

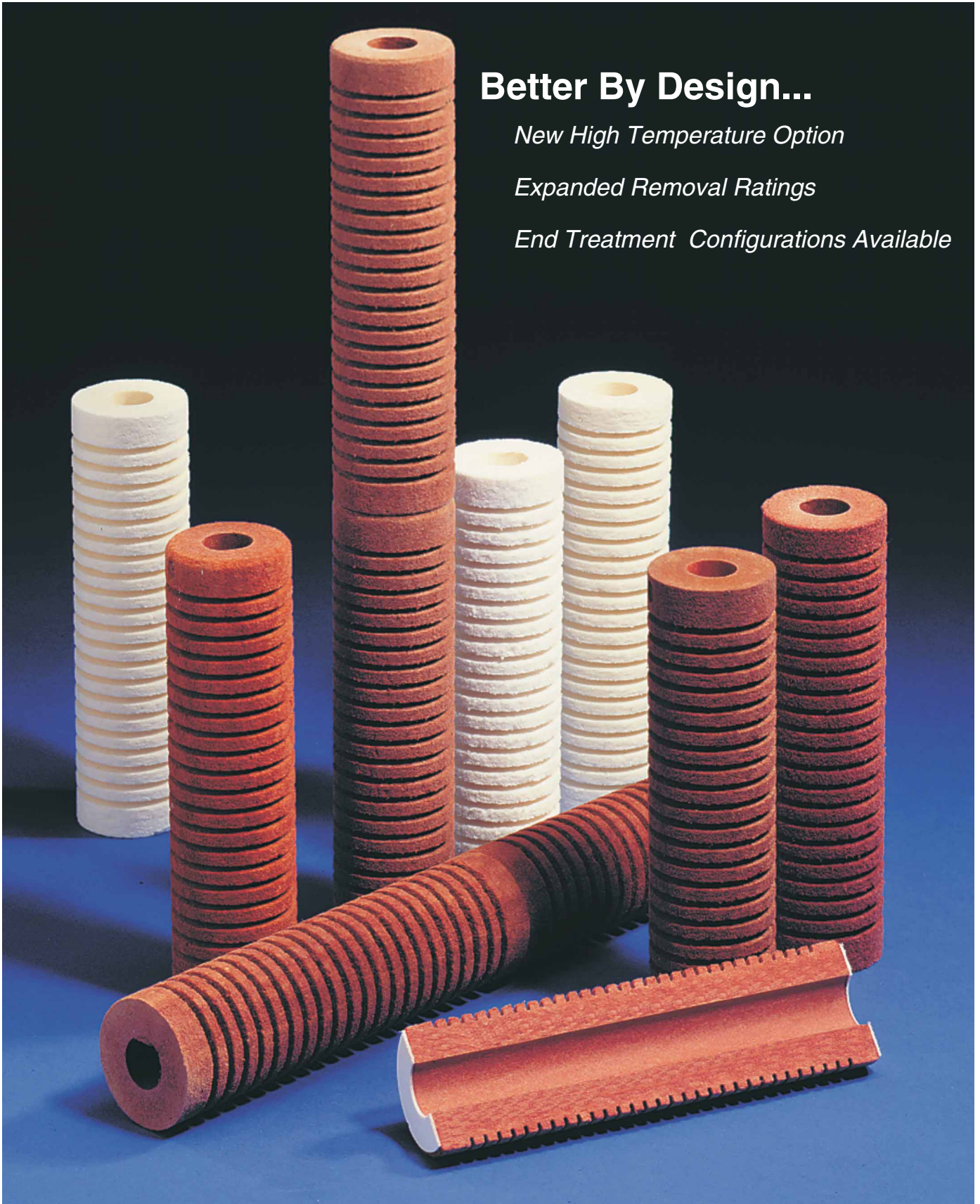
Micro-Klean[®] III Premium Resin Bonded Filter Cartridges

Better By Design...

New High Temperature Option

Expanded Removal Ratings

End Treatment Configurations Available



Micro-Klean III - *Better By Design*

Features

- Graded Porosity Design
- Rigid Resin Bonded Structure
- No Metal or Plastic Cores
- Broad Chemical Compatibility
- 300°F Acrylic Cartridge Multi-length Option
- Available with Optional End Treatments
- Broad Range of Ratings from 1µm to 150µm Nominal

Benefits

- Low Pressure Drop and Long Life for Consistent Filtration Performance
- No By-pass or Unloading with High Pressure Drops or Pressure Surges
- Easy Disposal
- For Chemically Aggressive Applications
- Ease of Installation and Removal in High Temperature Applications
- Can be used in Competitive Filter Housings
- Wide Range of Effective Applications

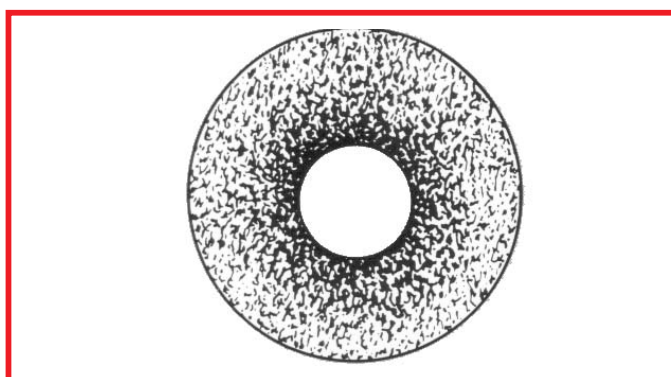
Design

The exclusive Micro-Klean III 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 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 is excellent for the removal of gels and other deformable contaminants. To provide compatibility with a wide range of process fluids, Micro-Klean III is available in different combinations of fiber type and resin (see table 1). For more information about chemical compatibility and Micro-Klean III, refer to CUNO publication GF.G02.



PICTURE 1. - MICRO-KLEAN III CROSS-SECTION SHOWING TRUE

FORMULATION	FIBER	RESIN
2	Cellulose/Glass*	Melamine
	Cellulose (FDA Compliant**)	Melamine
3	Cellulose/Glass*	Phenolic
	Cellulose	Phenolic
8	Acrylic	Phenolic
* Available only as 3 micron rated cartridges		
CUNO recommends that only the Micro Klean 2 formulation be employed in food & beverage applications. Furthermore, the Micro Klean 2 formulation filter should only be used in accordance with 21CFR 177.2260 and that operating temperatures for use should not exceed 75°F (24°C). CUNO recommends testing of the product in actual application conditions before use.		

TABLE 1. - CARTRIDGE FORMULATIONS

Operating Data

Standard Micro-Klean III formulation is designed for maximum operating temperatures up to 300°F depending upon options selected. Use of CUNO's patented polyethylene foam flat gasket for enhanced sealing limits the maximum operating temperature to 200°F. Micro-Klean III filter cartridges will withstand differential pressures of up to 70 psid. To enhance both filter life and filtration efficiency, CUNO recommends use of the lowest possible flow rate and filter replacement at 35 psid. Micro-Klean III filters used in Food & Beverage applications should not exceed 75°F (24°C).

Micro-Klean III - Better By Design

Micro-Klean III High Temperature 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 (19 1/2" to 40" long cartridges) bonding using a filter grade high temperature resin 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 formulation.

PARAMETER	DESCRIPTION
Length	9 3/4" to 40"
Inside Diameter	1 1/16"
Outside Diameter	2 19/32"

TABLE 2. - MICRO-KLEAN III PARAMETERS

Performance

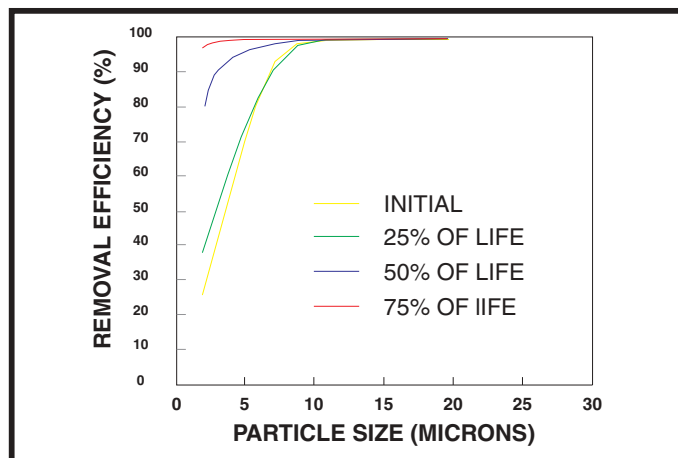
Micro-Klean III combines the principles of surface and depth filtration in one cartridge to provide enhanced filter service life, particle removal efficiency and optimum flow characteristics.

Enhanced Service Life

Laboratory testing and extensive field experience has shown that, compared to competitive products of equally reported retention ratings, Micro-Klean III can hold up to 2 or more times the contaminant by weight.

Particle Removal Efficiency

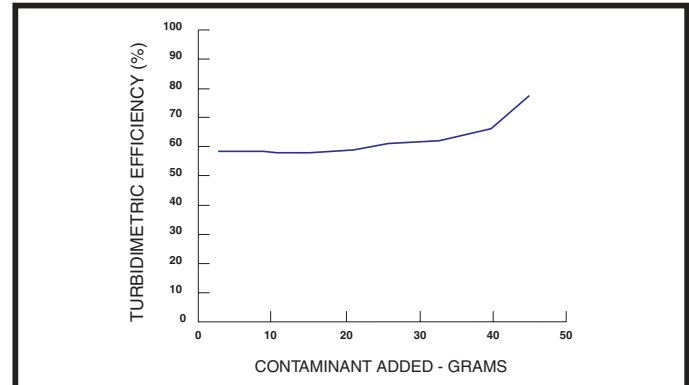
Continuous, on-line, nondestructive testing during the manufacturing process provides consistent batch to batch cartridge performance. Micro-Klean III particle removal efficiencies provide a sharp cut-off and consistent particulate removal throughout the cartridge life as shown in Graph 1.



GRAPH 1. - TYPICAL MICRO-KLEAN III RETENTION EFFICIENCY

Turbidimetric Efficiency

Micro-Klean III exhibits a constant and uniform effluent turbidity for nearly 70% of its 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.



GRAPH 2. - TYPICAL MICRO-KLEAN TURBIDIMETRIC EFFICIENCY to 10 psid pressure drop

Flow Characteristics

For sizing systems and calculating the operating pressure drop of Micro-Klean cartridges, use the following procedure to accurately 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 gpm of flow rate of 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:

$$\Delta p_{\text{Clean}} = \frac{\left(\frac{\text{Total system}}{\text{gpm [lpm]}} \right) \left(\frac{\text{Viscosity in}}{\text{Cp}} \right) \left(\frac{\text{Value from}}{\text{table}} \right)}{\left(\frac{\text{Number of}}{\text{Equivalent Single Length Cartridges}} \right) \left(\frac{\text{in housing}}{\text{in housing}} \right)}$$

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 aqueous pressure drop at ambient temperature for a single length equivalent (10") cartridge. For multiple cartridge lengths, divide the total flow by the number of equivalent lengths.

TABLE 2. - SPECIFIC PRESSURE DROP (SPD)

Micro-Klean III Ordering Guide

Standard Product

SURFACE TYPE	CARTRIDGE LENGTH *	DESIGNATION GRADE - Rating	FORMULATIONS AVAILABLE	CARTRIDGE LENGTHS *	OPTIONS
G - Grooved	78 - 9 3/4"	Y - 1µm	8	1	N - None
U - Ungrooved	80 - 10"	A - 3µm	2,3,8	2	G - Polyethylene Gasket
		B - 5µm	2,3,8	3	X - 316 S.S. Core Extender
		C - 10µm	8	4	P - Polypropylene core Extender
		F - 25µm	2,3,8		S - Shrink Wrap
		L - 50µm	2,3,8		T - Tissue Wrap
		Q - 75µm	8		
		V - 100µm	8		
		W - 125µm	8		
		X - 150µm	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 - 1µm	8	1	H - High Temperature	N - None	N - None
U - Ungrooved	80 - 10"	A - 3µm	8	2		X - 316 S.S. Core Extender	A - Silicone
		B - 5µm	8	3		B - Single Open End, 226 Bayonet Lock & Fin	B - Fluorocarbon
		C - 10µm	8	4		C - Single Open End, 222 O-ring & Fin	C - EPR
		F - 25µm	8			F - Single Open End, 222 O-ring & Flat Cap	D - Nitrile
		L - 50µm	8				
		Q - 75µm	8				
		V - 100µm	8				
		W - 125µm	8				
		X - 150µm	8				

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

Special Configurations

Micro-Klean III is available in special configurations including polypropylene end treatments. The length, outside diameter, and inside diameter can be designed to your custom requirements. Consult your local CUNO Distributor for more information.

WARRANTY

Seller warrants its equipment against defects in workmanship and material for a period of 12 months from date of shipment from the factory under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by Seller and for purposes disclosed in writing at the time of purchase, if any. Any unauthorized alteration or modification of the equipment by Buyer will void this warranty. Seller's liability under this warranty shall be limited to the replacement or repair, F.O.B. point of manufacture, of any defective equipment or part which, having been returned to the factory, transportation charges prepaid, has been inspected and determined by the

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