 1 1/2" sanitary flange connections. Other end connections will affect maximum flow rates (see table at right).

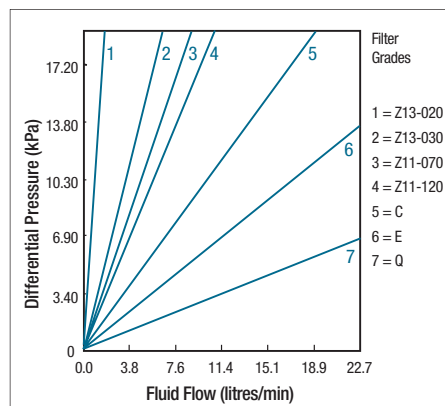
#### Betapure™ AU Series Capsule – Materials of Construction

All Betapure Filter Media	Bi-component polypropylene / polyethylene fibers
Z11 Filter Media	Includes a polypropylene insert
Z13 Filter Media	Includes a glass paper insert
Capsule Body	PolyPropylene
Vent/drain O-rings	See ordering guide

### Flow Rates for 2 1/2" Capsules with 1 1/2" Sanitary Flanges @ 20 °C



### Flow Rates for 5" Capsules with 1 1/2" Sanitary Flanges @ 20 °C



### Betapure™ AU Series Capsule – Maximum Recommended Flow by Configuration

End Connection	Maximum Flow Rate (litre / min)	Housing Pressure Loss (kPa)
1 1/2" Sanitary Flange	22.7	6.90
3/8" FNPT	22.7	6.90
1/2" Hose Barb	11.4	10.30
1/4" MNPT	5.7	16.50

## Polyolefin Betapure™ AU Cartridge Ordering Guide

Cartridge Type	Length*	Grade / Micron rating Absolute (Nominal)	Betapure AU Media	End Modification	Flat gasket or O-ring material
<b>AU=</b> Betapure AU	<b>09</b> = 9 ¾" <b>10</b> = 10" <b>19</b> = 19 ½" <b>20</b> = 20" <b>29</b> = 29 ¼" <b>30</b> = 30" <b>39</b> = 39" <b>40</b> = 40"	<b>B</b> = 20 µm abs (5 µm) <b>C</b> = 30 µm abs (10 µm) <b>E</b> = 40 µm abs (20 µm) <b>G</b> = 70 µm abs (30 µm) <b>L</b> = 90 µm abs (50 µm) <b>Q</b> = 100 µm abs (75 µm) <b>V</b> = 140 µm abs (100 µm) <b>W</b> = 160 µm abs (150 µm) <b>X</b> = 190 µm abs (175 µm)	<b>11-</b> Polyolefin	<b>A</b> = Millipore <b>B</b> = Code 7 Bayonet lock <b>C</b> = Code 8 double O-ring <b>D</b> = DOE with hard cap (length = 10" nominal) <b>E</b> = DOE with hard cap (length = 9¾" nominal) <b>F</b> = Code 3 Double O-ring flat cap <b>N</b> = No end modification	<b>A</b> = Silicone (MVQ)** <b>B</b> = Fluorocarbon (FPM)** <b>C</b> = Ethylene Prop. (EPDM)** <b>D</b> = Nitrile (NBR)**  <b>G</b> = Polyethylene <b>N</b> = None

\* Other lengths on request

\*\* ISO designation

## Polyester Betapure™ AU Cartridge Ordering Guide

Cartridge Type	Length*	Grade / Micron rating Absolute (Nominal)	Betapure AU Media	End Modification	Flat gasket or O-ring material
<b>AU=</b> Betapure AU	<b>09</b> = 9 ¾" <b>10</b> = 10" <b>19</b> = 19 ½" <b>20</b> = 20" <b>29</b> = 29 ¼" <b>30</b> = 30" <b>39</b> = 39" <b>40</b> = 40"	<b>A***</b> = 8 µm abs (3 µm) <b>B</b> = 20 µm abs (5 µm) <b>C</b> = 30 µm abs (10 µm) <b>E</b> = 40 µm abs (20 µm) <b>G</b> = 70 µm abs (30 µm)	<b>12-</b> Polyester	<b>A</b> = Millipore <b>B</b> = Code 7 Bayonet lock <b>C</b> = Code 8 double O-ring <b>D</b> = DOE with hard cap (length = 10" nominal) <b>E</b> = DOE with hard cap (length = 9¾" nominal) <b>F</b> = Code 3 Double O-ring flat cap <b>N</b> = No end modification	<b>A</b> = Silicone (MVQ)** <b>B</b> = Fluorocarbon (FPM)** <b>C</b> = Ethylene Prop. (EPDM)** <b>D</b> = Nitrile (NBR)**  <b>G</b> = Polyethylene <b>N</b> = None

\* Other lengths on request

\*\* ISO designation

\*\*\* Require D or E end modification

## Betapure™ AU Z Grade Cartridge Ordering Guide

Cartridge Type	Length*	Betapure AU Media	End Modification	Flat gasket or O-ring material	Absolute Removal Rating
<b>AU=</b> Betapure AU	<b>09</b> = 9 ¾" <b>10</b> = 10" <b>19</b> = 19 ½" <b>20</b> = 20" <b>29</b> = 29 ¼" <b>30</b> = 30" <b>39</b> = 39" <b>40</b> = 40"	<b>Z13-</b> Polyolefin / Glass <b>Z11-</b> Polyolefin / Polyolefin	<b>A</b> = Millipore <b>B</b> = Code 7 Bayonet lock <b>C</b> = Code 8 double O-ring <b>D</b> = DOE with hard cap (length = 10" nominal) <b>E</b> = DOE with hard cap (length = 9¾" nominal) <b>F</b> = Code 3 Double O-ring flat cap <b>N</b> = No end modification	<b>A</b> = Silicone (MVQ)** <b>B</b> = Fluorocarbon (FPM)** <b>C</b> = Ethylene Prop. (EPDM)** <b>D</b> = Nitrile (NBR)**  <b>G</b> = Polyethylene	<b>Z13 Material Only</b> <b>020</b> = 2 µm abs <b>030</b> = 3 µm abs <b>050</b> = 5µm abs  <b>Z11 Material Only</b> <b>060</b> = 6 µm abs <b>070</b> = 7 µm abs <b>080</b> = 8 µm abs <b>100</b> = 10 µm abs <b>120</b> = 12 µm abs <b>150</b> = 15 µm abs

\* Other lengths on request

\*\* ISO designation

### 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.

### Limitation of Liability

3M Purification Pty Limited will not be liable, to the extent permitted by law, for any loss or damage from the use of the Product(s), whether direct, indirect, special, or consequential, regardless of the legal theory asserted, included warranty, contract, negligence or strict liability.



### 3M Purification Pty Limited

140 Sunnyholt Road  
Blacktown NSW 2148  
AUSTRALIA

Tel. 1300 367 362  
Fax. 1800 671 599

[www.3mpurification.com.au](http://www.3mpurification.com.au)

### New Zealand

PO BOX 33-246  
North Shore 0740  
Auckland, NEW ZEALAND

Tel. 0800 362 886  
Fax. 0800 362 880

[www.3m.com/nz](http://www.3m.com/nz)