ThermoFisher SCIENTIFIC



Industrial filtration

Betapure AU filter cartridges and capsules

thermo scientific

Designed for optimum filtration quality

The controlled pore size of the filter matrix of the Thermo Scientific™ Betapure™ AU Filter Cartridges and Capsules allows for distinction between cartridge grades to provide consistent filtration. The Betapure AU filters provide:

- Contaminant reduction
- Consistent effluent quality
- Consistent service life

Betapure AU filters are available in several distinct grades with absolute ratings from 2 to 190 µm. By providing distinct cut-off points by particle size, exact filtration performance characteristics can be selected.



Features and benefits

Features	Benefits
Absolute ratings	Consistent and reproducible contaminant reduction
Rigid structure	Reduces cartridge by-pass and offloading to provide consistent filtration from start to finish
Depth filtration	Excellent reduction of deformable contaminants for consistent effluent
Gasket design	Reduces by-pass from poor to damaged seals
Lower pressure drop	Provides long service life within a small filter housing
Available in standard cartridge sizes	Wide range of filter sizes allows appropriate filter sizing for batch and continuous processes

Applications

- **Paints and coatings** — High quality paint, film coatings, resins and inks
- **General industrial** — Desalination, plating, process water
- **Electronics** — Pre-RO, ceramic slurries, chemical mechanical polishing
- **Chemical/petrochemical** — Process water, pre-RO
- **Lithium ion battery manufacturing** — Lithium ion battery cathode and anode slurry filtration

The rigid construction advantage

To meet demanding filtration quality standards in today's market, absolute ratings provide product consistency.

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 have minimum effect on product consistency, if any. Depth filtration reduces deformable contaminants to help eliminate rework or product quality rejection.

The reduction of filter by-pass is critical to any filtration process. A closed cell polyethylene foam gasket provides proper cartridge sealing when using knife-edge housing systems.

Filters appropriately sized for a specific application provide longer service life, thereby reducing costs associated with frequency of purchase, installation, and disposal.

Designed for optimum filtration quality

Betapure AU filter manufacturing technology produces 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. Betapure AU filters are available in two bicomponent fiber structures, polypropylene/polyethylene or polyester/co-polyester, for compatibility in a wide range of industrial processes.

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 does not require a core support.

The Betapure AU filter efficiently reduces unwanted particles by:

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

With several distinct grades in absolute ratings from 2 to 190 µm, Betapure AU filters provide filtration economy through exact filter performance selection.

Enhanced effluent consistency

The sole purpose of filtration is to help 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's service life. This can only be corrected by a filter that retains its pore structure. Betapure AU filters are manufactured with precise control of the filter porosity coupled with the rigid Betapure AU structure to maintain its porosity throughout its service life. The result is reproducible, consistent filtrate quality.

Removal ratings

Thermo Fisher 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 removal efficiencies.

Table 1. Thermo Scientific™ Betapure™ AU polyester filter, ratings, from 8 to 70 µm absolute (3 to 30 nominal)

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

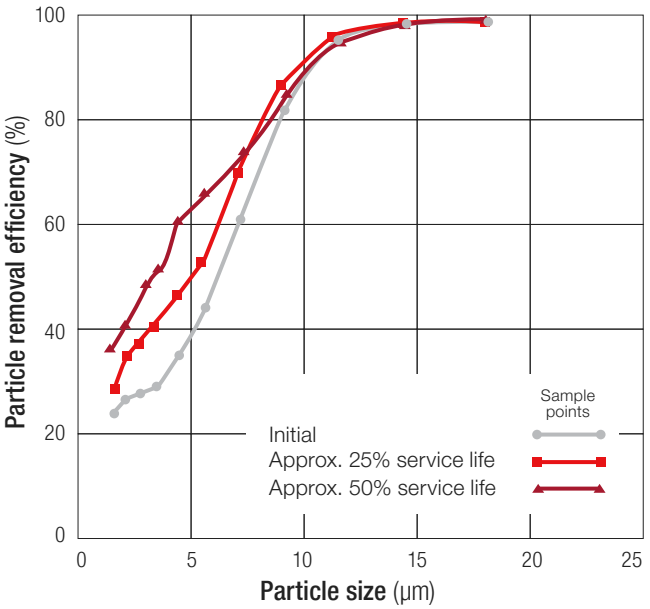
Table 2a. Thermo Scientific™ Betapure™ AU polyolefin filter, Z grade ratings, from 0.6 to 15 µm absolute (0.06 to 3 nominal)

Grade	Rating (µm) absolute	Rating (µm) nominal
Z15-SF6	0.6	0.06
Z13-020	2	0.2
Z13-030	3	0.3
Z13-050	5	0.5
Z11-070	7	0.7
Z11-100	10	0.9
Z11-120	12	1
Z11-150	15	3

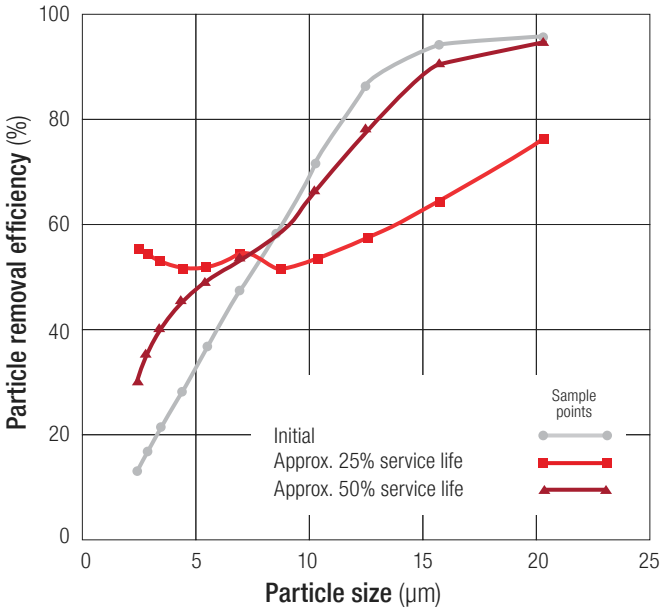
Table 2b. Thermo Scientific™ Betapure™ AU polyolefin filter, ratings, from 20 to 190 µm absolute (5 to 175 µm nominal)

Grade	Rating (µm) absolute	Rating (µm) nominal
B11	20	5
C11	30	10
E11	40	20
G11	70	30
L11	90	50
Q11	100	75
V11	140	100
W11	160	150
X11	190	175

Conditions of test	
Flow	3 gpm (11.36 lpm)
Fluid	Water



Graph 1. Thermo Scientific™ Betapure™ AU Filter exhibits consistent effluent quality as differential pressure increases



Graph 2. Other polyolefin bicomponent filters exhibit inconsistent effluent quality as differential pressure increases

Filtration advantage — rigid construction

Comparing filtration characteristics

The structure of the Betapure AU cartridge provides filtration characteristics that demonstrate consistency. The particle removal efficiency curves show the filtration characteristics of the Betapure AU cartridge compared to other polyolefin cartridges of equivalent removal rating.

Betapure AU filter

Note that the Betapure AU filter exhibits excellent filtration capability during its service life. This is evident by the close proximity of the curves to one another (see Figure 1). From start to finish, the filter performance does not vary. The rigid Betapure AU filter structure resists deformation, particle unloading or filter by-pass, and provides consistently high particle removal efficiency.

Other polyolefin bicomponent filters

Other bicomponent filters may look like Thermo Fisher's, but their performance is a clear indication they are not Betapure AU cartridges. Note that immediately after the other filters are put into service, the efficiency drops but then recovers to the initial efficiency. Inconsistent efficiency exhibited during a filter's service life affects effluent quality, which may not be reliable enough to satisfy the demand for exceptional product quality (see Figure 2).

Flow characteristics

Betapure AU filters offer superior flow characteristics while maintaining the same removal rating as other polyolefin fiber-based cartridges. At a given flow rate, Betapure AU filters exhibit lower pressure drop, resulting in longer cartridge life, higher throughput, smaller housing requirements, and reduced overall ownership costs.

Chemical compatibility

Betapure AU 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, Thermo Fisher recommends that the filter be tested. For more general information about Betapure AU filter chemical compatibility, contact your Thermo Fisher Scientific representative.

Betapure AU series filters operating data

Operating parameter	Description
Polyolefin Betapure AU filters	
Maximum temperature	175°F (80°C)
Maximum differential pressure*	80 psid (551.5 kPa) @ 68°F (20°C)
Polyester Betapure AU filters	
Maximum operating temperature*	250°F (120°C)
Maximum differential pressure*	80 psid (551.6 kPa) @ 68°F (20°C)

* Betapure AU filter's rigid structure tolerates up to 80 psid (551.6 kPa). Normally Thermo Fisher recommends the use of the lowest possible flow rate and filter replacement at 35 psid (241.3 kPa) to enhance both filter life and filtration efficiency.

Disposal

Depending upon the substance contained within the used filter cartridges, and in accordance with federal, state, and local regulations regarding its handling and disposal, Betapure AU filter cartridges can be incinerated, shredded or crushed after use to reduce disposal costs related to volume.

Cartridge configurations

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

Table 3. Thermo Scientific™ Betapure™ AU Filter Cartridge parameters

Parameter	Description
Length	9.75 in to 40 in (24.8 - 101.6 cm)
Inside diameter	1.0 in (2.54 cm)
Outside diameter	2.5 in (6.35 cm)

Table 4. Thermo Scientific™ Betapure™ AU Filter flow information

Grade	Absolute rating (µm)	Specific pressure drop per 10-inch cartridge** (psid/gpm)	Specific pressure drop per 10-inch cartridge** (kPa/lpm)
Polyolefin Betapure AU filters			
B11	20	0.28	0.51
C11	30	0.12	2.2
E11	40	0.05	0.09
G11	70	0.03	0.05
L11	90	0.02	0.04
Q11	100	0.01	0.02
V11	140	0.007	0.13
W11	160	0.005	0.01
X11	190	0.004	0.007
Polyester Betapure AU filters			
A12	8	0.14	0.25
B12	20	0.11	0.2
C12	30	0.08	0.14
E12	40	0.03	0.05
G12	70	0.02	0.04
Polyolefin Betapure AU filters			
Z15-SF6	0.6	2.5	4.38
Z13-020	2	0.88	1.6
Z13-030	3	0.47	0.86
Z13-050	5	0.29	0.53
Z11-070	7	0.29	0.53
Z11-100	10	0.27	0.5
Z11-120	12	0.22	0.4
Z11-150	15	0.19	0.35

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

How to determine cartridge flow rates/pressure drop sizing

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

The specific pressure drop values (psid/gpm) per 10-inch 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 15 gpm (57 lpm) per 30-inch (C11) 30 µm cartridge.

Fluid = Water (1 centipoise)
Flow = 15 gpm (57 lpm)
Flow per 10-inch cartridge = 15 ÷ 3 = 5 gpm (18.9 lpm)
Specific pressure drop from column 3 of Table 4 = 0.12
Calculate: 0.12 x 5 = 0.6 psi initial pressure drop (30-inch cartridge)

Example 2: Determine the oil flow rate at an initial pressure drop of 2.0 psi per 10-inch (E11) 40 µm cartridge.

Fluid = 100 centipoise oil
Initial differential pressure = 2 psi (13.8 kPa)
Specific pressure drop from column 3 of Table 4 = 0.05
Multiply psi/gpm x viscosity in centipoise = 0.05 x 100 = 5
Calculate: 2.0 (psi)/5 (psi/gpm per 10-inch ctg) = 0.4 gpm (10-inch ctg)



Filter systems

Thermo Fisher manufactures a full line of Betapure AU compatible filter housings and a wide variety of industrial filter media to meet most application requirements. Housing models are available for fluid applications in a wide range of construction materials, to suit a variety of application needs. For more information about filter housings and other filter media, consult your Thermo Fisher Scientific representative.

Ordering guides

Betapure AU filter cartridges ordering guide

Cartridge type	Length (inches)	Grade/removal rating (µm)	Media	End modification	Gasket or O-ring material
AU	09 / 9.75 in 10 / 10 in 19 / 19.5 in 20 / 20 in 29 / 29.25 in 30 / 30 in 39 / 39 in 40 / 40 in	A* / 8 B / 20 C / 30 E/ 40 G / 70 L** / 90 Q** / 100 V** / 140 W** / 160 X** / 190	11 - Polyolefin 12 - Polyester	B - 226 O-ring & spear C - 222 O-ring & spear F - 222 O-ring & flat cap N - No end modification J - 226 with flat cap	A - Silicone B - Fluorocarbon C - EPR G - Polyethylene (with Polyolefin media only) K - PTFE N - None

*Available in Polyester only, requires end modification. **Available in Polyolefin only.

Part number example: AU09B11CA is a Betapure AU filter cartridge, 9.75-inch long, 20 µm, Polyolefin media, 222 O-ring & spear style with Silicone O-ring.

Thermo Scientific™ Betapure™ AU "Z" Grade Polyolefin Filter Cartridges ordering guide

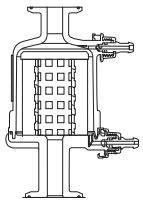
Cartridge type	Length (inches)	Grade designation	End modification	Gasket or O-ring material	Grade/removal rating (µm)
AU	02 / 2 in 05 / 5 in 09 / 9.75 in 10 / 10 in 19 / 19.5 in 20 / 20 in 29 / 29.25 in 30 / 30 in 39 / 39 in 40 / 40 in	Z11 - Polypropylene insert Z13 - Binderless glass insert Z15 - Binder glass insert	B - 226 O-ring & spear C - 222 O-ring & spear D - Double open end w/hard cap 10-inch nom. length E - Double open end w/hard cap 9.75-inch nom. length F - 222 O-ring & flat cap N - No end modification	A - Silicone B - Fluorocarbon C - EPR G - Polyethylene K - PTFE	Z11 - materials only 070 - 7µm Abs. 100 - 10µm Abs. 120 - 12µm Abs. 150 - 15µm Abs. Z13 - materials only 020 - 2µm Abs. 030 - 3µm Abs. 050 - 5µm Abs. Z15 - materials only SF6 - 0.6µm Abs.

Part number example: AU09Z11CA070 is a Betapure AU "Z" grade filter cartridge, 9.75-inch long, Polypropylene insert, 222 O-ring & spear style with Silicone O-ring, 7 µm.

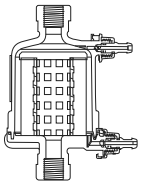
Please note: The ordering guides above are for reference only. Not all combinations are available. Please consult with your Thermo Fisher Scientific representative to determine the appropriate part number for your application.

Betapure AU filter capsules ordering guide

Capsule	Grade code & rating (µm)	Media	Configuration	Length (inches)	In/out connection	Gasket/ O-ring material	Pack size
AU	B - 20 C - 30 E - 40 G - 70 L - 90 Q - 100 V - 140 W - 160 X - 190	11 - Polyolefin	C	01 / 2.5 in 02 / 5 in	A - 1.5-inch sanitary D - 0.375-inch FNPT	A - Silicone C - EPR	01



A - 1.5-inch sanitary

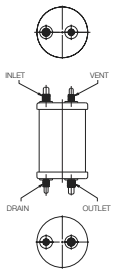


D - 0.375-inch FNPT

Part number example: AUQ11C01AC01 is a Betapure AU filter capsule, 70µm, 2.5-inch, 1.5-inch sanitary in/out, EPR, 1 pack

Thermo Scientific™ Betapure™ AU Filter Capsules (Z grade) ordering guide

Capsule	Grade designation	Grade code & rating (µm)	Configuration	Length (inches)	In/out connection	Pack size
AU	Z13 - Binderless glass insert Z15 - Binder glass insert	020 - 2.0 050 - 5 SF6 - 0.6	Y	02 / 2 in 04 / 5 in 10 / 10 in	L - 0.375-inch flaretek in/out, 0.25-inch flaretek vent/drain P - 0.25-inch MNPT in/out, vent/drain R - 0.25-inch flaretek in/out, vent/drain S - 0.75-inch flaretek in/out, 0.25-inch flaretek vent/drain	01



Capsule Confgurations

Part number example: AUZ15SF6Y10S01 is a Betapure AU filter capsule, 0.6µm, 10-inch, 0.75-inch flaretek in/out, 0.25-inch flaretek vent/drain, 1 pack; 2-inch capsule is available only in 6 per case

Please note: The ordering guides above are for reference only. Not all combinations are available. Please consult with your Thermo Fisher Scientific representative to determine the appropriate part number for your application.

Intended Use: Betapure AU filter cartridge and capsule products are intended for use in industrial, chemical, and electronics filtration applications of aqueous and non-aqueous fluids in accordance with the product instructions, specifications and where materials of construction are compatible.

Since there are many factors that can affect a product's use, the customer and user remain responsible for determining whether the Thermo Scientific product is suitable and appropriate for the user's specific application, including user conducting an appropriate risk assessment and evaluating the Thermo Scientific product in the user's application.

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