



Pall Corporation

Profile[®] II Filters

*Absolute Rated,
Economical,
High Efficiency
Depth Filter
Cartridges*



Filtration. Separation. Solution.SM

Description -- Profile[®] II Filters

Each Profile[®] II element has...

An inner (downstream) section in which the pore diameter is constant. This section provides absolute rated filtration.

and...

An outer (upstream) section in which the pore diameter varies continuously from that of the absolute rated section up to 120 micrometers* (μm).

An absolute rating, which may only be assigned to a filter with a fixed pore structure, assures consistent, high quality filtration. The upstream section provides effective prefiltration for every particle with a diameter larger than the rated size. The continuity of the variable pore section, its wide range of pore sizes, and its depth, combine to provide extraordinarily long life in service.

Pore size variation within the Profile II medium is achieved by varying the fiber diameter, while maintaining uniform density — and hence, uniform compressibility. Profile II elements contain effective pore sizes varying over a range as much as 40 to 1, a ratio many times higher than is achievable by simply varying density. Because uniform density and compressibility are maintained, Profile II elements can be made at lower density, and for this reason, have higher void volume — which means more pores and longer service life. No other competitive filter is made with this type of construction.

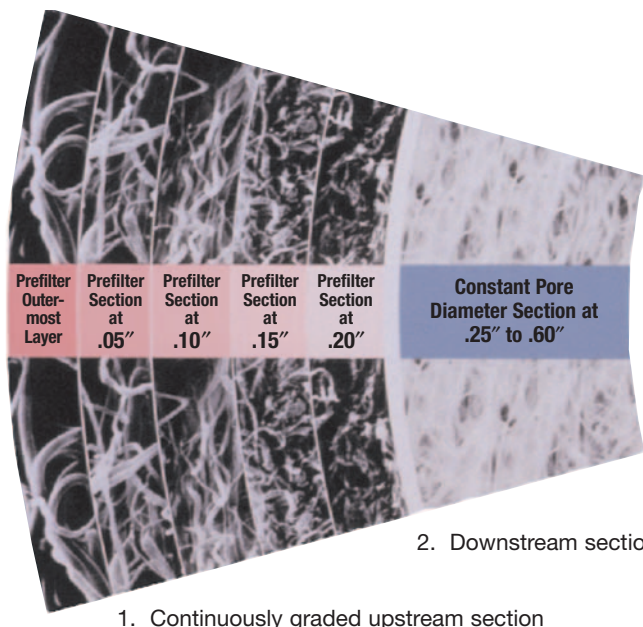
The thinner the fiber used to manufacture a fibrous structure, the greater the number of pores within the structure. A medium with more pores will provide greater service life. Also, the thinner the fibers, the

smaller the pores within a medium. Profile II filter medium is constructed of ultra-thin fibers. As a result, the finest grade of the Profile II series of elements achieves an absolute rating of $0.3 \mu\text{m}$. No commercially available competitive filter of similar appearance which we have tested provided absolute removal efficiency below about $5 \mu\text{m}$.

Profile II cartridge filters are available in polypropylene, nylon, polyphenylene sulfide and positively charged polypropylene. The positively charged polypropylene Profile II-Plus[™] cartridges provide enhanced removal of bacteria, viruses, bacterial endotoxins and particles which are negatively charged in suspension (most particles). The materials of construction for Profile II Plus filters differ from polypropylene Profile II cartridges only with respect to the modified acrylic-derived polymers which are permanently grafted to the continuous polypropylene fibers and which provide the positive zeta potential in aqueous service. The fibers in all Profile II filters may for all practical purposes be considered continuous. No surfactant or binder resin is used — the fibers are "bonded" by intertwining during the manufacturing process.

Profile II filters have a low level of extractables and due to the choice of available materials of construction they have wide temperature and chemical compatibility. Based on the widely accepted modified F-2 Filter Performance Test, when compared at equal efficiency, Profile II elements can be expected to yield longer service cycles, in some cases by factors of six or more, compared with existing products of similar physical appearance.

* One micrometer (μm) referenced as a micron, is 1/1000 of a millimeter or 1/25,400 of an inch. The smallest visible particle is about 30 to 50 μm in diameter.



2. Downstream section

1. Continuously graded upstream section



Profile II RF Style Filter

Shown above are sample sections of Profile II filter medium from a typical Profile II element at 300X. The photomicrographs illustrate the new principles of Profile II elements. 1. Continuously profiled pore size upstream section. 2. Absolute rated constant pore downstream section. Note the continuously decreasing fiber diameter in the profiled upstream section and the constant fiber diameter in the downstream section.

Applications



Acid Filtration



Wine and Beer Filtration



Automotive Paint Filtration



Coolant Water Filtration at a Nuclear Plant

Profile II cartridges and Profile II Plus cartridge filters may be utilized either upstream of finer Profile II filters or finer pleated filters — or alone as final filters. Representative applications include:

General Service: rinse water, reverse osmosis system prefiltration, water — prior to and/or after demineralization.

General Process Industries: printing inks, adhesives, liquid detergents, dyestuffs, fabric coatings, paper coatings, electroplating solutions, metal etching solutions, audio and video tape, automotive paints, can coatings, coil coatings, computer tape coatings, floppy and rigid disc coating, chemicals for photographic film development.

Electronic Industries: photoresists, acids, bases, solvents, etchant liquid mixtures, cryogenic gases, etchant gases, D.I. water prefiltration and post filtration, R.O. water prefiltration, prefiltration prior to absolute filtration.

Chemical/Petrochemical Industries: monoethanolamine and diethanolamine for gas scrubbing, monomers, polymers, glycols, herbicides and pesticides, catalysts, product polishing, photoresists, acids, bases, solvents, deep disposal well fluids.

Film and Fiber Industries: monomers, quench water, slurry additives, delusterants, slip agents, D.I. water, solvents, spin finishes, aqueous salt solutions.

Power Generation Industries: makeup water, laundry drain waste water, steam generator blowdown prefilters, filter demineralizer septa.

Pharmaceutical Industry: small and large volume parenterals, ophthalmics, oral medications.

Biological Industry: serum and serum fractions, tissue culture media, vaccine preparations, microbiological growth media, media makeup water, diagnostic sera.

Veterinary Industries: parenterals, therapeutic sera.

Fermentation Industries: liquid growth media, makeup water, intermediates, final liquid products, additives.

Food and Beverage Industries: bottled water, wine, beer, soft drinks, flavors, storage tank/reactor vents, corn syrup, edible oils, milk and distilled spirits.

Features and Benefits

Features	Advantages	Benefits
Absolute Rated Medium	<ul style="list-style-type: none"> • Consistent, verifiable filtration due to fixed pore structure. 	<ul style="list-style-type: none"> • Reproducible production yields and absolute particle retention.
Constant Density Medium with Tapered Pores	<ul style="list-style-type: none"> • Longer service life — in some cases by factors of six times or greater. 	<ul style="list-style-type: none"> • Lower filtration costs per year. • Lower waste disposal costs per year. • Quicker filling rates.
Small Diameter Fibers in Medium	<ul style="list-style-type: none"> • Longer service life. • Finer removal ratings than generally available. 	<ul style="list-style-type: none"> • Lower yearly filtration costs. • Fewer filtration stages. <ul style="list-style-type: none"> - lower filtration costs - less downtime • Elimination or reduction of recirculation to achieve product clarity. • Improved product yields.
No Surfactants or Binders	<ul style="list-style-type: none"> • Low extractables. 	<ul style="list-style-type: none"> • Consistent production yields and quality.
Polypropylene Medium	<ul style="list-style-type: none"> • Wide chemical compatibility. • Can remove trace quantities of oil. 	<ul style="list-style-type: none"> • Multiple applications within one plant. • Reduced crater defects with paints.
Polypropylene Medium Available with a Positive Charge	<ul style="list-style-type: none"> • Enhanced removal of particles in aqueous fluids. 	<ul style="list-style-type: none"> • Improved product yields. • Lower yearly filtration costs.
Continuous Fibers	<ul style="list-style-type: none"> • No media migration. 	<ul style="list-style-type: none"> • Improved reliability. • Consistent production yields and quality.
Materials of Construction are FDA Listed	<ul style="list-style-type: none"> • Cartridge is appropriate for use in the pharmaceutical, biological, and food & beverage industries. 	<ul style="list-style-type: none"> • Consistent, high quality filtration in stringent applications.
Available in a "P" Option for Pharmaceutical Applications	<ul style="list-style-type: none"> • Quality Control Procedures: <ol style="list-style-type: none"> 1. Manufacturing in controlled environment by specially trained personnel. 2. Statistical testing of filter effluent for: <ul style="list-style-type: none"> - particle and fiber counts - oxidizables by USP KMnO₄ consumption test - pH shift - pyrogens using LAL test • Cartridge can be <i>in-situ</i> steam sterilized. 	<ul style="list-style-type: none"> • Performance tested.
Manufacturing Facilities in the U.S. and Europe	<ul style="list-style-type: none"> • Consistent product quality. • Continuous product availability. 	<ul style="list-style-type: none"> • Consistent production yields.

Styles

Style: RF Style

Description: Double open-ended, 2-1/2" diameter element. The cartridge is constructed of either polypropylene, nylon, polyphenylene sulfide or positively charged polypropylene medium. Cartridge sealing is ensured by using a tie-rod seal nut in a Pall Profile II housing and by spring engaged knife edge sealing surfaces in competitive housings. The polypropylene cartridge is also available with elastomeric gaskets heat welded to each end. This cartridge may be used in competitive cartridge housings with blunt knife edge sealing surfaces, where cartridge to housing fluid bypass is suspected.

Service: General Industrial

Housing: See Table 7



RF Style Profile II filter cartridges available in 10", 20", 30" and 40" lengths.

Style: AB Style - Code 3, 7, 8

Description: Single open-ended, 2-3/4" diameter element with double external O-rings at one end. Available in polypropylene and positively charged polypropylene medium.

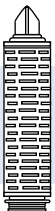
Service: Most commonly used in pharmaceutical, food & beverage and electronic applications. The cartridge may be hot water sanitized. Only P grade filters may be *in-situ* steam sterilized.

This style cartridge is also recommended for applications where the filters are heated for any reason above 122°F (50°C) and the temperature is then reduced by 36°F (20°C) or more prior to filtration.

Housing: See Table 7



AB Style Code 7 Profile II filter cartridges available in 10", 20", 30" and 40" lengths.



The distinctive fin at one end of the filter cartridge identifies it as a Pall product and is a trademark of Pall Corporation.

Ordering Information

Filter Selection Guidelines

For optimum efficiency and throughput, it is recommended that you select a filtration scheme based on flow and differential pressure requirements.

To select your filter simply:

A. Select desired level of filtration (refer to Table 8 for reference).

B. Select filter cartridge style and grade by referring to Tables 1, 2, 3, 4 and 5.

C. Confirm that the Profile II filter medium selected is compatible with the fluid and the operating temperature. See Table 9.

D. Determine the required number of 10 inch filter modules by dividing the system flow rate by the typical flow rate per 10 inch module given in Table 6. Calculate the clean pressure drop to verify that it is acceptable.

E. Refer to Table 7 for ordering information on housings. Determine stacking array (number of cartridges and length) of RF or AB series filter element(s) for selected housing.

F. Refer to Table 2 to complete ordering information for desired filter element(s).

For example: You require a filter cartridge for 40 µm removal in an RF style. Your flow rate is 100 gpm. Therefore, from Table 6 you require approximately 6-10, 10" filter modules (100 gpm divided by 15 gpm per 10" cartridge). From Table 7, you require a P04 housing which can accept four 20" or 30" filter cartridges. Four 20" filter cartridges (8, 10" filter modules) meet your requirements.

The part number for your filter cartridge would be:

R2F400

The part number stands for:

R: style-retrofit

2: 20" length

F400: 40 µm absolute rated, polypropylene Profile II medium

Table 1 – Maximum Operating Conditions

Cartridge ¹	Materials of Construction		Maximum Differential Pressure ² (psid)	Temperature	
	Medium	Support Core		°F	°C
Polypropylene Profile II	Polypropylene	Polypropylene	15	180	82
			30	158	70
			50	122	50
			60	86	30
Profile II Plus	Polypropylene with positive zeta potential	Polypropylene	15	180	82
			30	158	70
			50	122	50
			60	86	30
Nylon Profile II	Nylon	Glass filled polypropylene	35	180	82
			50	158	70
			75	86	30
	Nylon	Glass filled nylon	50	300	150
			70	212	100
			80	158	70
			90	86	30
			Profile A/S	Polyphenylene Sulfide	316L Stainless Steel
			40	200	93

¹ P grade AB Style elements can be heated to 125°C (257°F), for example during *in-situ* steam sterilization or in an autoclave, and subsequently cooled to ambient temperature prior to use. AB style elements may be constructed of either a polypropylene or a positively charged polypropylene medium.

² For higher differential ratings and for compatible fluids, Profile II cartridges are available with glass filled polypropylene cores on a special order basis. Please contact the Pall Sales Department or your local distributor.

Table 2 – Standard Configurations of Profile II Filter Cartridges

A. Polypropylene and Positively Charged Polypropylene Profile II Element Part Numbers

Removal Rating (µm)	RF and RMF Series	AB Series Code 3,7,8 -Hot water sanitization -In situ steam sterilization (P grade only)
0.3 ¹	-	AB ▲ Y003 ● ▼ + ★
0.5 ¹	R ■ ▲ F 005 >	AB ▲ Y005 ● ▼ + ★
0.7 ¹	-	AB ▲ Y007 ● ▼ + ★
1	R ■ ▲ F 010 ● >	AB ▲ Y010 ● ▼ + ★
3	R ■ ▲ F 030 ● >	AB ▲ Y030 ● ▼ + ★
5	R ■ ▲ F 050 ● >	AB ▲ Y050 ● ▼ + ★
7	R ■ ▲ F 070 >	AB ▲ Y070 ▼ + ★
10	R ■ ▲ F 100 >	
12	R ■ ▲ F 120 >	
15	R ■ ▲ F 150 >	
20	R ■ ▲ F 200 >	
30	R ■ ▲ F 300 >	
40	R ■ ▲ F 400 >	
70	R ■ ▲ F 700 >	
90 ¹	R ■ ▲ F 900 >	
120 ¹	R ■ ▲ F 1200 >	

¹ Extrapolated values.

B. Nylon Profile II Element Part Numbers

Removal Rating (µm)	RFN Element Part Number
5	R * ◆ FN050
10	R * ◆ FN100
20	R * ◆ FN200
30	R * ◆ FN300
40	R * ◆ FN400
70	R * ◆ FN700

C. Profile A/S Element Part Numbers

Removal Rating (µm)	RFN Element Part Number
5	RLS ◆ FPS050
10	RLS ◆ FPS100
20	RLS ◆ FPS200
40	RLS ◆ FPS400
70	RLS ◆ FPS700

O-Ring Option	Code ★
Silicone - standard	H4
Viton A	H
Ethylene Propylene	J

Nominal Length, (Inches)	Code ◆
10	1
20	2
30	3
40	4

Charge Option	Code ●
Positive Zeta Potential	Z

Application	Code +
Pharmaceutical	P
Other	Omit

Adaptor Materials	Adaptor Configuration	O-ring Size	Code ▼
Polypropylene	Flat top, double O-ring	222	3
Polypropylene	Finned end bayonet lock, double O-ring	226	7
Polypropylene	Finned end, double O-ring	222	8

Inner Core Material Construction	Code *
Glass Filled Polypropylene (Standard)	GY
Glass Filled Nylon (Option)	GN

Gasket Material	Code >
Alloy of Polypropylene and Ethylene Propylene Diene Monomer (EPDM)	H21

Nominal Length (Inches)	Code ▲
10	1
20	2
30	3
40	4

Gasket	Code ■
None	No Symbol
Elastometric Material*	M**

* Provides a positive sealing surface to eliminate potential fluid bypass in competitive housings with blunt knife edges.

** When the M symbol is selected the part number must end in H21 code.

Table 3 – Profile II Filter Cartridges Removal Ratings

Cartridge Grade	Liquid Service Removal Rating, μm				Gaseous Service DOP (0.3 μm) Removal Efficiency (%) ³
	90%	99%	99.9%	99.98%	
003	<0.5 ¹	<0.5 ¹	<0.5 ¹	<0.5 ¹	>99.9999
005	<0.5 ¹	<0.5 ¹	<0.5 ¹	<0.5 ¹	>99.9999
010	<0.5 ¹	<0.5 ¹	<0.5 ¹	1.0	>99.9999
030	<1.0 ¹	1.8	2.5	3.0	>99.9999
050	2.0	3.0	4.0	5.0	>99.9999
070	3.5	5.0	6.0	7.0	>99.9999
100	6.5	7.5	9.0	10.0	99.2
120	7.0	9.0	11.0	12.0	96.5
150	8.0	10.0	13.0	15.0	88.0
200	10.0	14.0	18.0	20.0	84.8
300	14.0	18.0	26.0	30.0	67.0
400	20.0	30.0	35.0	40.0	48.3
700	32.0	50.0	70.0	- ²	34.0
900	50.0	78.0 ¹	90.0 ¹	- ²	25.0
1200	60.0	100.0 ¹	120.0 ¹	- ²	10.0

¹ Extrapolated values.

² Precise evaluation of the 100% removal efficiency for these coarse grades is not possible with the test procedure utilized.

³ The test containment, dioctyl phthalate (DOP) is a 0.3 μm suspension in air. Air flow used for these data was 20 CFM/10" cartridge, except grade 700 and coarser, which were run at 4 CFM.

For more information on Profile II filter cartridges see Element Data Sheet E1.

Table 4 – Profile II Plus Cartridge Filters Removal Ratings

Cartridge Grade	Removal Rating Independent of Zeta Potential (μm at % Efficiency)		Bacteria ² Endotoxin Removal Capacity (Endotoxin Units/ 10" Cartridge)
	90%	99.98%	
003Z	<0.5 ¹	<0.5 ¹	>1.6 x 10 ⁸
005Z	<0.5 ¹	0.5 ¹	>1.6 x 10 ⁸
007Z	<0.5 ¹	0.7 ¹	>1.6 x 10 ⁸
010Z	<0.5 ¹	1.0	>1.6 x 10 ⁸
030Z	<1.0 ¹	3.0	>1.6 x 10 ⁸
050Z	2.0	5.0	>1.6 x 10 ⁸

¹ Extrapolated values.

² One endotoxin unit is equal to 0.10 nanograms of *E. Coli* 055:B5 endotoxin. Cartridges were challenged with 1.6 x 10⁸ Endotoxin Units (E.U.) without passing any detectable amount of endotoxin (<0.5 EU/ml).

For more information on Profile II Plus filter cartridges see Element Data Sheet E1Z.

Table 5 – Profile A/S Filter Cartridges Removal Ratings

Cartridge Grade	Liquid Service Removal Rating, μm			
	90%	99%	99.9%	99.98%
050	<1.0 ¹	2.5	4.0	5.0
100	6.0	8.0	9.0	10.0
200	11.0	15.0	18.0	20.0
400	15.0	20.0	30.0	40.0
700	20.0	30.0	50.0	70.0 ¹

¹ Extrapolated values.

Table 6 – Profile II and Profile II Plus Filter Cartridges Flow Characteristics

Profile II and Profile II Plus (Z) Cartridge Grades	Clean Pressure Drop				Typical Aqueous Flow GPM/10" Cartridge
	Aqueous Service PSI/GPM Per 10" Cartridge ¹ Polypropylene and Nylon		Gas Service CFM of Air/PSI Per 10" Cartridge ²		
	Profile II Cartridges All Series	Profile II Plus Cartridges All Series	Profile A/S Cartridges	Profile II and Profile II Plus Cartridges All Series	
003(Z)	3.5	4.5	–	2.3	1 – 2.0
005(Z)	2.8	3.5	–	2.7	1 – 2.5
007(Z)	2.7	2.7	–	3.1	1 – 2.5
010(Z)	2.6	2.6	–	3.6	1 – 3.0
030(Z)	1.5	1.5	–	6.4	2 – 5
050(Z)	0.8	0.8	–	11.0	3 – 8
070	0.5	–	–	17.0	5 – 12
100	0.3	–	0.35	29.0	6 – 15
120	0.2	–	–	36.0	6 – 15
150	0.15	–	–	44.0	8 – 15
200	0.10	–	0.10	75.0	10 – 15
300	0.08	–	–	119.0	10 – 15
400	0.05	–	0.09	207.0	10 – 15
700	<0.05	–	0.03	415.0	10 – 15
900	<0.05	–	–	640.0	10 – 15
1200	<0.05	–	–	1000.0	10 – 15

¹ Pressure drop in PSI per GPM for a single 10" cartridge. For multiple elements, divide by the number of cartridges. For fluids other than water, multiply by the viscosity in centipoise.

² For longer cartridges, increase the flow rates in proportion. The flow rates listed do not take into account pressure losses due to flow in the internal diameter of the elements which become significant above about 40 to 60 CFM.



Profile II and Profile II Plus Filter Cartridges

Table 7 – Housing Selection

Element Style	Housing Series	Materials of Construction	Stacking Array	Flow Range (GPM)	Maximum Allowable Pressure/Temp.		Housing Data Sheets*
					PSIG	°F	
RF, RMF	PC401	Carbon Steel or 316 Stainless Steel	1 x 10" 1 x 20" 1 x 30"	to 15 to 30 to 38	400	300	H14
	PC04	Carbon Steel or 316 Stainless Steel	4 x 10" 4 x 20" 4 x 30"	to 120 to 120 to 120	230 215	300 300	H15
	PC07	Carbon Steel or 316 Stainless Steel	7 x 20" 7 x 30" 7 x 40"	to 210 to 368 to 420	230 215	300 300	H16
	PC15	Carbon Steel or 316 Stainless Steel	15 x 20" 15 x 30" 15 x 40"	to 340 to 480 to 675	230 215	300 300	H17
	P23	Carbon Steel or 316 Stainless Steel	23 x 30" 23 x 40"	to 820 to 1240	205 215	300 300	H18
	P38	Carbon Steel or 316 Stainless Steel	38 x 30" 38 x 40"	to 1630 to 1930	200 215	300 300	H19
	AB Code 7	ALI in-line flow sanitary**	316L Stainless Steel	1 x 5", 10", 20", 30", 40"	to 20	150	284
ALT "T" -flow sanitary**		316L Stainless Steel	1 x 10", 20", 30", 40"	to 20	150	284	-
CLL4		316L Stainless Steel	1 x 10", 20", 30"	to 20	400	250	H26
STL03 "T" -flow sanitary multistack		316L Stainless Steel	3 x 10", 20", 30", 40"	to 100	125	200	-
STL06 "T" -flow sanitary multistack		316L Stainless Steel	6 x 10", 20", 30", 40"	to 200	125	200	-
STL10 "T" -flow sanitary multistack		316L Stainless Steel	10 x 20", 30", 40"	to 200	125	200	-
PCY		Polypropylene	1 x 10", 20"	to 15	150	100	H39

*For more information on the housings listed see the appropriate Housing Data Sheet.

**Available with 50psig/3.4 bar at 300°F/149°C 316 SS jackets.

Removal Ratings – Bringing Order to Confusion!

There is no universally accepted system for determining removal ratings of cartridge filters in liquid service. As an example, a number of depth type filters rated at 1 micrometer (μm) were evaluated using a modified OSU F-2 test method (see below) and were found to have absolute ratings of 15 to 25 μm . All had virtually no removal at 1 μm . Rating methods used by the vari-

ous manufacturers may be arbitrary and results obtained by different methods cannot be compared.

The OSU F-2 test method developed at Oklahoma State University in the 1970's has received wide acceptance for use on lubricating and hydraulic fluids. Pall Corporation uses this method for its oils extensively, and has adapted it for use with water in the range from 0.5 to 30 μm . A second modification uses oil and covers the range from 40 to 120 μm .

Profile II Replacement Filters

Some competitive elements deviate greatly from their assigned ratings. For example, one element rated at 0.5 μm nominal, had an efficiency of 90% at 8 μm and virtually zero efficiency at 0.5 μm in the modified F-2 test. A 1 μm rated element of the same brand had a 90% efficiency at 6 μm ! Both can be replaced by 10 μm rated Profile II elements which offer about equal removal and a probable two to four-fold increase in life.

Table 8 lists the nearest equivalent Profile II element to some of the more commonly used depth type filters. Therefore, in virtually all cases, when the contaminant added values were compared at *equal efficiency*, the Profile II element capacity was higher, often by a factor of two to three or more. Life in service may be different due to contaminant characteristics and process conditions. In general, longer life will be obtained when a Profile II element replaces a conventional depth filter with equal or similar OSU F-2 removal efficiency values.

Table 8 – Replacing Conventional Depth Filters with Profile II Elements

Manufacturer	Material	Part Number	Manufacturers Rating μm	Nearest Equivalent Profile II Element Rating μm
Cuno	Cotton String Wound	DCCFY	1	15
		DCCFA	3	15
		DCCFB	5	40
		DCCFC	10	40
		DCCFF	25	40
	Polypropylene String Wound	DPPFY	1	30
		DPPFA	3	40
		DPPFB	5	40
		DPPFC	10	40
		DPPFF	25	70
	Molded Fiber	G78A3	3	30
		G78B3	5	40
		G78C8	10	70
		G78F3	25	70
	Polyethylene Coated Polypropylene	AU9A11N	3	15
AU9B11N		5	30	
AU9C11N		10	40	
Commercial	Cotton String Wound	39R10	1	10
		27R10	3	15
		23R10	5	20
		19R10	10	30
		15R10	20	40
	Polypropylene	MBC10M10A	10	10
		MBC20M10A	20	20
Hytex	Polypropylene	GX01	1	30
		GX03	3	30
		GX05	5	70
		GX10	10	70
		GX20	20	70
		Nippon Roki	Polypropylene	HT10
HT20	0.2			5
HT30	0.3			7
HT40	0.4			7
HT50	0.5			10
HT55	0.5			15
HT60	0.6			20
HT60a	0.7			15
HT80	0.8			20

Note: Many competitive depth cartridges are constructed of materials other than polypropylene. In many cases Profile II cartridges, constructed of polypropylene or nylon, may be suitable replacements provided that either of these materials has the required temperature and chemical compatibility. See Table 9.

Table 9 – Profile II Compatibility Data

Chemical Classification	Examples	Polypropylene	Nylon	Polyphenylene Sulfide
Inorganic Acids	Hydrochloric, Dilute Sulfuric, Dilute Nitric, Boric, Phosphoric	GR	T	NR GR
Organic Acids	Acetic	GR	T	GR
Bases (Alkalies)	Sodium Hydroxide, Potassium Hydroxide Amines, Quaternary Ammonium Hydroxide	GR	T	GR
Salt Solutions	Aluminum Chloride, Sodium Sulfate, Sodium Nitrate	GR	T	T
Brines	Sodium Chloride, Potassium Chloride, Sodium Bromide, Calcium Chloride	GR	T	GR
Oxidizers	Peroxides, Peracids	NR	NR	NR
Organic Solvents	Ethers, Esters, Amides, Ketones	GR	GR	GR
	Alcohols, Cellosolves, Glycols	GR	GR	GR
	Aromatics (Benzene, Toluene, Xylenes)	NR	GR	T
	Petroleum Products (Gasoline, Kerosene)	NR	GR	GR
	Hydrocarbons (Hexane, Octane, Fats, Oils, Petroleum Ether)	T ¹	GR	GR
	Halogenated Hydrocarbons (Methylene Chloride, Perchloroethylene)	T ¹	T	T
Water (Ambient) (Hot – up to 180°F without oxidants) (Hot – with oxidants)		GR	GR	GR
		GR	NR	GR
		NR	NR	T
Air (Ambient & Hot)		NR	NR	GR
Recommended temperature limits for most organic fluids unless evaluated on an individual basis		150°F	200°F	200°F
Recommended temperature limits for most compatible organic fluids unless evaluated on an individual basis		180°F	200°F	200°F
Maximum temperature limits for any fluid after evaluation on an individual basis		180°F	300°F	400°F
Disclaimer:		GR=Generally Recommended NR=Not Recommended T=Evaluate on An Individual Basis ¹ Recommended maximum temperature must not exceed 90°F.		
<ul style="list-style-type: none"> The compatibility data presented in this chart is for general guidance only. Because so many factors can affect the chemical resistance of a given product, you should pre-test under your own operating conditions observing applicable safety practices such as those given on the Material Safety Data Sheet for each chemical. If any doubt exists about specific applications, please contact Pall Corporation. 				

Scientific and Laboratory Services

Service for our customers, not only in product quality and delivery, but also in problem solving, system recommendations and sharing of scientific information, is the cornerstone of the Pall Corporation philosophy.

The Scientific and Laboratory Services (SLS) group is composed of highly competent Ph.D. level scientists and engineers, supported by professional laboratory personnel and extensive and specialized laboratory facilities. The SLS main laboratories are in the U.S., Great Britain and Japan, with support locations in over 25 countries, including Canada, Germany, France, Italy, Brazil, Singapore, Korea, Australia, and China.

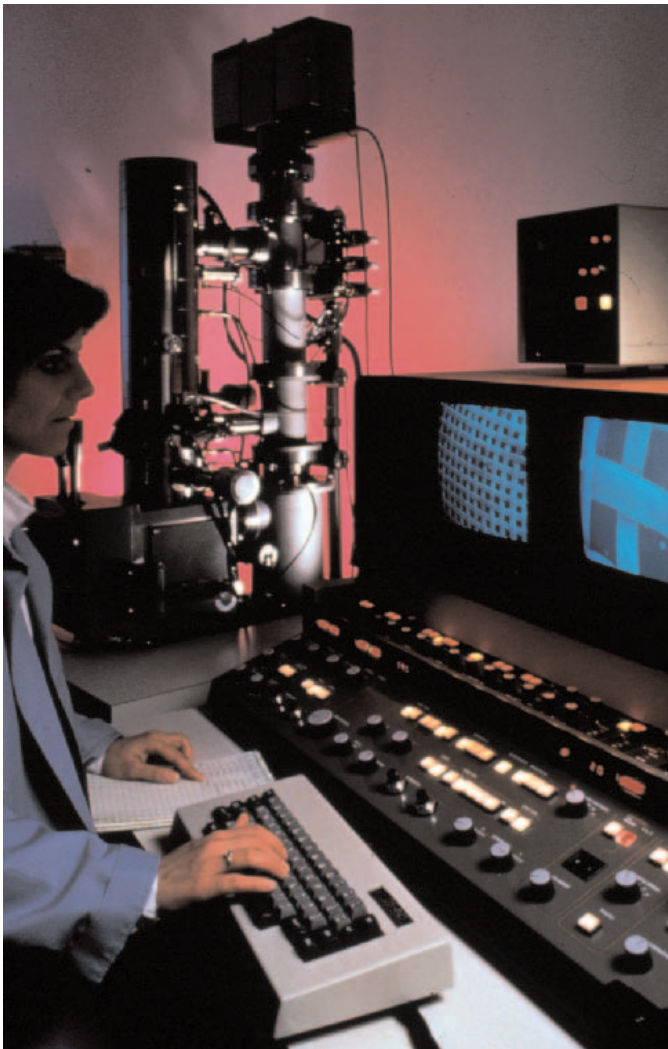
SLS staff, specifically knowledgeable of your industry, will work closely with you in solving difficult contami-

nation control problems and in the selection of the most efficacious and economical Pall filtration systems. This frequently can involve on-site testing, as well as extensive work in our SLS laboratories.

For more information on this service, please call either your local Pall distributor or the appropriate Pall Sales Department at 516-484-5400 in New York State or 888-873-7255 outside the New York area.

As an additional service, Pall provides scientific and technical seminars encompassing the subjects of fluid clarification, filtration, and solids separation. These programs are presented by senior application engineers and scientists, and are available at no cost.

SLS Facilities, World Headquarters, Port Washington, New York



Worldwide Leadership in Fluid Clarification

Pall Corporation is a world leader in fluid clarification. From its organization in 1946, Pall Corporation has developed products to meet the critical filtration needs of industry: protecting people, products, and systems through the capture and removal of contaminants in a variety of applications. Pall products serve three broad markets which include Fluid Processing, Aeropower and Health Care. The company is different from other filter companies for three important reasons:

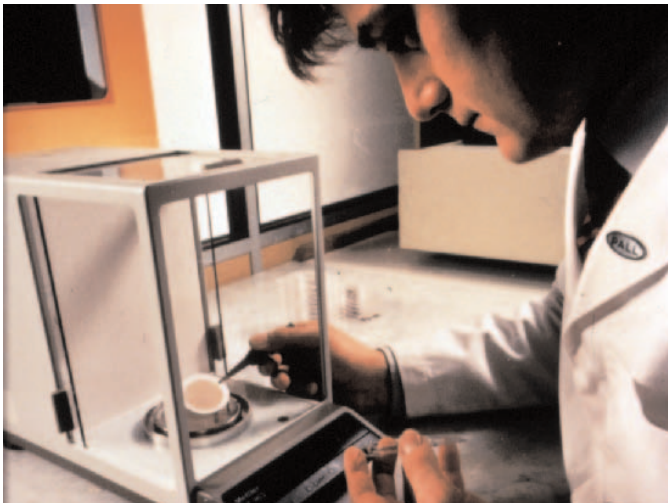
- Pall is a highly integrated manufacturer and leader in the development and production of filter media which are made by a variety of proprietary methods which include metallurgy, papermaking, chemical deposition, plastic extrusion, and others.
- Pall is the leader in design and manufacture of sophisticated housings that encase the filter cartridges.

- Pall has vast technical resources. The unique human resource, the Scientific Laboratory Services (SLS) Department, is staffed with skilled engineers and scientists and equipped with the most sophisticated analytical instruments available to help solve the complex contamination problems associated with fluid clarification.

Pall products are readily available around the world. Regardless of the location of your plant or project, Pall has a manufacturing facility, regional office or distributor nearby, with a ready stock of many products. Pall products, from any Pall manufacturing plant, will be identical in performance.

For more than 50 years Pall has followed a simple, but important credo which is called **EESES**. Pall strives to do what eases the way for our customers by providing **E**ase of use, **E**conomy of use, **S**afety, **E**fficacy, and **S**ervice with each product sold around the world.

SLS Facilities, Pall Europe, Ltd., Portsmouth, England



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