

Cartridge Filter Systems For Oil and Gas Processing

- ☒ Reduce Filtration Costs
- ☒ Improve Process Performance
- ☒ Minimize Downtime & Labor Costs
- ☒ Control Disposal Costs



Petro-Klean®Filters

Petro-Klean Cartridges - Raising the standards for Oil & Gas filtration systems.

Petro-Klean* filter cartridge systems have demonstrated an unmatched record of consistently providing the most cost effective solutions to Gas Processing and Refining filtration applications. The Petro-Klean family of depth media filter cartridges have greater service life, reduced filter cartridge change-out frequency, and provide higher quality effluent than competitive products! Petro-Klean uniquely combines absolute filtration performance with exceptionally high dirt holding capacity providing the cost effective choice in these Oil & Gas filtration applications:

- **Amine sweetening systems for gas plants and refineries**
- **Glycol Dehydration**
- **Compressor lube oil systems**
- **Refinery catalytic process protection**
- **Process and equipment protection**
- **Waterflood and enhanced oil recovery**

Discover the Petro-Klean Competitive Advantage!

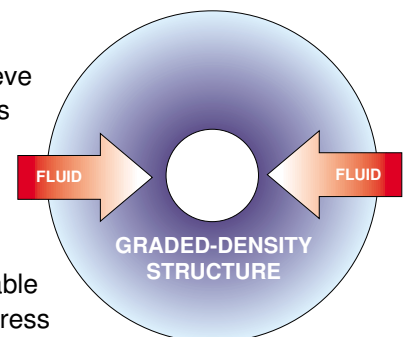
Filtration Characteristic	Petro-Klean Filters	Sock Type Filters	Melt-Blown Filters	Pleated Filters	String-Wound Filters
Absolute Rated	Yes	No	Yes	Yes	No
Rigid Structure	Yes	No	No	No	No
Graded Density	Yes	No	No	No	No
Bypass and Unloading	No	Yes	Yes	Yes	Yes
Performs at High Delta-P	Yes	No	No	No	No

The above table lists common filtration characteristics of various filter types for comparison. Petro-Klean filter construction and design provide the features that ensure performance superior to competitive product.

Petro-Klean Filter Construction

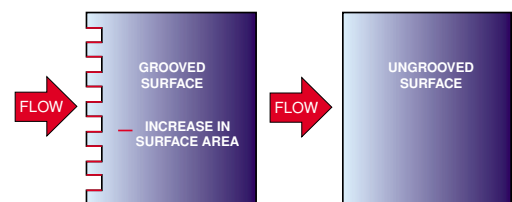
Rigid Graded-Density Petro-Klean Structure

Petro-Klean filter cartridges are manufactured using an exclusive process to achieve a true graded-density structure. A proprietary Cuno manufacturing process results in progressively more dense center core region creating a graded-density structure. Each fiber is locked in place by a thermosetting resin binder to create a rigid depth filter matrix that traps larger particles near the outer surface and smaller particles near the cartridge's inside diameter. The overall effect is to greatly improve cartridge service life by retaining particles and deformable contaminants in decreasing particle size ranges as the contaminant particles progress through the cartridge.



High Surface Area Petro-Klean

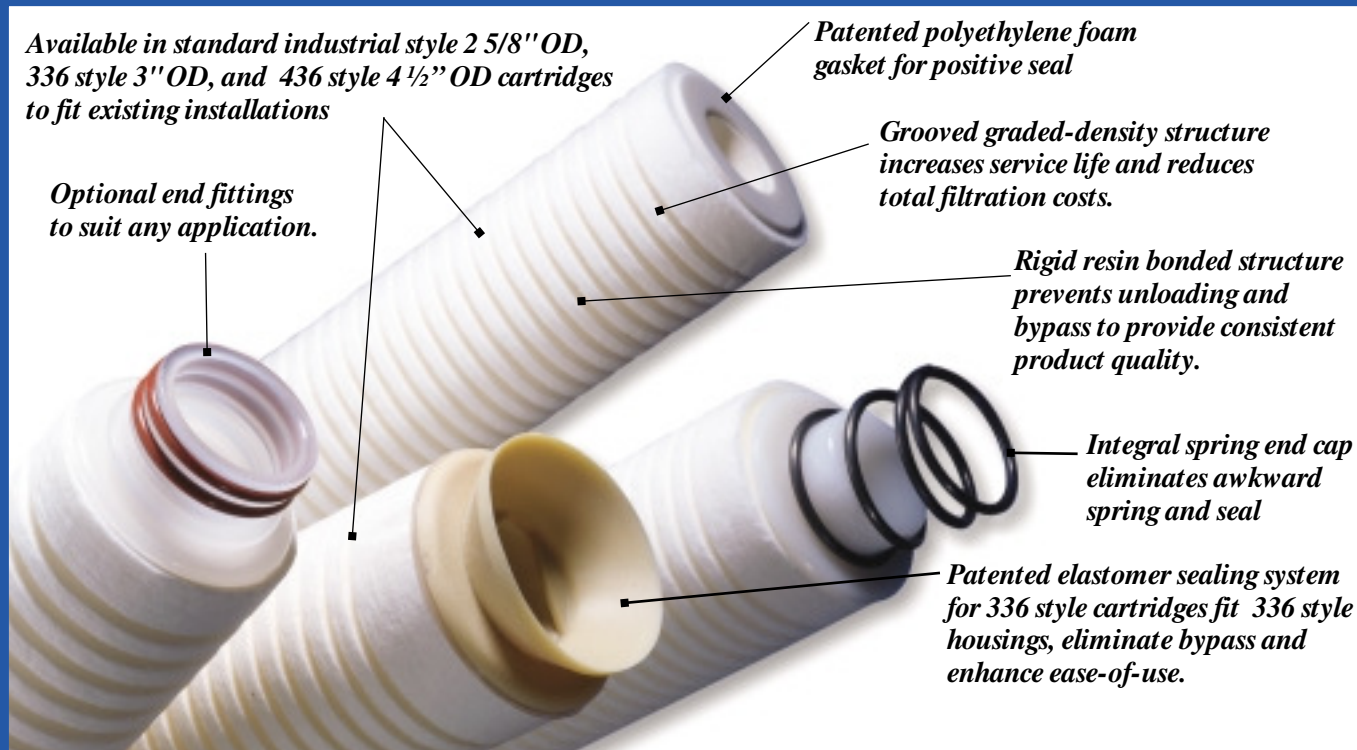
Petro-Klean cartridges also feature an optimized groove pattern to increase the surface area by over 65% when compared to ungrooved cylindrical cartridges. The grooved surface prevents premature blinding of the outer surface by large particles and allows full utilization of the depth structure. Maximum surface area with a true graded-density structure means that Petro-Klean can provide significantly greater service life than competitive filter cartridges.



* U.S. Patent Number 5,399,264, 5,015,316, 5,028,037, and other U.S. and foreign patent rights.

The Petro-Klean® Advantage!

Feature	Advantage	Benefit
■ Absolute-rated cartridge filters from 10 - 60 microns	■ Distinct particle size cutoff at the specified removal rating	■ Reproducible effluent quality throughout the filter's life
■ Beta 1000 rated throughout the cartridge life	■ No bypass or unloading at high differential pressure	■ Consistent product quality throughout the filter's life
■ Grooved surface with true graded-density structure	■ Significantly longer life	■ Dramatic cost savings with optimized yields
■ Patented "336" cartridge elastomer sealing system	■ User-friendly, maintains integrity at high differential pressure	■ Fast filter change-out and consistent product quality
■ No metal or plastic cores	■ Easy disposal, suitable for incineration or shredding	■ Reduced disposal costs
■ Available in 2 5/8" OD, 336 style 3" OD, and 436 style 4 1/2" OD and lengths to 72"	■ Broad range of configurations for custom sizing	■ Retrofit existing housings and current applications



Absolute Petro-Klean®Filters

Absolute removal ratings for Petro-Klean are determined using a filter performance test developed by CUNO to comply with the general procedures outlined in ASTM 975. Cuno defines absolute rating as the particle size (x) providing an initial Beta Ratio (B_x) = 1000. At this Beta ratio the removal efficiency is equal to 99.9%. Beta Ratio (B_x) is defined by the following equation:

$$B_x = \frac{\text{Cumulative Number of Particles Larger than } x \text{ in the Influent Challenge}}{\text{Cumulative Number of Particles Larger than } x \text{ in the Effluent}}$$

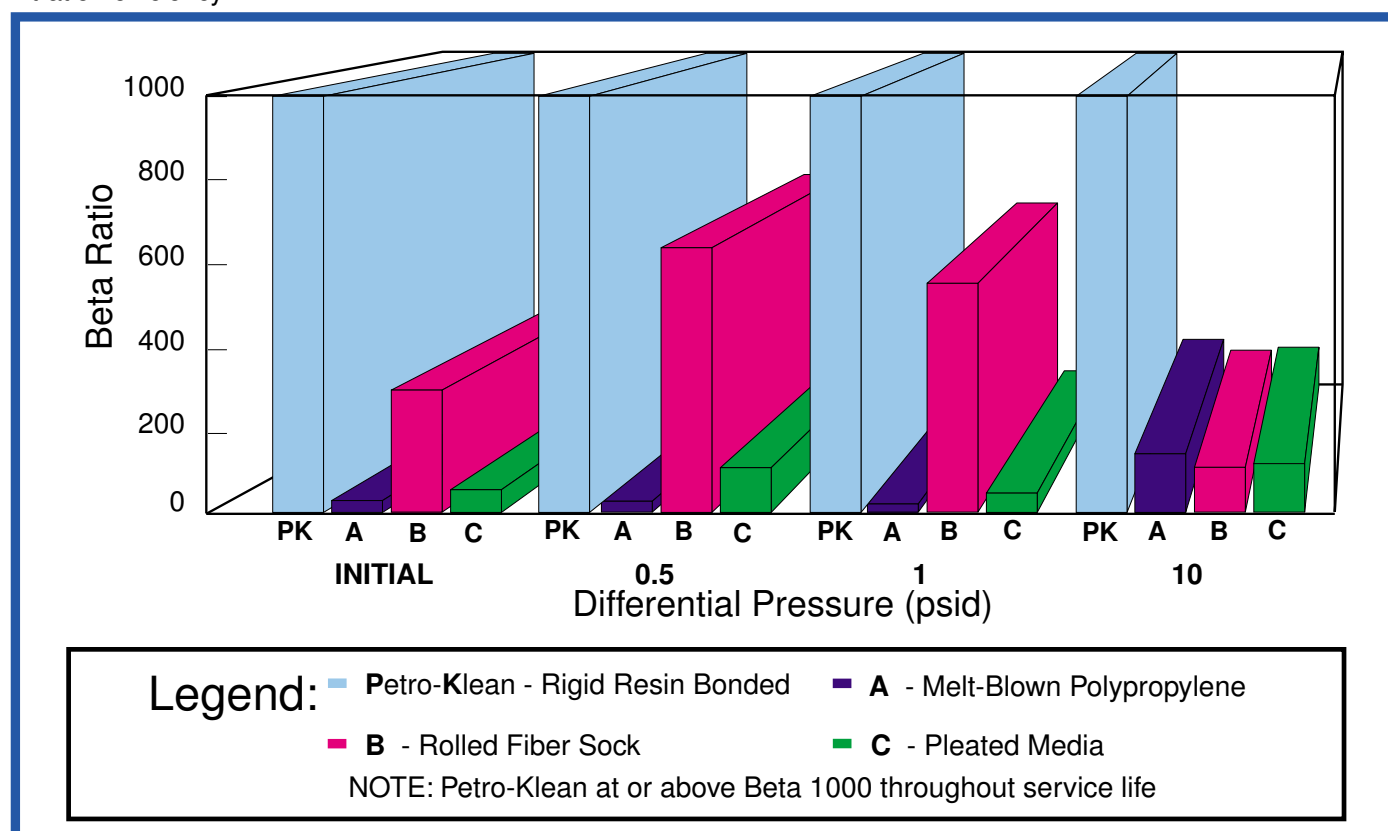
Petro-Klean filters achieve a minimum Beta (B_x) value of 1000 at the ratings specified in Table 1.

Grade Designation	Absolute Rating (m)
M100	10
M200	20
M300	30
M400	40
M600	60

TABLE 1 PETRO-KLEAN ABSOLUTE RATINGS

Petro-Klean - Consistent Performance

The initial Beta-Ratio for all grades of Petro-Klean filter cartridges is equal or greater than 1000, and Petro-Klean cartridges perform at or above this initial value throughout the usable (all the way to plugging) life. This defines Petro-Klean's absolute filtration performance. The Beta Ratio vs. Differential Pressure in Graph 1 illustrates how competitive filters do not achieve the consistent performance of Petro-Klean. 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.



GRAPH 1. - BETA RATIO COMPARISON 10 µm CARTRIDGES

As illustrated in Graph 1, the performance of the Rolled Fiber Sock cartridges (Competitor B) exhibits contaminant unloading and a loss of filtration efficiency as differential pressure increases from 1 to 10 psid. The Melt-Blown (Competitor A) and the Pleated Cellulose/Polyolefin (Competitor C) filters exhibit minimal contaminant retention through the test duration.

Filtration Applications

Petro-Klean for Natural Gas Processing

Petro-Klean provides excellent filtration performance in many natural gas processing applications including:

- Amine Sweetening
- Glycol Dehydration
- Compressor lube oil systems

Petro-Klean for Refining

Petro-Klean provides excellent filtration performance in many refinery applications including:

- Hydrotreater, Catalyst protection
- Amine plant systems
- Fuel Products

Petro-Klean for Oil & Gas Production

Distinct particle size cutoff and reproducible effluent quality make absolute-rated Petro-Klean ideally suited for oil & gas production. Petro-Klean consistently provides clean fluids to maximize well production. The efficient removal of suspended solids minimizes formation damage and plugging, and reduces the need for injection well workovers. Applications include:

- Waterflooding
- Completion, workover fluids



The Cuno Petro-Klean Advantage

Installation of Petro-Klean filters in ALL amine filtration systems at a major gas processing plant in New Mexico provided:

Over \$ 250,000 Total Annual Filtration Cost Reduction through:

- Major reduction in filter use and disposal costs
- Significant labor savings
- Reduced fouling of heat transfer surfaces
- Reduced maintenance and shutdown frequency

In another application, a major Texas refiner replaced competitive “sock” filter cartridges with Petro-Klean “472” cartridges to filter NGL, natural gas liquid, with the following results.

- Service life improved from 3 weeks to 12-14 weeks
- \$ 20,000 savings in filter, labor, and disposal costs
- \$ 200,000 increase in NGL production by reducing change-out downtime



Petro-Klean® Product Specifications

Rating & Materials Of Construction			
Absolute Rating (m)	Grade	Fiber	Resin
10	M100	Cellulose / Glass	Melamine
20	M200		
30	M300	Cellulose	
40	M400		
60	M600		

Operating Parameters		
Maximum Operating Temperature	Standard (Media Only)	250 °F (121 °C)
	With Polyethylene Foam Gasket	200 °F (93 °C)
	With Elastomer Seal or Polypropylene End Fittings	180 °F (82 °C)
Maximum Differential Pressure	70 psid (4.8 bar) @ 68°F (20°C)	
Recommended Change-out Differential Pressure	35 psid (2.4 bar)	

Dimensions			
Cartridge Style	PG Style	336 Style	Standard Industrial Style
Inside Diameter	3 1/8" (79.4 mm)	1 15/32" (37.3 mm)	1 1/16" (26.9 mm)
Outside Diameter	4 1/2" (114.3 mm)	2 25/32" (70.6 mm)	2 19/32" (65.9 mm)
Cartridge Length	24" to 72" (610 - 1829 mm)	36" to 72" (914 - 1829 mm)	9 3/4 to 40" (248 - 1016 mm)

TABLE 2. - PETRO-KLEAN PRODUCT SPECIFICATION

Petro-Klean Flow Rates

Standard Industrial Cartridges		
Grade	Absolute Rating	Specific Δp/10" Element * (psi/gpm)
M100	10	0.35
M200	20	0.19
M300	30	0.11
M400	40	0.10
M600	60	0.09
336 Style Cartridges		
Grade	Absolute Rating	Specific Δp/36" Element (psi/gpm)
M100	10	0.06
M200	20	0.04
M300	30	0.03
M400	40	0.02
M600	60	0.015
PG Style Cartridges (4 1/2" OD)		
Grade	Absolute Rating	Specific Δp/12" Element @ 20 °C (psi/gpm)
M100	10	0.12
M200	20	0.06
M300	30	0.03
M400	40	0.02
M600	60	0.01

*Specific aqueous pressure drop (Δp) for a 10" equivalent length cartridge. For multiple length cartridges, divide total flow by the number of 10" equivalents.

TABLE 3. - PETRO-KLEAN FLOW RATES

For liquids other than water, use the following formula in conjunction with the values from column 3 of Table 3. The specific pressure drop values may be effectively used when three of the four variables (Viscosity, Flow, Differential Pressure, and Cartridge Grade) are set.

$$\text{psid clean} = \frac{\left(\frac{\text{Total system}}{\text{gpm}} \right) \left(\frac{\text{Viscosity in}}{\text{Cp}} \right) \left(\frac{\text{Value from}}{\text{table}} \right)}{\left(\frac{\text{Number of}}{\text{Equivalent Single Length Cartridges}} \right) \left(\frac{\text{in housing}}{\text{in housing}} \right)}$$

Petro-Klean Chemical Compatibility

Petro-Klean is well suited for organic solvents including amines and glycols. Table 4 contains specific recommendations.

Fluid		RATING
Category	Example	
Organic Solvents	Amines (DEA, MDEA, MEA) 20% - 50% up to 160 °F (71 °C)	R
	Glycols	R
	MEK	R
	Benzene	R
	Xylene	R
	Alcohols	R
	Dimethyl Formamide (DMF)	R
Petroleum	Gasoline	R
	Kerosene	R
	Diesel Fuel	R
	Lube Oil	R
	Fuel Oil	R
	Waxes	R
Water	Process @ 212 °F (100 °C)	R
	Produced @ 212 °F (100 °C)	R
	Boiler Feed @ 212 °F (100 °C)	R
	Demineralizer Feed @ 212 °F (100 °C)	R
Organic Acids	Acetic (100%)	N
	Tannic 10%	N
Inorganic Acids	Hydrochloric (Muriatic) Acid 5%	N
	Sulfuric 50%	N
	Sulfurous 5-10%	N
	Nitric	N
Brines and Aqueous Salt Solutions	Sodium Chloride	R
	Sodium Sulfate	R
	Sodium Nitrate	R
Weak Alkalis	Aluminum Hydroxide	N
	Ferric Hydroxide	N
	Magnesium Hydroxide	N
Fatty Acids - Oils	Detergents	R
	Mineral Oil	R
	Silicone Oils	R

R = Generally Recommended up to 250 °F (121 °C) unless otherwise noted.

N = Not Recommended

TABLE 4. - CHEMICAL COMPATIBILITY

The recommendations in Table 4 are for general guidance only. Testing under specific application conditions is recommended. For various end modifications and multi-length cartridges, consult your local distributor or Cuno. Refer to Cuno publication GF.G02.788 for additional information.



CUNO Filter Housings

The Express Series (ES) cartridge filter housings are designed and certified to ASME Code, Section VIII, Div. I to provide a broad range of high quality stainless and carbon steel vessels for the oil and gas processing industries. Available in 150 and 300 psi ASME Code, this premium 304L, 316L stainless, or carbon steel filter housing can be constructed to fit specific system requirements including inlet/outlet location, connection size and type, and corrosion allowance. For more information ask your local CUNO Distributor for literature number LITCHSES1.

Express Series Advantages

- Durable construction for long service life
- Easy access, swing bolts and cover lifting device, for filter removal
- Flexible housing design accepts a wide range of industrial style filters
- Easy maintenance and clean-up
- ASME Code design meets plant safety requirements

Housing Model	Housing Diameter (Inches)	Number of Cartridges	Cartridge Style	Construction Material	Pressure Rating	Gasket Materials	Outlet Location
For Standard Industrial Cartridges (2.625" Maximum OD)							
ES	8	6	Double Open End	Carbon Steel, 304L Stainless Steel, or 316L Stainless Steel	150 psi or 300 psi	Nitrile, EPR, Viton, or Teflon encapsulated Viton	Bottom, Side 90°, Side 180° Side 270°
	12	12					
	14	18					
	16	24					
	20	36					
	24	52					
	30	85					
	36	120					
For 336 Style Cartridges (36" long by 3" Maximum OD)							
ES	8	3	Petro-Klean 336	Carbon Steel, 304L Stainless Steel, or 316L Stainless Steel	150 psi or 300 psi	Nitrile, EPR, Viton, or Teflon encapsulated Viton	Bottom, Side 90°, Side 180° Side 270°
	12	9					
	14	12					
	16	17					
	20	27					
	24	39					
	30	63					
	36	91					

CUNO ... A World Leader in Fluid Purification

CUNO's manufacturing sites have ISO 9000 registered quality systems. Global manufacturing together with trained stocking distributors and state-of-the-art laboratory support bring quality solutions to existing and challenging gas processing filtration applications.



Scientific Applications Support Services (SASS)

The cornerstone of CUNO's philosophy is service to customers, not only in product quality and prompt delivery, but also in problem solving, application support, and in the sharing of scientific information. CUNO's Scientific Applications Support Services (SASS) group is a market-focused group of scientists and engineers who work closely with customers in the oil & gas processing industry to provide solutions to challenging filtration applications and aid in the selection of the most efficient and economical filter systems. SASS provides a vital link between CUNO and users of CUNO filter systems. SASS specialists are skilled in performing on-site testing (pilot or lab bench scale) and are able to relate field test results to full manufacturing scale operations. SASS projects can also be performed in CUNO's extensive in-house laboratory facilities. CUNO's vast experience with gas processing operations worldwide provides the knowledge and insight to resolve problems promptly and efficiently in a cost-effective, confidential manner.

Petro-Klean® Ordering Guide

Standard Dimension Industrial Cartridges (2 5/8" OD)

Cartridge Type	Cartridge Length	Grade Description		Surface Type	Packaging Option	End Modification	Gasket Material
		Grade	Absolute Rating (m)				
PT (2 5/8" OD)	09 - 9 3/4"	M100	10	G - Grooved	2 - Bulk	C - 222 O-ring & Spear	A - Silicone
	10 - 10"	M200	20	U - Ungrooved		F - 222 O-ring & Flat Cap	B - Fluorocarbon
	19 - 19 1/2"	M300	30			N - None	C - EPB
	20 - 20"	M400	40			P - Polypropylene Core Extender	D - Nitrile
	29 - 29 1/4"	M600	60			R - Closed Cap with Stainless Spring	N - None*
	30 - 30"					S - Stainless Steel Core Extender	G - PE Foam*
	39 - 39"					Q - Same as "R" without Spring	
	40 - 40"					Y - 222 Single O-ring & Flat Cap (40" length only)	

* For End Modifications N, P, Q, R, & S only.

336 Style Cartridges (3" OD)

Cartridge Type	Cartridge Length	Grade Description		Surface Type	Packaging Option	End Modification	Gasket Material
		Grade	Absolute Rating (m)				
PK (3" OD)	35 - 35 1/2"	M100	10	G - Grooved	2 - Bulk	V - Elastomer Compression Seal (Double Open End)	S - Elastomer Compression Seal
	36 - 36"	M200	20	U - Ungrooved		W - Elastomer Compression Seal (Single Open End)	G - PE Foam*
	37 - 36 1/2"	M300	30			R - Closed Cap with Spring	N - None*
	72 - 72" **	M400	40			Q - Same as R without spring	
		M600	60			N - None (35" & 36" lengths only)	

* For End Modifications N, Q, & R only.

** For End Modifications V & W only.

"1401" Style (PN 46467-01) internal o-ring is available in all grades in 38 7/8" length only.

PG Style Cartridges, 436 (4 1/2" OD)

Cartridge Type	Cartridge Length	Grade Description		Surface Type	Packaging Option	End Modification	Gasket Material
		Grade	Absolute Rating (m)				
PG (4 1/2" OD)	24 - 24"	M100	10	U - Ungrooved	2 - Bulk	N - None	G - PE Foam
	36 - 36"	M200	20				N - None
	71 - 71"	M300	30				

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 Seller to be defective. THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EITHER EXPRESSED OR

IMPLIED, AS TO DESCRIPTION, QUALITY, MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR USE, OR ANY OTHER MATTER. Under no circumstances shall Seller be liable to Buyer or any third party for any loss of profits or other direct or indirect costs, expenses, losses or consequential damages arising out of or as a result of any defects in or failure of its products or any part or parts thereof or arising out of or as a result of parts or components incorporated in Seller's equipment but not supplied by the Seller.

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The below 3M Cuno -series cartridge filters are all the models that are potentially possible in all variations.
Please note that not all models are actually produced or on stock and some model numbers and names have become obsolete.
Nevertheless this should help as cross reference table chart for Cuno filters nomenclature.

Petro klean

PT09M100G2CA	PT10M100G2CA	PT19M100G2CA	PT20M100G2CA	PT29M100G2CA	PT30M100G2CA	PT39M100G2CA	PT40M100G2CA	PK35M100G2V5	PK36M100G2V5	PK37M100G2V5	PT29M600U2RA	PT30M600U2RA	PT39M600U2RA	PT40M600U2RA
PT09M100G2CB	PT10M100G2CB	PT19M100G2CB	PT20M100G2CB	PT29M100G2CB	PT30M100G2CB	PT39M100G2CB	PT40M100G2CB	PK35M100G2W5	PK36M100G2W5	PK37M100G2W5	PT29M600U2RB	PT30M600U2RB	PT39M600U2RB	PT40M600U2RB
PT09M100G2CC	PT10M100G2CC	PT19M100G2CC	PT20M100G2CC	PT29M100G2CC	PT30M100G2CC	PT39M100G2CC	PT40M100G2CC	PK35M100G2RG	PK36M100G2RG	PK37M100G2RG	PT29M600U2RC	PT30M600U2RC	PT39M600U2RC	PT40M600U2RC
PT09M100G2CD	PT10M100G2CD	PT19M100G2CD	PT20M100G2CD	PT29M100G2CD	PT30M100G2CD	PT39M100G2CD	PT40M100G2CD	PK35M100G2QG	PK36M100G2QG	PK37M100G2QG	PT29M600U2RD	PT30M600U2RD	PT39M600U2RD	PT40M600U2RD
PT09M100G2FA	PT10M100G2FA	PT19M100G2FA	PT20M100G2FA	PT29M100G2FA	PT30M100G2FA	PT39M100G2FA	PT40M100G2FA	PK35M100G2NG	PK36M100G2NG	PK37M100G2NG	PT29M600U2RN	PT30M600U2RN	PT39M600U2RN	PT40M600U2RN
PT09M100G2FB	PT10M100G2FB	PT19M100G2FB	PT20M100G2FB	PT29M100G2FB	PT30M100G2FB	PT39M100G2FB	PT40M100G2FB	PK35M100G2RN	PK36M100G2RN	PK37M100G2RN	PT29M600U2RG	PT30M600U2RG	PT39M600U2RG	PT40M600U2RG
PT09M100G2FC	PT10M100G2FC	PT19M100G2FC	PT20M100G2FC	PT29M100G2FC	PT30M100G2FC	PT39M100G2FC	PT40M100G2FC	PK35M100G2QN	PK36M100G2QN	PK37M100G2QN	PT29M600U2SA	PT30M600U2SA	PT39M600U2SA	PT40M600U2SA
PT09M100G2FD	PT10M100G2FD	PT19M100G2FD	PT20M100G2FD	PT29M100G2FD	PT30M100G2FD	PT39M100G2FD	PT40M100G2FD	PK35M100G2GN	PK36M100G2GN	PK37M100G2GN	PT29M600U2SB	PT30M600U2SB	PT39M600U2SB	PT40M600U2SB
PT09M100G2NA	PT10M100G2NA	PT19M100G2NA	PT20M100G2NA	PT29M100G2NA	PT30M100G2NA	PT39M100G2NA	PT40M100G2NA	PK35M100U2V5	PK36M100U2V5	PK37M100U2V5	PT29M600U2SC	PT30M600U2SC	PT39M600U2SC	PT40M600U2SC
PT09M100G2NB	PT10M100G2NB	PT19M100G2NB	PT20M100G2NB	PT29M100G2NB	PT30M100G2NB	PT39M100G2NB	PT40M100G2NB	PK35M100U2W5	PK36M100U2W5	PK37M100U2W5	PT29M600U2SD	PT30M600U2SD	PT39M600U2SD	PT40M600U2SD
PT09M100G2NC	PT10M100G2NC	PT19M100G2NC	PT20M100G2NC	PT29M100G2NC	PT30M100G2NC	PT39M100G2NC	PT40M100G2NC	PK35M100U2RG	PK36M100U2RG	PK37M100U2RG	PT29M600U2QA	PT30M600U2QA	PT39M600U2QA	PT40M600U2QA
PT09M100G2ND	PT10M100G2ND	PT19M100G2ND	PT20M100G2ND	PT29M100G2ND	PT30M100G2ND	PT39M100G2ND	PT40M100G2ND	PK35M100U2ZG	PK36M100U2ZG	PK37M100U2ZG	PT29M600U2QB	PT30M600U2QB	PT39M600U2QB	PT40M600U2QB
PT09M100G2NN	PT10M100G2NN	PT19M100G2NN	PT20M100G2NN	PT29M100G2NN	PT30M100G2NN	PT39M100G2NN	PT40M100G2NN	PK35M100U2NG	PK36M100U2NG	PK37M100U2NG	PT29M600U2QC	PT30M600U2QC	PT39M600U2QC	PT40M600U2QC
PT09M100G2NG	PT10M100G2NG	PT19M100G2NG	PT20M100G2NG	PT29M100G2NG	PT30M100G2NG	PT39M100G2NG	PT40M100G2NG	PK35M100U2ZN	PK36M100U2ZN	PK37M100U2ZN	PT29M600U2QD	PT30M600U2QD	PT39M600U2QD	PT40M600U2QD
PT09M100G2PA	PT10M100G2PA	PT19M100G2PA	PT20M100G2PA	PT29M100G2PA	PT30M100G2PA	PT39M100G2PA	PT40M100G2PA	PK35M100U2QN	PK36M100U2QN	PK37M100U2QN	PT29M600U2QN	PT30M600U2QN	PT39M600U2QN	PT40M600U2QN
PT09M100G2PB	PT10M100G2PB	PT19M100G2PB	PT20M100G2PB	PT29M100G2PB	PT30M100G2PB	PT39M100G2PB	PT40M100G2PB	PK35M100U2NN	PK36M100U2NN	PK37M100U2NN	PT29M600U2QG	PT30M600U2QG	PT39M600U2QG	PT40M600U2QG
PT09M100G2PC	PT10M100G2PC	PT19M100G2PC	PT20M100G2PC	PT29M100G2PC	PT30M100G2PC	PT39M100G2PC	PT40M100G2PC	PK35M100U2RS	PK36M100U2RS	PK37M100U2RS	PT29M600U2YA	PT30M600U2YA	PT39M600U2YA	PT40M600U2YA
PT09M100G2PD	PT10M100G2PD	PT19M100G2PD	PT20M100G2PD	PT29M100G2PD	PT30M100G2PD	PT39M100G2PD	PT40M100G2PD	PK35M100U2QS	PK36M100U2QS	PK37M100U2QS	PT29M600U2YB	PT30M600U2YB	PT39M600U2YB	PT40M600U2YB
PT09M100G2RA	PT10M100G2RA	PT19M100G2RA	PT20M100G2RA	PT29M100G2RA	PT30M100G2RA	PT39M100G2RA	PT40M100G2RA	PK35M100U2NS	PK36M100U2NS	PK37M100U2NS	PT29M600U2YC	PT30M600U2YC	PT39M600U2YC	PT40M600U2YC
PT09M100G2RB	PT10M100G2RB	PT19M100G2RB	PT20M100G2RB	PT29M100G2RB	PT30M100G2RB	PT39M100G2RB	PT40M100G2RB	PK35M200G2V5	PK36M200G2V5	PK37M200G2V5	PT29M600U2YD	PT30M600U2YD	PT39M600U2YD	PT40M600U2YD
PT09M100G2RC	PT10M100G2RC	PT19M100G2RC	PT20M100G2RC	PT29M100G2RC	PT30M100G2RC	PT39M100G2RC	PT40M100G2RC	PK35M200G2W5	PK36M200G2W5	PK37M200G2W5	PT09M600U2RA	PT10M600U2RA	PT19M600U2RA	PT20M600U2RA
PT09M100G2RD	PT10M100G2RD	PT19M100G2RD	PT20M100G2RD	PT29M100G2RD	PT30M100G2RD	PT39M100G2RD	PT40M100G2RD	PK35M200G2RS	PK36M200G2RS	PK37M200G2RS	PT09M600U2RB	PT10M600U2RB	PT19M600U2RB	PT20M600U2RB
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