



Hardy Filtration

Integrated filtration solutions: air, water & oil



Depth Filter Cartridge

HYTREX

Description

Ge Osmonics unique one-step manufacturing process continuously extrudes and thermally bonds pure polypropylene micro fibers into a complex filter matrix.

Microfilaments plus precise control maximize the positive filtration characteristics of graded density, tight micron cut-offs and maximum void area with millions of tortuous paths. This fully automated manufacturing process assures consistent quality, filter to filter, year in and year out. New thermal and vacuum finishing procedure produce exceptionally clean filters imprinted for easy identification in the field.



An Entirely New Technology

Years ago there were string-wound cartridge filters. Later, chopped fibers cartridges cemented with binders were developed. Then in 1978, Hytrex dramatically improved cartridge filter performance. Proprietary technology supported by 23 patents made Hytrex filters unique in the cartridge filtration industry. Since 1978, field experience in hundreds of applications has proved Hytrex filters' superiority. Thousands of repeat customers have confirmed Hytrex filters' value. GE Osmonics research, engineering and manufacturing expertise has generated further improvements to Hytrex.

- » It is not strings of yarn mechanically wound around a separate core with added lubricants and anti-static agents.
- » It is not short chopped fibers molded together with chemical binders.
- » It is not layers of non-woven micro fibers.

Pleated, molded and layered micro fibers cartridges function for the most part only as surface filter.

In molded filters, binders such as melamine, formaldehyde and phenols become extractable and leach into the filtrate. Their decomposition allows fibers to loosen and migrate.

In string-wound filters, additives can leach and particles can slip through channels in the windings, contaminating the filtrate.

What Hytrex Filters Offer That Other Cartridges Cannot

TRUE GRADED DENSITY

- » Lower density at the surface of the filter with progressively higher density toward the center.
- » Particles are trapped throughout the entire cross section of the filter, creating superior dirt-holding capacity.
- » No surface blinding, this reduces flow and increases filter changeouts.
- » High flow rates with low pressure drop throughout the range of flows.
- » Longest service life compared with competitive cartridge filters.

THERMALLY BONDED MICROFIBER CONSTRUCTION

- » Thermally fixed fibers will not move under pressure or pressure surges and dislodge dirt into the filtrate.
- » Extremely small continuous filaments maximize controlled porosity and complex tortuous paths.
- » High structural strength and integrity provide excellent end sealing.
- » Lowest media migration ensures no fibers contamination of the filtrate.
- » Patented thermally bonded blown micro fibers process assures consistent performance, filter to filter.

A SINGLE PURE MATERIAL

- » Highest quality lot controlled polypropylene.
- » Contains no wetting agents, solvents, anti-agents, binders or any kind.
- » Inert material means broad chemical compatibility.
- » No leachables or extractables.
- » Incinerates to trace ash with no hazardous volatiles, for easy disposal.
- » Meets the requirements of the United States Food and Drug Administration (FDA) for food and beverage contact.

AUTOMATED CONTINUOUS MANUFACTURING

- » Continuous construction in lengths of 1½ " (3.8cm) to 50" (127 cm), with no joints or welds.
- » Self-supporting media requires no separate central core.
- » Marked with micron rating right on the cartridge for easy filter identification.
- » Thermal and vacuum finishing procedures virtually eliminate manufacturing debris.
- » Integral pure polypropylene end adapters fit filter housings without bypass.
- » Machine packaging and sealing of each cartridge provides clean filters in the field.
- » Automated, consistent manufacturing assures reliable performance and repeatable results year after year.

True Depth Filtration vs Claimed Depth Filtration

Many cartridges claim to be depth filters. But to be a true depth filter, a cartridge must be able to retain contaminants throughout the entire cross section of the filter.

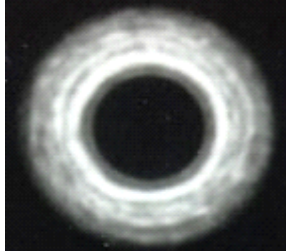



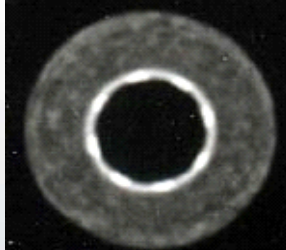
To accomplish this, the density must increase progressively from the exterior surface to the interior. This "graded density" allows larger particles to be trapped near the surface while smaller particles penetrate the larger open areas to be trapped nearer the center of the filter in the smaller openings.

Without graded density, a so-called "depth" filter will operate in practice only as a surface filter. With only the surface area loading with dirt, the pressure drop will increase rapidly, dramatically reducing both the dirt-holding capacity and the effective filter life.

CAT Scans tell the truth about graded density

CAT Scanning (Computerized Axial Tomography) is a relatively recent breakthrough in diagnostic X-Ray imaging technology. In medical applications, it provides detailed cross-sectional images of the human body. Here, CAT scans provide detailed cross-sectional images of cartridge filters.

NOTE: All CAT scanned filters were purchased on the open market and are rated by their manufacturers at 10 microns. All CAT scans were taken with the same scanner at the same setting by the same operator. Lighter areas of the photos indicate greater density.

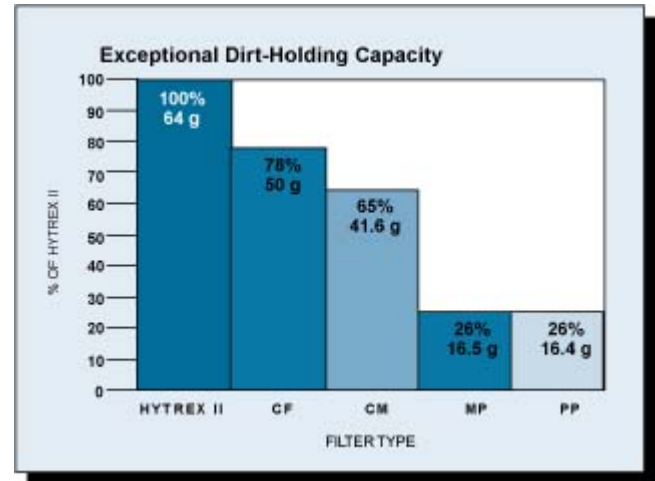
	<p>Hytrex® II – Thermally bonded blown micro fibers matrix</p> <ul style="list-style-type: none"> » True graded density » Particles trapped throughout the depth of the filter » No separate core » Highest density at knife-edge seal
	<p>CF – String wound polypropylene</p> <ul style="list-style-type: none"> » Inconsistent density » Channels in windings allow particles to penetrate directly into filtrate » Separate core required
	<p>MP – Single density, polyolefin micro fibers</p> <ul style="list-style-type: none"> » No graded density » Surface blinding » No central core
	<p>CM – Molded, resin bonded fibers, grooved</p> <ul style="list-style-type: none"> » No graded density (apparent second filtration “surface” is actually the groove cut into the filter to increase surface area) » Surface blinding
	<p>PP – Layered non-woven micro fibers</p> <ul style="list-style-type: none"> » No graded density » Low density layers » Surface blinding » Separate core required

Performance

Exceptional Dirt-Holding Capacity

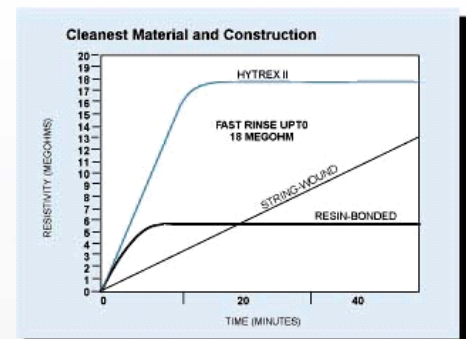
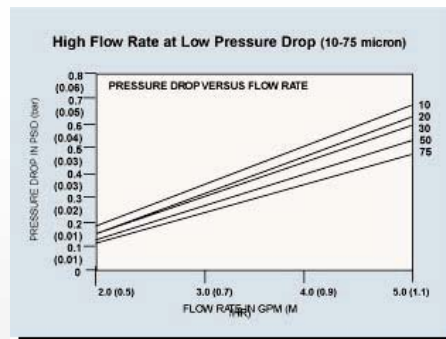
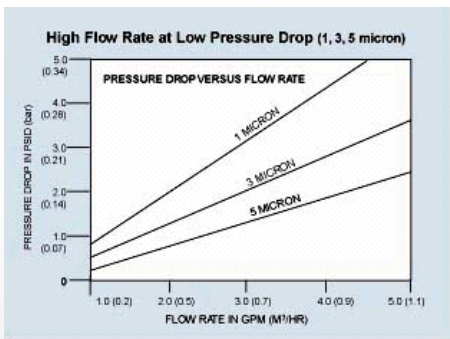
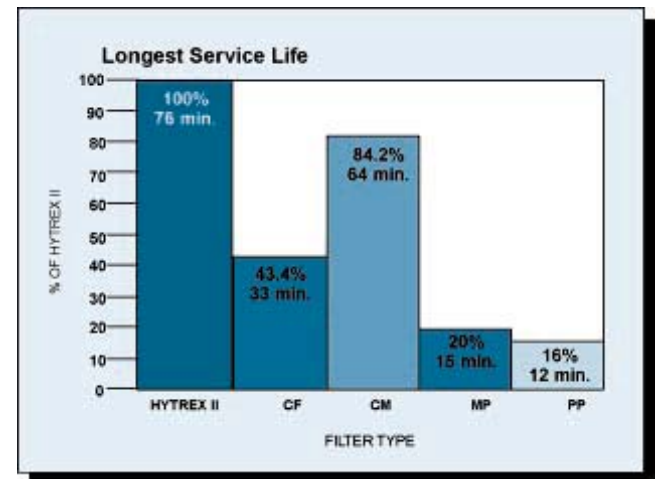
Several 10 micron filters of each type were purchased on the open market and weighed. They were then challenged with a slurry of 100 ppm AC Fine Test Dust at 5 gpm (1.1 m³/hr) until a 40 psi (276 kPa) differential pressure was reached. All filters were then force dried for 72 hours at 125°F (52°C) and weighed again. The bar chart above illustrates the relative difference in average dirt-holding capacity compared with Hytrex.

NOTE: AC Fine Text Dust is the laboratory standard commonly used to characterize cartridge filters with ratings on micron or greater.

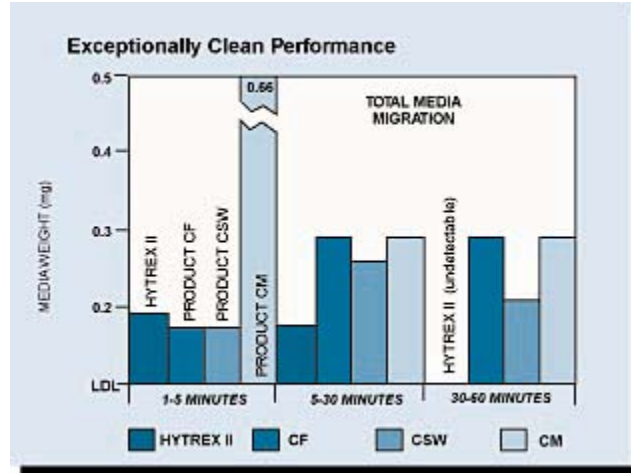


Longest Service Life

Several 10 micron filters of each type were purchased on the open market and weighed. Each was challenged with a 100 ppm slurry of AC Fine Test Dust at 5 gpm (1.1 m³/hr) until a 40 psi (276 kPa) differential pressure was reached. The bar chart above illustrates that relative difference in average filter lifetime compared with Hytrex.



A good measure of a cartridge's ionic cleanliness is its "Rinse-Up Time". This is the amount of time required for the resistivity of an 18 megohm deionized water stream to return to its pre-filter resistivity after passing through a new filter cartridge. All cartridges are rated by their manufacturers at 5 microns and were tested at a flow rate of 2 gpm (0.45 m³/hr).



Because of their unique construction and clean manufacturing process, Hytrex filters provide cleaner performance than conventional depth filters. The showed data are based on tests using 10 micron Hytrex filters from Hytrex finished good inventory and 10 micron filters purchases on the open market from the leading string-wound and resin-bonded cartridge manufacturers.

Each filter was tested on GE Osmonics “Media Migration Test Stand” at a flow rate of 10 gpm (2.3 m³/hr), twice the highest recommended rate, to stress the filters and simulate pressure surges. After a one minute flush to eliminate start-up debris usually present in housing and piping.

The particulate migration was collected from the filtrate using membrane filters which were then weighed at the specified time intervals. All tests were run on sample lots of five individual cartridges, and the results were averaged.

In all Hytrex filters, the particulate migration at 60 minutes was below the Lowest Detection Limit (LDL) (0.1 mg) of the test equipment. A more complete test protocol is available from Osmonics.

Specifications

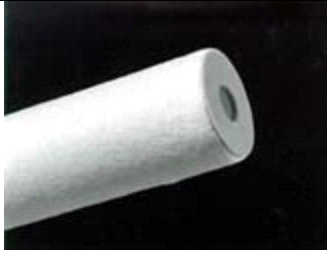
Eight standard micron ratings: 1, 3, 5, 10, 20, 30, 50, 75 microns

Two standard diameters:

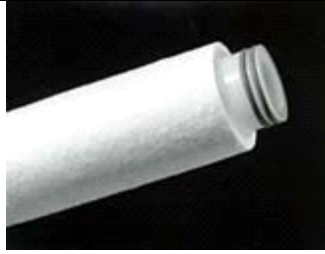
- » **GX series:** Inside diameter 1 in. (25 mm), outside diameter 2 ½ in. (64 mm).
- » **RX series:** Inside diameter 1 3/8 in. (35 mm), outside diameter 2 ¾ in. (70 mm).

End Adapters and Accessories

All end adapters are thermally-welded to the pure polypropylene Hytrex filter. The positive weld assures bypass-proof performance and structural integrity without adhesives or additives, maintaining cartridge purity. All adapters including the elastomeric gasket comply with FDA requirements for food and beverage contact. Adapters and accessories pictured here are immediately available from inventory. Hytrex filters fit all currently available filter housings.



A – Elastomeric seal gasket, open end



E – Pure polypropylene molded adapter with « 222 » O-rings

- Silicone O-rings standard, EPR, viton and BUNA-N



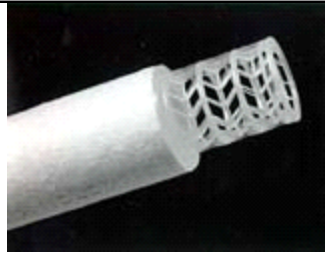
F – Pure locking polypropylene molded adapter with locking « ears » and two « 226 » O-rings

- Silicone O-rings standard, EPR, viton and BUNA-N



H – Pure polypropylene molded « fin »

- Complete seal
- Assures alignment



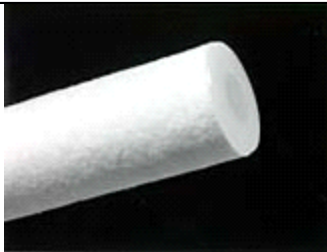
K – Pure polypropylene molded spring

- Replaces metal assemblies
- Provides more positive seal, eliminates bypass
- Easy, quick changeout



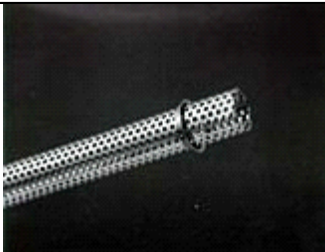
L – Pure polypropylene extended core

- Centers filter on tube sheet adapter
- Eliminates tube guide



S – Pure polypropylene closed end cap

- Complete seal
- Other end open



SP – Stainless steel support post

- 316 stainless steel
- Extends chemical, temperature, viscosity and (delta) P limits of cartridge
- Reusable – more economical than cored cartridges
- Chamfered ends ease cartridge installation

Available lengths:

9.75, 10, 19.5, 20, 29 ¼, 30 et 40 in.



FC – Polypropylene filter cage

- All polypropylene cage holds 15 Hytrex cartridges
- 30 filter seals reduced to 1
- Available in 8 different micron ratings
- Integral eyehook for handling by mechanical equipment – eliminates handling of individual filters
- Standard 10, 20 and 30 in. lengths
- Fits housings accepting cages Ø 13 ½" in.
- Flow rates from 45 to 225 gpm 10 to 51 m³/hr per cage depending on micron rating of cartridges cartouches

How to order Hytrex

If you are ordering Hytrex filters with standard Hytrex ends (that is with no adapter on either end), then pick one boldface designation from each of the first three columns. Your product order number will look like this: GX-05-29 1/4").

If you are ordering Hytrex with one or more end adapters, pick additional boldface designations from each of the next two columns. Your product order number will look like this: GX-05-29 1/4"-E.S).

GX	05	29 1/4	E	S	
Type	Micron Rating	Cartridge Length (inches) (mm)	End 1 Adapter	End 2 Adapter	Gasket Material
GX :	01 = 1	1 1/2 (38)	E = 222 O-ring	S = Solid end	P Santoprene (gasket only)
I.D. = 1" (25mm)	03 = 3	3 7/8 (98)	A = 7/8 in.	A = 7/8 in. Open end gasket	
O.D. = 2 1/2" (64mm)	05 = 5	4 7/8 (124)	Open end gasket	H = Fin adapter	« O-rings »
	10 = 10	5 (127)	F = 226 O-ring	L = Extended core	S = Silicone
RX :	20 = 20	6 1/2 (165)	K = Self seal spring	X = Standard Hytrex plain end (no gasket)	E = EPDM
I.D. = 1 3/8" (35mm)	30 = 30	9 3/4 (248)	X Standard Hytrex plain end (no gasket)	Y = 1 in. Open end gasket	V = Viton
O.D. = 2 3/4" (70mm)	50 = 50	9 7/8 (251)	Y = 1 in. Open end gasket	K = Self seal spring	B = BUNA
	75 = 75	10 (254)	L = Extended core		
FC : Cage holds 15 cartridges (GX-10, 20 ou 30 in. lengths only)		10 1/4 (260)			
		12 (305)			
		12 1/2 (318)			
		19 1/2 (495)			
		20 (508)			
		20 1/8 (511)			
		29 1/4 (743)			
		30 (762)			
		39 (991)			
		40 (1016)			
		50 (1270)			

NOTE:

Silicone O-rings are included. EPR, Viton and BUNA-N O-rings are available by special order. End adapters not available on RX series, except for special Type 336 with Self Seal Spring K. Stainless steel support posts (SP) should be ordered separately.

Material and FDA Compliance

Hytrex cartridge filters are made from thermally-welded blown micro fibers of polypropylene. GE Osmonics certifies that the resin used for manufacturing the filter media of this product meets the requirements of the Food and Drug Administration (FDA) Title 21 of the Code of Federal Regulations (CFR) 174.5 and relevant subparts of 177. If required, specify FDA-compliant sealing materials and end adapters.

Important Notice To User

The following is made in lieu of all other warranties expressed or implied. Manufacturer's and Seller's only obligation shall be to issue credit against the purchase or replacement of the product proved to be defective in material or workmanship. Neither Manufacturer nor Seller shall be liable for any injury, loss or damage, direct or indirect, special or consequential, arising out of the use of, misuse, or the inability to use such product. The information contained herein is based on technical data and tests which we believe to be reliable and is intended for use by persons having technical skill at their discretion and risk. Since conditions of use are outside GE Osmonics' control, we can assume no liability whatsoever for results obtained or damages incurred through the application of the date presented. This information is not intended as a license to operate under, or a recommendation to infringe upon, any patent of GE Osmonics or others covering any material or use. The foregoing may not be altered except by a written agreement signed by officers of the Manufacturer.