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Betapure™ BK-Z8 Series

Depth Filter Cartridges

3M Purification continues an 95+ year tradition of innovative cost effective solutions to challenging industrial filtration applications with Betapure BK-Z8, formerly known as Beta-Klean Z8. Betapure BK-Z8 is a truly absolute rated, rigid (non-compressible) resin bonded filter cartridge. Consistent quality and performance at absolute ratings from 5 to 70 µm make Betapure BK-Z8 the clear choice in the confusing world of indistinguishable „me-too" cartridge filters.

Consistent Performance

Absolute rated rigid structure Betapure BK-Z8 provides consistent performance. Unlike many competitors, Betapure BK-Z8 does not unload or lose filtration efficiency throughout its usable life.

Significant Life Advantage

Betapure BK-Z8's rigid graded density grooved structure provides a significant life advantage over the competition.
3M Purification provides quality solutions worldwide for the most challenging filtration applications. 3M Purification filtration systems include clarifying filters, pre-filters, final filters, stainless steel housings and engineered skid-mounted systems designed and sized for specific applications.

What is Betapure BK-Z8 ?

Betapure BK-Z8 is a rigid, graded-density filter cartridge constructed primarily of acrylic fibres, cellulose fibres and a tough chemically resistant thermosetting resin. The manufacturing process results in more fibres towards the centre core region creating a graded-density structure. The thermosetting resin „bonds" the fibres into a permanent rigid matrix. Betapure BK-Z8 cartridges are grooved to significantly increase the surface area and extend the service life. Betapure BK-Z8 is manufactured and tested to deliver quality, consistency and absolute cost effective filtration performance. 3M Purification's in-process quality assurance provides the control that results in consistent cartridges with defined absolute ratings time-after-time-after-time.

Features and Benefits

Absolute rated cartridge filters from 5 to 70 microns
- Absolute filtration efficiency at the specified removal rating
- Consistent production yields with absolute contaminant retention

Rigid resin bonded structure
- No by-pass or unloading at high differential pressure
- Consistent product quality throughout the filter's life

Grooved surface with true graded-density internal structure
- Significantly longer life
- Cost effective filtration with optimised yields

149 °C high temperature option
- Choice of temperature compatible options
- Inventory one product for many applications

No metal or plastic cores
- Easy disposal, suitable for incineration or shredding
- Disposal cost reduction

Available with polypropylene or polyester end modifications
- Retrofit any industrial housing
- Usable in existing filter housings

Applications

Betapure BK-Z8 provides consistent reproducible filtration performance and longer life while meeting or exceeding quality specifications in a wide variety of industrial processing applications. Betapure BK-Z8 is particularly well suited for high viscosity fluids, high temperature processes and differential pressures to 4.8 bar.

Applications include:

Petroleum Products
- gasoline, kerosene, lube oil, fuel oil, wax

Chemical/Petrochemical
- acids, bases, organic solvents, catalysts, monomers, polymers, glycols

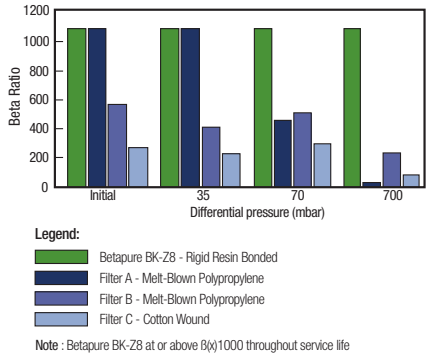
Water
- process water, produced water, boiler feed, demineralised feed, pre-reverse osmosis system, waste water

General Industrial
- paint, varnish, lacquer, inks, coatings, emulsions, magnetic media, resins, detergents, adhesives

Brines and aqueous salt solutions

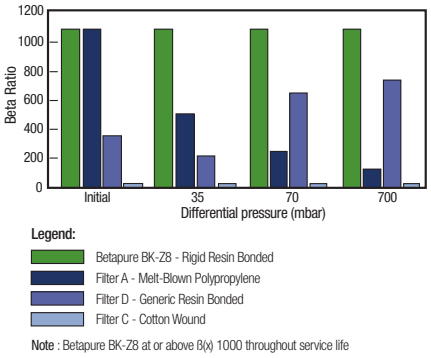
3M

Graph 1: Beta Ratio comparison of filter cartridges rated at 20 microns



Note : Betapure BK-Z8 at or above ß(x)1000 throughout service life

Graph 2: Beta Ratio comparison of filter cartridges rated at 70 microns



Note : Betapure BK-Z8 at or above ß(x) 1000 throughout service life

Table 1: Betapure BK-Z8 Absolute Ratings

Grade Designation	Absolute Rating (µm) Beta Ratio ßx = 1000
Z8 050	5 µm
Z8 070	7 µm (1)
Z8 100	10 µm
Z8 140	14 µm (2)
Z8 150	15 µm (3)
Z8 200	20 µm
Z8 300	30 µm
Z8 400	40 µm
Z8 500	50 µm
Z8 700	70 µm

(1) - Better flow rate than 5 µm
(2) - Better flow rate than 15 µm
(3) - Better life time than 14 µm

Consistent Performance

The initial Beta Ratio for all grades of Betapure BK-Z8 filter cartridges is equal to or greater than 1000 and each cartridge performs at or above this initial value throughout its usable (all the way to plugging) life. This defines Betapure BK-Z8‘s absolute filtration performance. The Beta Ratio vs. Differential Pressure Graphs 1 and 2 illustrate how competitive filters do not achieve the consistent performance of Betapure BK-Z8. Filters that show a decrease in Beta Ratio as the differential pressure increases are exhibiting either unloading of previously held contaminants or a loss of filtration efficiency. This inconsistent performance results in a reduction in finished product quality, product yield and an increase in total filtration cost.

Comments

- As illustrated in Graphs 1 and 2, the performance of melt-blown polypropylene (Competitor A) degrades rapidly after a small (35 mbar) increase in differential pressure, indicating contaminant unloading and a loss of filtration efficiency typical of a compressible structure. In Graph 1, the generic cotton wound, Competitor C, exhibits erratic performance caused by media movement under increasing pressure and, in Graph 2, it exhibits minimal ability to retain contaminant throughout the test.
- In Graph 1, melt-blown Competitor B never approaches a Beta Ratio of 1000 and it shows a decreasing Beta Ratio at high differential pressure.
- Resin bonded Competitor D, as shown in Graph 2, exhibits very low Beta Ratios at low differential pressures indicating poor performance. Above 70 mbar, the contaminant builds a cake which accounts for the subsequent increase in Beta Ratio.

Betapure BK-Z8 exhibits consistent Beta Ratios at all differential pressures.

Absolute Betapure BK-Z8

Absolute Betapure BK-Z8 removal ratings are determined for the entire cartridge life using a new filter performance test developed by 3M Purification that complies with the general procedure outlined in ASTM 975. Test conditions available on request.

3M Purification defines Absolute Rating as „the particle size (x) providing an initial Beta Ratio (ßx) = 1000“. At this Beta Ratio the removal efficiency is equal to 99.9%. Beta Ratio (ßx) is defined by the following equation:

$$ß\,(x) = \frac{\text{Cumulative Number of Particles Larger than x in the Influent Challenge}}{\text{Cumulative Number of Particles Larger than x in the Effluent}}$$

Betapure BK-Z8 filters achieve a minimum Beta Ratio (ßx) value of 1000 at the specified ratings seen in Table 1.

High Temperature Betapure BK-Z8

Standard Betapure BK-Z8 provides consistent performance at temperatures to 120 °C and differential pressures to 4.8 bar.

High temperature (HT) Betapure BK-Z8 extends the temperature rating to 149 °C for those processes that require service under extreme conditions.

NOT RECOMMENDED FOR HOT DI WATER. This HT version requires NYLON flat gasket (DOE) or polyester end cap. (SOE). Please see ordering guide.

Reproducible cost effective filtration

Betapure BK-Z8 is manufactured to rigid specifications and subjected to stringent process and quality controls to ensure consistency in filtration performance and ultimately, end-user process consistency - run after manufacturing run.

Rigid graded density Betapure BK-Z8

Betapure BK-Z8 filter cartridges are manufactured using an exclusive process that achieves a true „graded density“ fibre structure with a clean and smooth inside diameter. Each fibre is locked in this arrangement by a thermosetting resin binder to create a rigid structure, eliminating the need for a metal or plastic centre core. Larger particles are trapped in the outer area and finer particles towards the inner area.

Figure 1 illustrates how in a graded-density structure the overall effect is to clarify and retain particles by size as they progress through the cartridge.

Betapure BK-Z8: High surface area

Betapure BK-Z8 cartridges also feature an optimised groove pattern that increases the surface area by over 65% when compared to smooth cylindrical cartridges (see Figure 2). The grooved surface prevents premature blinding of the outer surface by large particles and allows full utilisation of the depth structure. Maximum surface area with a true graded-density structure means that Betapure BK-Z8 can provide 3 times or greater service life than competitive filter cartridges.

Betapure BK-Z8 Product Specifications

See Table 2

Cartridge End Modifications

- Standard temperature: Polypropylene bonding with polypropylene end modifications
- High temperature: Thermoset epoxy bonding with polyester end modifications

Operating parameters

- Maximum operating temperature
  1. High temperature - 149 °C (DOE version)
  * With polyester end modifications - 120°C
  2. Standard - 120 °C (DOE version)
  * With polypropylene end modifications - 82 °C
  * With polyethylene gasket - 93 °C
  * With polyester end modifications - 120 °C
- Maximum differential pressure: 4.8 bar at 20°C
- Recommended change-out differential pressure: 2.4 bar

Dimensions

* Inside diameter: 26.9 mm (1 1/16“)
* Outside diameter: 65.9 mm (2 19/32“)
* Cartridge length: 9 3/4“ through 40“ (from 248 to 1016 mm)

Betapure BK-Z8 flow rates

Table 3 provides flow information for Betapure BK-Z8 in aqueous fluids.
For liquids other than water, multiply the specific pressure drop value (in column 3) 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.

Waste Management

Betapure BK-Z8 cartridges contain no metal or plastic cores. They can be incinerated, shredded, or crushed after use to reduce overall disposal costs.

* *Specific aqueous pressure drop at ambient temperature for a single equivalent 10“ cartridge. For multiple cartridge lengths, divide total flow by the number of single length equivalents.*
** *Optimal efficiency and life is achieved at aqueous flow rates less than the maximum flow indicated.*

Figure 1: Betapure BK-Z8 graded density structure

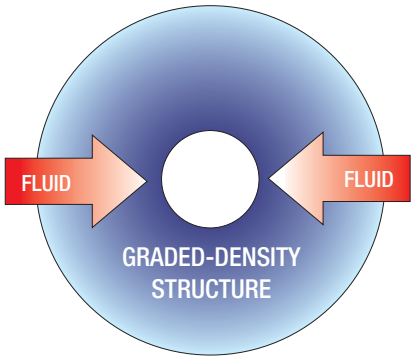


Figure 2: Surface area comparison

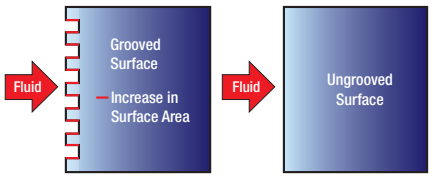


Table 2

Absolute rating (µm)	Grade	Fibre	Resin
5 7 10 14 15	Z8050 Z8070 Z8100 Z8140 Z8150	Acrylic / Glass / Cellulose	Phenolic
20 30 40 50 70	Z8200 Z8300 Z8400 Z8500 Z8700	Acrylic / Cellulose	Phenolic

Table 3

Absolute rating (µm)	Grade	Specific pressure drop per 10” Cartridge * (mbar) for each litre/min	Recommended max. aqueous flow rate ** per 10” cartridge (l/min)
5	Z8050	13.6	11.4
7	Z8070	5.98	11.4
10	Z8100	3.64	15.1
14	Z8140	2.89	15.1
15	Z8150	4.88	15.1
20	Z8200	2.34	18.9
30	Z8300	1.44	18.9
40	Z8400	1.10	22.7
50	Z8500	0.89	26.5
70	Z8700	0.55	26.5

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Table 4: Chemical Compatibility

Category	Example	Rating*	Category	Example	Rating*
Petroleum	Gasoline - Kerosene - Diesel Fuel Lube Oil - Fuel Oil - Wax	R R	Inorganic Acids	Hydrochloric (Muriatic) Acid 5% Sulphuric 50% - Sulphurous 5-10% - Nitric	R R
Organic Solvents	MEK - Benzene - Toluene Xylene - Alcohols - Glycols Dimethyl Formamide (DMF) Amines (DEA, MDEA, MEA) (20% - 50% up to 71 °C)	R R N L	Brines and Aqueous Salt Solutions	Sodium Chloride Sodium Sulphate Sodium Nitrate	R R R
			Weak Alkalis	Aluminium Hydroxide Ferric Hydroxide - Magnesium Hydroxide	R R
Water	Process - Produced Boiler Feed - Demineraliser Feed Potable water - WFI	R R N	Fatty Acids Oil	Detergents - Mineral Oil Industrial Vegetable Oil - Silicone Oil	R R
Organic Acids	Acetic (100%) - Tannic (10%)	R	Oxidisers	Hydrogen Peroxide 90%	R

* ER = Generally Recommended up to 121 °C unless otherwise noted. N = Not recommended L = Likely compatible, test before use.

Betapure BK-Z8 Ordering Guide

Range	Cartridge Length (1)	Absolute Micron rating Beta ratio = 1000	Finishing	Packaging (2)	Temperature	End Modification	Flat gasket or o-ring material
BK = Betapure BK-Z8	**09** = 9 ¾” **10** = 10” **19** = 19 ½” **20** = 20” **29** = 29 ¼” **30** = 30” **39** = 39” **40** = 40”	**Z8050** = 5 µm **Z8070** = 7 µm **Z8100** = 10 µm **Z8140** = 14 µm **Z8150** = 15 µm **Z8200** = 20 µm **Z8300** = 30 µm **Z8400** = 40 µm **Z8500** = 50 µm **Z8700** = 70 µm	**U** = Grooved **G** = Ungrooved	**1** = Standard shrink wrap **2** = bulk pack	**S** = Standard version	DOE Length **N** = No end cap	**N** = no gasket **G** = with flat Polyethylene gasket (required for grade 5 µm to 14 µm)
						SOE with Polypropylene end cap **B** = Code 7 (226 O-ring) with bayonet **C** = Code 8 (222 O-ring) with Spear **F** = Code 3 (222 O-ring) with flat cap	O- Ring material **A** = Silicone (MVQ) **B** = Fluorocarbon (FPM) **C** = EPR (EPDM) **D** = Nitrile (NBR) **K** = PTFE encap. viton **X** = PTFE encap. silicone
						R = Spring on top version	**N** = no gasket **G** = with flat Polyethylene gasket
					H = High Temp version	DOE Length **N** = No end cap	**N** = no gasket **Y** = with flat Nylon® gasket (required for grade from 5 µm to 14 µm)
						SOE with Polyester end cap **C** = Code 8 (222 O-ring) with Spear **F** = Code 3 (222 O-ring) with flat cap	**K** = PTFE encap. viton **X** = PTFE encap. silicone

NOTES ON ORDERING

(1) Lengths are multiples of either 9 ¾” or 10”.
(2) (option 1) Standard packaging is shrink wrapping for cartridge length from 9 ¾” to 30”.
(For 40”, only option 2 is available).
(option 2) Bulk pack polyethylene bagged with divider is available on request. (For cartridge length from 9 ¾” to 40”).

Betapure BK-Z8 is new name for Beta-Klean Z8.

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For more contact addresses visit our website www.3M.eu/filtration or www.3Mpurification.com/international.

Data may be subject to change without further notice.