

# AMPS Filter Cartridges

■ Polypropylene

Quality-Pure Pleated Series

## Absolute, Cost-Effective Filtration From All-Polypropylene Cartridges

Quality-Pure AMPS Cartridges provide the ultimate in economical filtration for even the most critical process fluids. The proprietary melt blown media are rigidly controlled for reliable results time after time. Quality-Pure AMPS Cartridges are produced without adhesives that can potentially contaminate fluids.

Quality-Pure AMPS Pleated Cartridges are available in 0.2µm, 0.45µm, 1µm, 2µm, 5µm, 10µm, 20µm, 40µm and 70µm absolute rated pore sizes.

### Applications

- Electronics
- Membrane Prefilter
- Food & Beverage
- Pharmaceuticals
- Water
- Chemicals
- Precious Metal Recovery
- Catalyst Recovery
- Waste Water



### Features and Benefits

- Absolute ratings for consistent and reliable performance (99.98%;  $\beta = 5000$ ).
- Backwashable media, reduces replacement maintenance and cartridge disposal costs. See page 4 for procedure.
- AMPS cartridges are non-fiber releasing and contain minimal extractables.
- All materials of construction are FDA listed as acceptable for potable and edible liquid contact according to CFR Title 21.
- One-piece construction eliminates bypass concerns on multilength cartridges.
- All-polypropylene construction offers wide chemical compatibility with most chemicals, acids, bases and solvents.
- Fused construction and continuous lengths eliminate the need for adhesives and allow accurate bubble point integrity testing.



**WARNING! FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**  
This document and other information from Clark-Reliance Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection for the products and systems and assuring that all performance, safety and warning requirements of the application are met.

# Ultimate Pleated Cartridge Performance

Quality-Pure AMPS Filter Cartridges offer high efficiency, high purity, high flow rate capability and long service life. AMPS extractable levels in water are less than 0.001% by weight. The result is a line of cartridges with broad particle

removal ratings that meet critical filtration requirements.

Quality-Pure AMPS cartridges make an ideal membrane prefilter and serve as a cost-effective alternative to membrane filters in many applications.

The unique construction allows for backwash cleaning that extends service life and reduces handling and disposal costs. Quality-Pure AMPS cartridges can be incinerated, significantly reducing hazardous material disposal costs.

## Specifications

### Filtration Ratings:

- 99.98% removal efficiency at 0.2µm, 0.45µm, 1µm, 2µm, 5µm, 10µm, 20µm, 40µm and 70µm pore sizes

### Effective Filtration Area:

- Up to 7.2 ft<sup>2</sup>/10 in (0.7m<sup>2</sup>/254mm)

### Materials of Construction:

- Filter Media and Support Layers: Polypropylene
- Bonding Polymer: none, completely fusion-sealed
- Surface Treatment: none, chemically inert and neutral
- Media Protection: polypropylene cage
- Support Core: Glass filled Polypropylene
- Pleat Pack Side Seal: fused polypropylene
- End Caps: polypropylene
- Seals: Buna-N, EPR, silicone, Viton\*, PFA encapsulated Viton\* O-rings, polyethylene foam gaskets

## Performance Profile

Clark-Reliance Filtration Group test procedures address the varying filtration requirements of customers. Selection of media of the Quality-Pure AMPS product line maximizes performance in terms of efficiency, dirt-holding capacity, flow and other characterization variables. Tests and analyses were conducted using microprocessor technology.

## High Filtration Efficiency

Filtration efficiency is affected by media pore size and fluid velocity. The removal efficiency is based on a design flow rate

### Maximum Recommended Operating Conditions:

- Change Out ΔP: 35 psid (2.4 bar)
- Temperature: 200°F (93°C)
- Temperature @ 35 psid (2.4 bar): 200°F (93°C)
- ΔP @ 70°F (21°C): 90 psid (6 bar)
- ΔP @ 200°F (93°C): 35 psid (2.4 bar)
- Flow Rate: 10 gpm (38 lpm) per 10 in length

### Dimensions:

- Overall Length: See bulletin A-700.
- Cartridge Outside Diameter: 2-1/2 in (63.5 mm)
- Cartridge Inside Diameter: DOE - 1-1/16 in (27 mm); SOE - 1 in (25.4 mm)

### Biological Safety:

- Meets USP XXI Class VI requirements for plastics
- Nontoxic per WI-38 Human Cell Cytotoxicity Test

of 2.5 gpm per 10 in (9.5 lpm per 254 mm) cartridge. Lower flow rates yield higher efficiencies. Higher flow rates result in lower efficiencies.

## Test Conditions Liquid Service:

Particle Removal efficiencies were determined by challenging cartridges with aqueous dispersions of industry standard contaminants at a constant flow rate until a ΔP of 35 psi (2.4 bar) was reached. Performance validation of submicron rated media is based on a variety of bacterial challenge tests.

### Product Purity:

- All components FDA acceptable per 21 CFR, Section 177-1520
- Non-fiber releasing per FDA Part 210.3B (5) and (6). Refer to TAP-004 (Contact Clark-Reliance for TAP-004)
- Water Extractables: <0.001% by weight per USP XXI Physico-Chemical Test Procedures
- Non-photosensitive
- Low Total Organic Carbon (TOC) extractables. Refer to TAP-003 (Contact Clark-Reliance for TAP-003)

### Sterilization Parameters:

- Maximum 10 cycles @ 250°F (121°C) for 15 minutes @ 15 psi (1.3 bar)
- Hot water @ 180°F (82°C) for 30 minutes

### Deionized Water Rinse-up Properties:

- Refer to TAP-002 (Contact Clark-Reliance for TAP-002)

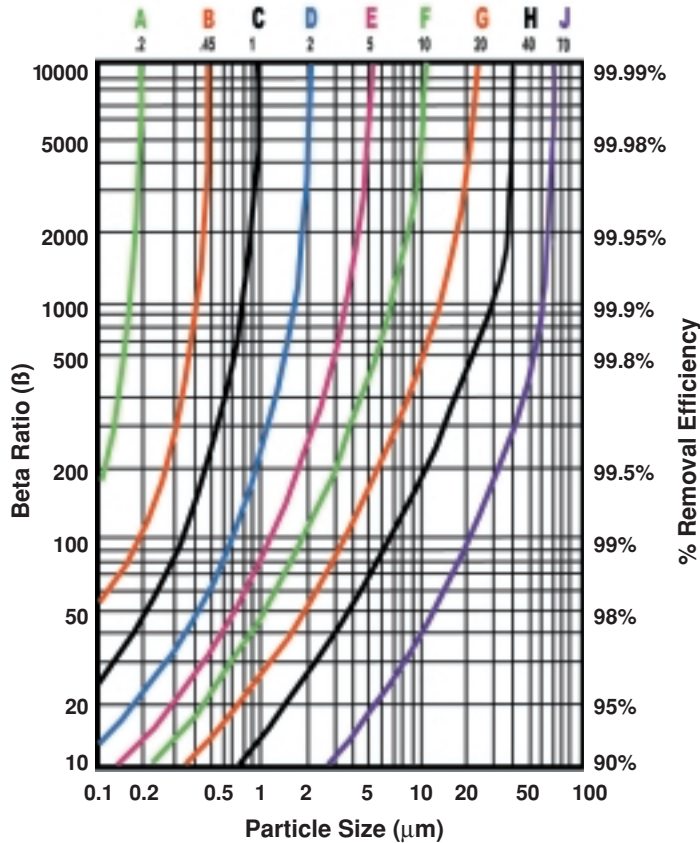
Consult the Process Filtration Division for specific test data.

## Gas Service:

Removal efficiencies for gas are determined using Mil-Std 282. This procedure challenges the media with thermally generated DOP (dioctylphthalate) smoke (0.3µm dispersion in air) at a flow rate of 3.2 cfm through a 10 in cartridge.

## Performance Profile

### AMPS Particle Removal Efficiency Over Life



A = AMPS002      D = AMPS020      G = AMPS200  
 B = AMPS004      E = AMPS050      H = AMPS400  
 C = AMPS010      F = AMPS100      J = AMPS700

Beta Ratio (β) =  $\frac{\text{Upstream Particle Count @ Specified Particle Size and Larger}}{\text{Downstream Particle Count @ Specified Particle Size and Larger}}$

$$\text{Percent Removal Efficiency} = \left( \frac{\beta - 1}{\beta} \right) \times 100$$

Performance determined per ASTM F-795-88. Single-Pass Test using AC test dust in water at a flow rate of 2.5 gpm per 10 in cartridge (9.5 lpm per 254 mm).

### Liquid Particle Retention Ratings (μm) @ Removal Efficiency of:

Cartridge	β=5000 Absolute	β=1000 99.9%	β=100 99%	β=20 95%	β=10 90%
A AMPS002	0.2	<0.2	<0.2	<0.2	<0.1
B AMPS004	0.45	0.4	0.2	<0.2	<0.1
C AMPS010	1	0.8	0.4	<0.2	<0.1
D AMPS020	2	1.9	0.8	<0.2	<0.1
E AMPS050	5	3.8	1.4	0.4	0.15
F AMPS100	10	7	2	0.5	0.25
G AMPS200	20	13	4	1.8	0.35
H AMPS400	40	22	7	3.2	0.8
J AMPS700	70	52	22	15	5.5

### AMPS Length Factors

Length (in)	Length Factor
9	1.0
10	1.0
19	2.0
20	2.0
29	3.0
30	3.0
39	4.0
40	4.0

### AMPS Cartridge Flow Factors (psid/gpm @ 1 cks)

Rating (μm)	Flow Factor
0.20	3.100
0.45	1.000
1	0.750
2	0.300
5	0.072
10	0.031
20	0.021
40	0.012
70	0.008

### Flow Rate and Pressure Drop Formulas:

$$\text{Flow Rate (gpm)} = \frac{\text{Clean } \Delta P \times \text{Length Factor}}{\text{Viscosity} \times \text{Flow Factor}}$$

$$\text{Clean } \Delta P = \frac{\text{Flow Rate} \times \text{Viscosity} \times \text{Flow Factor}}{\text{Length Factor}}$$

### Notes:

1. **Clean ΔP** is PSI differential at start.
2. **Viscosity** is centistokes. Use Conversion Tables for other units.
3. **Flow Factor** is ΔP/GPM at 1 cks for 10 in (or single).
4. **Length Factors** convert flow or ΔP from 10 in (single length) to required cartridge length.

### Performance Data by Cartridge Grade:

Cartridge	Water† ΔP PSID @ 1 gpm/10 in	Gas Efficiency DOP Efficiency	Air Flow Rate SCFM @ 1 psid
A AMPS002	3.100	99.999+	13
B AMPS004	1.000	99.999+	25
C AMPS010	0.750	99.999	10
D AMPS020	0.300	99.999	34
E AMPS050	0.072	99.900	126
F AMPS100	0.031	93.500	320
G AMPS200	0.021	80.000	362
H AMPS400	0.012	53.000	400
J AMPS700	0.008	18.000	400

† Pressure drops are for water @ 1.0 cks and S.G. = 1. For other liquids multiply pressure drop by the viscosity in cks

## Quality-Pure Pleated Series

### Backwash Protocol

Since applications vary, rigid rules for backwash operation are impossible. Please use these guidelines:

- Initiate a backwash cycle when the pressure drop rises about 3-4 psid (0.2 to 0.3 bar) above the initial value (1-5 psid [0.1 to 0.4 bar] for most systems) or alternately on a timed cycle, e.g., daily.
- Stop the process flow by closing valves 1 and 2.
- Begin backwash flow by opening valves 3 and 4.
- Backwash pressure should be about 10 psi (0.7 bar) greater than the existing pressure drop.
- A momentary pressure surge is beneficial in breaking particles free.
- Backwash flow rate is critical. It should be 1 to 1-1/2 times the process flow rate. Allow sufficient time to flush the containment from the vessel.
- Close valves 3 and 4 and open valves 1 and 2 to resume normal filtration. Vent the vessel. Note the decrease in pressure drop.
- Continue backwash cycles until the pressure drop no longer decreases. Change cartridges at about 35 psid (2.4 bar).
- Note: Valves 3 and 4 could be attached to the vessel's dirty and clean drains, respectively.

## Ordering Information

AMPS 004 Rating	F	A	DO	B
	Support Construction	Seal Material	End Cap Configuration	Special Options
AMPS002 = 0.2µm AMPS004 = 0.45µm AMPS010 = 1.0µm AMPS020 = 2.0µm AMPS050 = 5.0µm AMPS100 = 10.0µm AMPS200 = 20.0µm AMPS400 = 40.0µm AMPS700 = 70.0µm	F = Glass-Filled Polypropylene (Core only) G = 304 Stainless Steel (Core only) N = Natural Polypropylene (All support components)	A = Polyethylene Foam (DOE Gasket Only) E = EPR N = Buna-N S = Silicone T = PFA Encapsulated Viton (222,226 O-Ring Only) V = Viton	AR = 020 O-Ring/Recessed DO = Double-Open-End (DOE) DX = DOE With Core Extender LL = 120 O-Ring (Both Ends)** LR = 120 O-Ring/Recessed** OB = Std. Open End/Polypro Spring Closed End PR = 213 O-Ring/Recessed** SC = 226 O-Ring/Closed SF = 226 O-Ring/Fin SSC = S.S. Inserted 226 O-Ring/Closed SSF = S.S. Inserted 226 O-Ring/Fin STC = S.S. Inserted 222 O-Ring/Closed STF = S.S. Inserted 222 O-Ring/Fin TC = 222 O-Ring/Closed TF = 222 O-Ring/Fin TX = 222 O-Ring/Flex Fin XB = Ext. Core Open End/Polypro Spring Closed End	B = Bubble Point Test R = Rinse with DI water (5 mins.) Z6 = Individual poly bag only
	<b>10</b> Nominal Length			
	(code)	(in)	(mm)	
	9	9-5/8	244	
	10	9-13/16	249	
	19	19-5/8	498	
	20	19-15/16	506	
	29	29-1/4	743	
	30	30-1/16	764	
	40	40	1016	

\*\* Available only in 9-5/8" (-9) and 19-5/8" (-19) lengths.

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