Micro-Klean™ RB Series

Premium Resin Bonded Filter Cartridges

Micro-Klean™ RB Series Cartridges — Better By Design

The Micro-Klean™ RB Series Cartridge manufacturing process produces a rigid, resin bonded, graded porosity structure that reduces by-pass and avoids the unloading characteristics of soft and easily deformable competitive meltblown and stringwound filter cartridges. The design of Micro-Klean RB series cartridges provides a family of filter cartridges that offer distinct benefits:

- Consistent particle reduction efficiencies
- Extended cartridge life
- Ability to withstand high temperatures and elevated differential pressures
- Broad chemical compatibility
- Consistent batch to batch filtration characteristics

Construction

Micro-Klean RB series filter cartridges are the product of continuous refinement of manufacturing and fiber technologies. Available in both grooved and ungrooved versions, Micro-Klean RB series filters are ideal for a wide variety of applications. The grooving of the outer surface significantly increases the filter's effective surface area, and increases the contaminant holding capacity. The ungrooved version of the Micro-Klean RB series cartridge is preferred for the reduction of gels and other deformable contaminants. To provide compatibility with a wide range of process fluids, Micro-Klean RB series cartridges are available in different combinations of fiber type and resin (see Table 1).

Features & Benefits

Graded Porosity Design
- Low pressure drop and long life for consistent filtration performance

Rigid Resin Bonded Structure
- No by-pass or unloading with high pressure drops or pressure surges

Grooved Face
- 2.3 times the surface area of competitive ungrooved cartridges for greater dirt loading capacity

Broad Chemical Compatibility
- For chemically aggressive applications

300 °F Acrylic Cartridge Multi-length Option
- Ease of installation and removal in high temperature applications (Micro-Klean RB series High Temperature Cartridges only)

Broad Range of Ratings from 1 µm to 150 µm
- Wide range of effective applications

Disposal (Must comply with appropriate state and local regulations)
- No metal or plastic cores
- Crushable
- Shreddable
- Incinerable (8,000 btu/lb)

Environmental/Energy Advantage
- Formulation 8 Micro-Klean RB series filters with porosity between 1 um and 75 um are made from greater than 20% recycled material by weight.

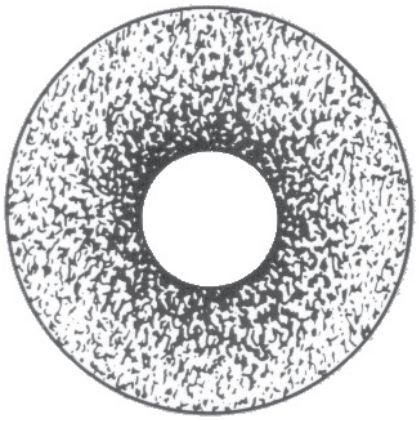
LEED® Claims: Use of this product (1 - 75 micron 8 formulations only) may
- Help comply with LEED® EB v3.0 Prerequisite 1: Sustainable Purchasing Policy
- Help contribute to LEED® EB v3.0 MR Credit 1: Sustainable Purchasing — Ongoing Consumables or LEED® EB v3.0 MR Credit 2: Sustainable Purchasing — Durable Goods

Applications*

- Paints
- Inks
- Emulsions
- Adhesives
- Resins
- Organic Solvents
- Coolants
- Lube Oils
- Various Chemicals
- Pesticides
- Fertilizers
- Process Water
- General Manufacture Processes

*Micro-Klean RB series cartridges are not designed for and should not be used in Food and Beverage, and Pharmaceutical applications. Please contact 3M Purification for the appropriate filters for these applications.

3M



PICTURE 1
Micro-Klean™ RB Series CARTRIDGE
CROSS-SECTION SHOWING TRUE GRADED
POROSITY DESIGN

Table 1: Cartridge Formulations

Formulation	Fiber	Resin
2	Cellulose / Glass*	Melamine
	Cellulose	Melamine
3	Cellulose / Glass*	Phenolic
	Cellulose	Phenolic
8	Acrylic	Phenolic

*Available only as 1 and 3 micron rated cartridges

Operating Data

Table 2: Micro-Klean™ RB Series Cartridge Product Parameters

Operating Parameters	
Maximum Operating Temperature	Standard Formulation — 250 °F (121 °C) With Polyethylene Foam Flat Gasket — 200 °F (93 °C) With Polypropylene End Modifications — 180 °F (82 °C)
High Temperature Option	With or without Polyester End Modifications — 300 °F (149 °C)
Maximum Differential Pressure	70 psid (4.8 bar)
Recommended Change-out Differential Pressure	35 psid (2.4 bar)
Dimensions	
Length	9 3/4" to 40" (248 - 1016 mm)
Inside Diameter	1 1/16" (26.9 mm)
Outside Diameter	2 19/32" (65.9 mm)

The Micro-Klean RB Series High Temperature Cartridge option is recommended for non aqueous applications with operating temperatures from 180 °F to 300 °F. The high temperature cartridge is the standard acrylic fiber and phenolic resin formulation with multi-length bonding using a high temperature adhesive for durability in the installation and removal process. Any end treatment on a high temperature cartridge will be made of polyester.

Cartridge Configurations

Standard series filter cartridges are available in multiple lengths with or without various end treatments to fit most major manufacturer's cartridge housings (See Ordering Guide). Note that for applications with operating temperatures greater than 180 °F, use the Micro-Klean RB series High Temperature Cartridge formulation.

Performance

Micro-Klean RB Series products combine the principles of surface and depth filtration in one cartridge to provide enhanced filter service life, particle removal efficiency and optimum flow characteristics.

Enhanced Service Life

Laboratory testing and extensive field experience has shown that, compared to competitive products of equally reported retention ratings, Micro-Klean RB Series cartridges can hold up to 2 or more times the contaminant by weight. The grooved face provides 2.3 times the surface area than ungrooved or wrapped cartridges for greater contaminant loading capacity. Additionally, the manufacturing process of Micro-Klean RB Series cartridges creates significant void volume within the internal matrix to increase loading capacity.

Particle Removal Efficiency

Scheduled non-destructive testing during the manufacturing process provides consistent

batch to batch cartridge performance. Micro-Klean RB Series cartridges particle removal efficiencies provide consistent particulate removal throughout the cartridge life as shown in Graph 1.

Turbidimetric Efficiency

Micro-Klean™ RB Series cartridges exhibit a constant and uniform effluent turbidity for nearly 70% of their service life (Graph 2). Non-rigid filters, wound or melt blown, by comparison can exhibit erratic effluent turbidities as they load and unload, indicating by-pass.

Flow Characteristics

For sizing systems and calculating the operating pressure drop of Micro-Klean RB series cartridges, use the following procedure to calculate the clean pressure drop of a Micro-Klean RB series filtration system. Specific Pressure Drop (SPD) is defined as the pressure drop across a 10" length filter element per flow rate of a 1 Cp fluid. By knowing the SPD of the filter media, the clean operating pressure drop of a filtration system can be quickly calculated by using the following formula:

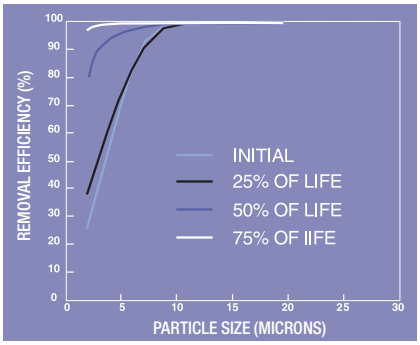
$$\underset{\text{psid (mbar)}}{\text{Clean } \Delta p} = \frac{\text{(Total System Flow gpm [lpm]) (Viscosity in Cp) (SPD Value from table)}}{\text{(Number of 10" Equivalent Single Length Cartridges in Housing)}}$$

Table 3. - Specific Pressure Drop (SPD)

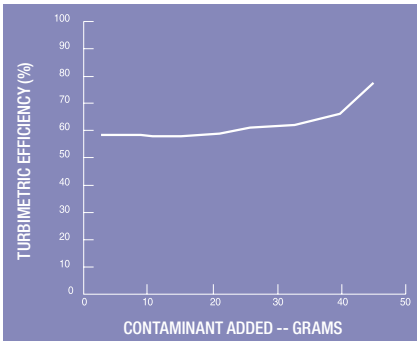
GRADE	Nominal RATING (Microns)	SPECIFIC PRESSURE DROP (SPD)* (psid/gpm-Cp)	(mbar/lpm-Cp)
Y8	1	0.3254	5.93
A8	3	0.2034	3.71
B8	5	0.1271	2.32
C8	10	0.0712	1.30
F8	25	0.0356	0.65
L8	50	0.0224	0.41
Q8	75	0.0142	0.26
V8	100	0.0092	0.17
W8	125	0.0041	0.07
X8	150	0.0031	0.06
Y2	1	0.3051	5.49
A2	3	0.1475	2.69
B2	5	0.0814	1.48
F2	25	0.0712	1.30
L2	50	0.0458	0.83
A3	3	0.1526	2.78
B3	5	0.0814	1.48
F3	25	0.0651	1.19
L3	50	0.0397	0.72

*Specific pressure drop for a 1 Cp fluid at ambient temperature for a single length equivalent (10") cartridge.

Graph 1: Typical Micro-Klean™ RB Series Cartridge Retention Efficiency



Graph 2. - Typical Micro-Klean™ RB Series Cartridge Turbidimetric Efficiency To 10 psid Pressure Drop



Micro-Klean™ RB Series Cartridge Ordering Guide

Standard Product

Surface Type	Cartridge Length*	Designation Grade — Rating	Formulations Available	Cartridge Lengths*	Options	
G - Grooved	78 - 9 3/4"	Y - 1 µm	2, 8	1	N - None	B - 226 O-ring and Spear
U - Ungrooved	80 - 10"	A - 3 µm	2 , 3, 8	2	G - Polyethylene Gasket	C - 222 O-ring and Spear
		B - 5 µm	2 , 3, 8	3	X - 316 S.S. Core Extender	F - 222 O-ring and Flat Cap
		C - 10 µm	8	4	P - Polypropylene Core Extender	Q - End Cap without Spring
		F - 25 µm	2 , 3, 8		S - Shrink Wrap	R - End Cap with Spring
		L - 50 µm	2 , 3, 8		T - Tissue Wrap	RI - End Cap with Plastic Spring
		Q - 75 µm	8		U - Polyethylene Bag	
		V - 100 µm	8			
		W - 125 µm	8			
		X - 150 µm	8			

Surface Type	Cartridge Length*	Designation Grade / Rating	Formulations Available	Cartridge Lengths*	Temperature Option	End Treatment Options**	Gasket/O-Ring
G - Grooved	78 - 9 3/4"	Y - 1 µm	8	1	H- High Temperature	N - None	N - None
U - Ungrooved	80 - 10"	A - 3 µm	8	2		X - 316 S.S. Core Extender	A - Silicone
		B - 5 µm	8	3		B - Single Open End, 226 O-ring & Spear	B - Fluorocarbon
		C - 10 µm	8	4			C - EPR
		F - 25 µm	8			C - Single Open End, 222 O-ring & Spear	D - Nitrile
		L - 50 µm	8				
		Q - 75 µm	8			F - Single Open End, 222 O-ring & Flat Cap	
		V - 100 µm	8				
		W - 125 µm	8				
		X - 150 µm	8				

* Cartridge over all lengths will be multiples of either 9 3/4" or 10".
** B, C, and F options constructed of polyester.

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 INC. BE RESPONSIBLE FOR DAMAGES OF ANY NATURE WHATSOEVER RESULTING FROM THE USE OF OR RELIANCE UPON INFORMATION.**

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