

# LENNTECH

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## Micro-Klean™ III Series

Premium Resin Bonded Filter Cartridges

### Micro-Klean™ III — Better By Design

The Micro-Klean III cartridge manufacturing process produces a rigid, resin bonded, graded porosity structure that eliminates by-pass and the unloading characteristics of soft and easily deformable, competitive filter cartridges such as spiral wound, melt-blown and string wound cartridges. The design of Micro-Klean III cartridges provides a family of filter cartridges that offer distinct advantages:

- Consistent particle removal efficiencies with sharp cut-offs,
- Extended cartridge life,
- Ability to withstand high temperatures and elevated differential pressures,
- Broad chemical compatibility, and
- Consistent batch to batch filtration characteristics.

### Construction

Micro-Klean III filter cartridges are the product of continuous refinement of manufacturing and fiber technologies. Available in both grooved and ungrooved versions, Micro-Klean III 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 III cartridge is excellent for the removal of gels and other deformable contaminants. To provide compatibility with a wide range of process fluids, Micro-Klean III 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

- Adds 47% more surface area than competitive ungrooved wound or wrapped 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 III 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
- Shreddable
- Crushable
- Incinerable (8,000 btu/lb)

#### Environmental/Energy Advantage

- Formulation 8 Micro-Klean™ filters with porosity between 1 µm and 75 µm 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

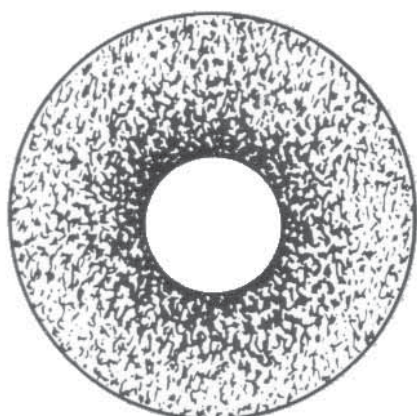
Pesticides

Fertilizers

General Manufacture Processes

\* Micro-Klean III 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 III 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 3 micron rated cartridges

## Operating Data

**Table 2: Micro-Klean III 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)

Micro-Klean III 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. All high temperature o-ring end treatments will be polyester.

## Cartridge Configurations

Standard Micro-Klean III filter cartridges are available in multiple lengths with or without various end treatments to fit your current housing (Table 2). Note that for applications with operating temperatures greater than 180°F, use the Micro-Klean III High Temperature Cartridge formulation.

## Performance

Micro-Klean III 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 III cartridges can hold up to 2 or more times the contaminant by weight. The grooved face provides nearly 50% more surface area than ungrooved or wrapped cartridges for greater contaminant loading capacity. Additionally, the manufacturing process of Micro-Klean III Series filters creates significant void volume within the internal matrix to increase loading capacity.

### *Particle Removal Efficiency*

Continuous, on-line, nondestructive testing during the manufacturing process provides consistent batch to batch cartridge performance. Micro-Klean III cartridges particle removal efficiencies provide a sharp cut-off and consistent particulate removal throughout the cartridge life as shown in Graph 1.

### Turbidimetric Efficiency

Micro-Klean III 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 cartridges, use the following procedure to calculate the clean pressure drop of a Micro-Klean filtration system. Specific Pressure Drop (SPD), is defined as the pressure drop in psid across a 10" length filter element per gallon per minute (gpm) of flow rate of a 1 Cp fluid. (Flow can also be expressed in lpm, and pressure drop in mbar if desired). By knowing the Specific Pressure Drop of the filter media, the operating pressure drop of a filtration system can be quickly calculated by using the following formula:

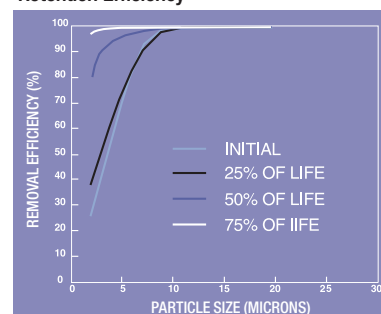
$$\frac{\text{Clean } \Delta p}{\text{psid (mbar)}} = \frac{(\text{Total System Flow gpm [lpm]}) (\text{Viscosity in Cp}) (\text{SPD Value from table})}{(\text{Number of 10" Equivalent Single Length Cartridges in Housing})}$$

Table 2. - Specific Pressure Drop (SPD)

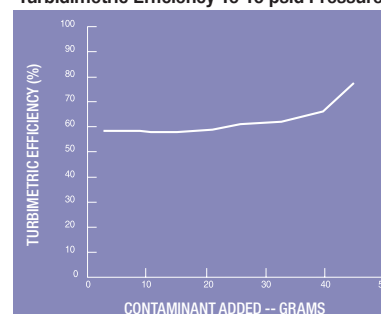
GRADE	Nominal RATING (Microns)	SPECIFIC PRESSURE DROP (SPD)*	
		(psid/gmp-Cp)	(mbar/lmp-Cp)
Y8	1	0.3254	5.93
A8	3	0.2034	3.71
B8	5	0.1271	2.32
C8	10	0.0712	1.30
F8	25	0.0356	0.65
L8	50	0.0224	0.41
Q8	75	0.0142	0.26
V8	100	0.0092	0.17
W8	125	0.0041	0.07
X8	150	0.0031	0.06
Y2	1	0.3051	5.49
A2	3	0.1475	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 III Cartridge Retention Efficiency



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



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# Micro-Klean III Series 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
U - Ungrooved	80 - 10"	A - 3 µm	2, 3, 8	2	G - Polyethylene Gasket
		B - 5 µm	2, 3, 8	3	X - 316 S.S. Core Extender
		C - 10 µm	8	4	P - Polypropylene Core Extender
		F - 25 µm	2, 3, 8		S - Shrink Wrap
		L - 50 µm	2, 3, 8		T - Tissue Wrap
		Q - 75 µm	8		
		V - 100 µm	8		
		W - 125 µm	8		
		X - 150 µm	8		

## Micro-Klean III High Temperature

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	2, 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 Bayonet Lock & Fin	B - Fluorocarbon
		C - 10 µm	8	4		C - Single Open End, 222 O-ring & Fin	C - EPR
		F - 25 µm	8			F - Single Open End, 222 O-ring & Flat Cap	D - Nitrile
		L - 50 µm	8				
		Q - 75 µm	8				
		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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The LEED® (Leadership in Energy and Environmental Design) Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings."