



Microelectronics

Filtration Solutions for Ink Jet Ink Formulation

Pall Ink Jet Team



Filtration. Separation. Solution.SM



Gain A Competitive Edge With Pall Filtration Technology

The Pall Advantage



The Pall Ink Jet Team

The Ink Jet Printing market is supported by many international industries from chemical production to semiconductor manufacturing. Pall has an international dedicated Ink Jet Team comprised of sales, marketing, R&D, and technical support members that cohesively supports all facets of this market. Their primary focus is to develop and provide unique filtration products designed specifically for ink jet ink.

Leadership and Innovation in Fluid Clarification

Pall Corporation is the world's leading supplier of filtration, separation and purification technologies for virtually all industrial and high-tech markets. Our intense focus on developing innovative materials and processes keeps Pall on the forefront of filtration science, assuring our customers the best possible filtration solutions.

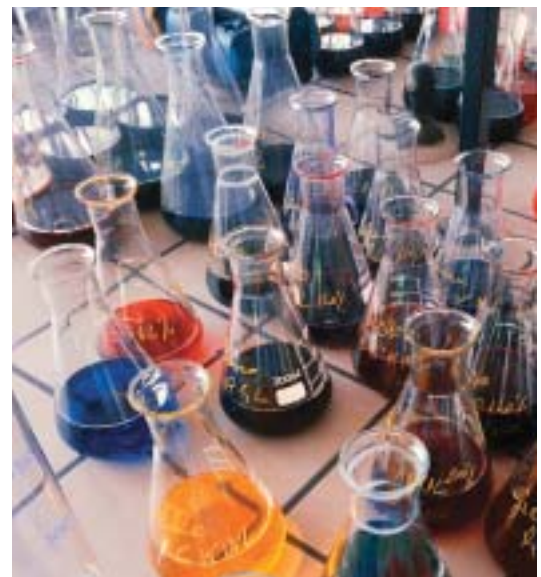
Available Resources

Pall offers a wide range of resources to assist the ink jet ink formulator including:

- ***Technical Troubleshooting***
- ***System Optimization***
- ***Technical Training***
- ***Custom Product Development***

Worldwide Expertise and Support

As a global leader, we provide local technical and support specialists to respond to the needs of our customers.



Aqueous Ink Jet Inks for Thermal Ink Jet Printing

Pigmented Inks

The key objective in filtration of pigmented ink for thermal ink jet printing is to remove oversized pigments and agglomerates, while classifying the dispersion for maximum printhead performance. It is imperative to keep filtration costs low while meeting this goal. Pall recommends the PROFILE® II or Profile Star filters for prefiltration and final filtration of pigmented inks. Final filtration requirements typically range from 0.3 to 1.0 micron.

Dye-Based Inks

Dye-based inks differ in chemical composition from pigmented inks, and, thus have different filtration requirements. In addition to insoluble dye elements, gelatinous residues and other contaminants, the potential presence of bacteriological matter may cause premature printhead failure. For effective and economical removal of these contaminants, Pall recommends two-stage filtration. Prefiltration options include the Profile II or NEXIS® depth filters while the WATER-FINE™ 0.2 µm membrane filter is best for final filtration.

Solvent-Based Inks for Industrial Marking

Industrial Marking Inks for General Use

Industrial marking systems require high efficiency filtration for contaminant removal that ensures proper operation without nozzle deflections or plugging. Therefore, ink filtration to 1 µm absolute is essential to assure printer performance. For most aqueous, ketone and alcohol formulations, the Profile II and Nexis Series filters are most suitable.

Inks for High Resolution Industrial Marking Applications

Pall has a wide range of filtration options for fine filtration of high resolution inks. Please contact the Ink Jet Team at Pall for a recommendation for your specific ink chemistry.

Ink Jet Inks for Piezo Printing

Pigmented Solvent-Based Inks

For filtration of pigmented solvent-based ink jet inks for piezo printing, Pall recommends filtration to 1.5 µm absolute. This provides for excellent protection of the printhead and outstanding ink shelf life. The Profile Star, POLY-FINE® XLD and ULTIPOR GF PLUS® filters are recommended based on specific chemical compatibility.

UV Curable Ink Jet Inks

The application of UV curable technology to the ink jet printing market offers many advantages such as image durability and fade resistance. These unique inks require filter technology with low pressure drop characteristics due to high viscosities. Excellent gel capture and retention is also critical for proper printhead performance. Pall Profile Star or Poly-Fine XLD filters are recommended for most formulations, while those higher in temperature should use the Ultipor GF Plus filter.

Filtration of Ink Jet Colorants

Proper filtration of both dye and pigmented ink jet colorants is critical for high quality final ink formulation. Colorants that are properly filtered will facilitate final ink formulation and enhance the overall ink performance in the printer. Pall recommends filtration at 0.5 µm absolute with the Profile II filter for pigmented colorants. Two-stage filtration is suggested for dye-based colorants with the Profile II or Nexis depth cartridges as prefilters. Water-Fine 0.2 µm membrane elements may be used as final filters.



Filtration Technology Overview

High Efficiency Depth Filters

Pall offers two exceptional melt blown polypropylene depth filter options with absolute retention ratings from 0.3 to 200 µm. These filters are ideal for classification of ultra fine pigment dispersions and as cost-effective prefilters for final ink formulations.

NEXIS SERIES

Nexis polypropylene filters utilize a revolutionary melt blowing technique called CoLD (Co-located Large Diameter) fiber technology. This patented process integrates large diameter CoLD fibers within the fine fiber filtration matrix to provide outstanding structural strength, resistance to contaminant unloading and exceptionally long service life.



Filtration zones with CoLD fibers.

PROFILE II

Profile II filters feature a continuously tapered prefiltration section and a constant pore size final filtration section that yields excellent service life. They are available in polypropylene, nylon and polyphenylene sulfide with filtration efficiencies to 0.3 µm absolute.

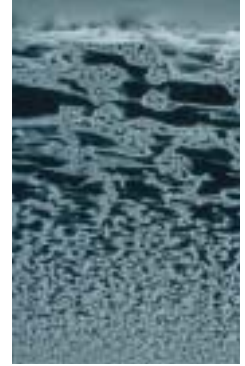


Membrane Filters

High efficiency membrane filters are available for fine filtration of ink jet inks.

VARAFINE™ and WATER-FINE SERIES

These high efficiency filters incorporate patented highly asymmetric polysulfone membrane to provide absolute rated filtration with superior flow rates and long life cycles. The uniquely manufactured membrane consists of very open pores on the upstream side for less flow restriction and lower pressure drops, while the downstream cut-off layer has smaller pores for the finest filtration.

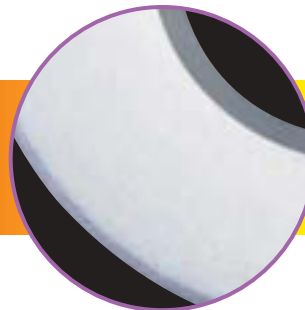


Highly asymmetric polysulfone membrane.

ULTIPOR® N₆₆

This filter is made from a pure, naturally hydrophilic nylon membrane, which has exceptional chemical and solvent compatibility and extremely low extractables. The membrane is cast on a nonwoven support material for added strength and integrity. The Ultipor N₆₆ filter is specifically engineered for reliable, economical, fine filtration.

BETTER
PREFILTRATION
EXCELLENT GEL CAPTURE
AND RETENTION



Filtration Technology Overview

Pleated Filters

The Pall family of pleated, fibrous products includes both resin-bonded microfiber and melt blown polymeric options.

ULTIPOR GF PLUS

These filters feature a resin-bonded inorganic microfiber matrix in a high area pleated configuration. The resin binder ensures a rigid structure and imparts a positive zeta potential in aqueous, low ionic solutions, thus enhancing contaminant removal. With retention ratings from 0.1 to 40 μm , they are available in a wide range of configurations and hardware choices.

POLY-FINE II SERIES

These pleated filter cartridges utilize chemically resistant polypropylene media and hardware. The filter media, manufactured directly by Pall just for filtration applications, offers long service life with low pressure losses and retention ratings to 0.2 μm . The Poly-Fine II filter is an ideal choice for dye-based inks.



Hybrid Technologies

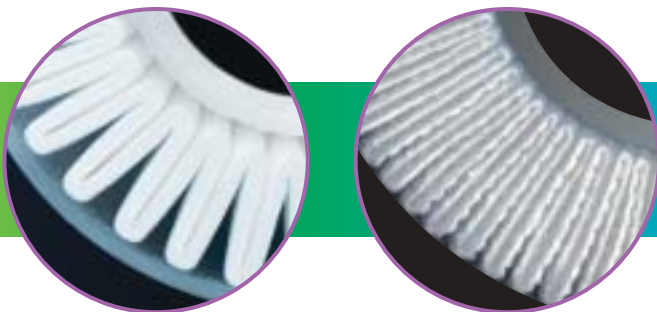
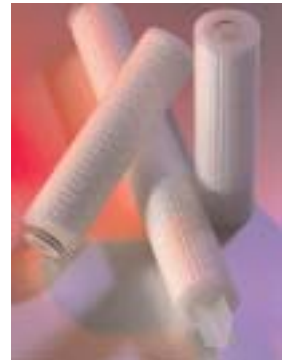
Pall has developed several innovative filters that combine the classification characteristics of pleated filters with the gel removal traits of depth filters. These filters work well in pigmented ink applications that are higher in viscosity.

PROFILE STAR SERIES

This filter combines the exceptional dirt holding capacity of Profile II depth filters with the high flow rates of traditional pleated filters. The pleated-depth design features a graded pore structure to maximize void volume and service life, while providing excellent removal of gels and agglomerates. The Profile Star filter media minimizes removal of desirable colorant while efficiently removing oversized contaminant and is available in polypropylene or nylon.

POLY-FINE XLD SERIES

These **Extended Life Depth** filters feature proprietary polypropylene media, manufactured directly by Pall, for effective capture of deformable contaminant. This pleated-depth filter provides long life, high flow rates and low pressure drops, while capturing gels and other contaminants.



HIGHER FLOW RATES
BETTER CLASSIFYING
FILTRATION

Ink Jet Laboratory Filtration Products



Initial Formulation Trials to Full Production

Proper selection and coordination of the filtration scheme, starting with the first formulation trials, assures the launch of high performance ink at an economical cost.

Selection of the best filtration technology begins during ink formulation. Preliminary ink formulations that are filtered properly will have better performance and an improved chance of being successful with minimal changes. In addition, filterability testing during pilot-scale manufacturing will help determine filter usage and allow optimization of the total filtration process.

From small disc filters to one-inch test filters and housings to capsule filters, we provide products and services to support the ink jet laboratory needs of our customers.

Capsule Filters for Digital Printing

On-Board Filtration for Printhead Protection

Pall has developed several capsule filter options for use with digital printing systems that feature compact designs with a wide range of media and connection choices. For UV curable printing systems, opaque capsules are available to minimize light exposure and the resulting adverse affects.

Small Capsule Filter & UV Small Capsule Filter

This compact filter assembly is designed for the needs of equipment OEMs where fine filtration and low hold-up volumes are critical. This capsule features a high-area pleated filter for long service life and low initial pressure drop, ideal for situations where space is at a premium.



Ink Jet Capsule & UV Ink Jet Capsule

The Pall Ink Jet Capsule range of disposable capsule filters has been developed to provide a high level of protection to print heads in ink jet printing equipment. This capsule has a rugged, all-welded design to ensure exceptional strength in a wide variety of ink chemistries. In addition, the Pall Ink Jet Capsule incorporates Pall's Profile Star and Profile II media options for maximum performance.

Multiple Application Capsule (MAC)

The Pall Multiple Application Capsule (MAC) is a self-contained filter assembly designed to meet the ever increasing needs of the digital ink jet printer. This unique capsule provides a high level of printhead protection and long service life in ink jet applications. Both the standard and UV (opaque) MAC filters offer flexibility in filter media and connector options that allow for easy customization of the product.



Filtration Products for Graphic Arts Applications

Beyond ink jet ink formulation, Pall is a key supplier of innovative filtration products for all areas of the graphic arts industry. From photographic film to photosensitive plates to traditional ink manufacture, we have demonstrated our expertise with high performance filtration products and unsurpassed technical support. Please contact us or visit Pall.com for additional details.



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2200 Northern Boulevard
East Hills, New York 11548-1289

888.873.7255 toll free
516.484.5400 phone
516.484.0364 fax

Portsmouth – UK

+44 (0)23 9230 2374 phone
+44 (0)23 9230 2509 fax
processuk@pall.com

Filtration. Separation. Solution.sm

Visit us on the Web at www.pall.com/graphic.asp

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