



UV Curable Ink Jet Inks

Filtration plays a key role in UV curable ink jet formulation

UV curable ink jet ink is a liquid marking material that cures in the presence of UV light. UV curable inks have several advantages over solvent inks. The two most dominant advantages are image durability and the fact that they contain no volatile organic compounds (VOCs). However, these inks must be filtered to very fine levels to not negatively impact printer performance or output quality. Proper application of filtration technology for UV curable ink jet ink formulation helps assure optimum printer performance.

Contamination can lead to printhead plugging and poor print quality

The typical contaminants found in UV curable ink jet inks are common environmental debris (particulates, fibers); contaminants from raw materials (e.g., oversized and agglomerated pigments, cured monomer), and gels formed during the manufacture and storage of the UV curable ink. These contaminants are a problem for digital printers as they can cause plugging or partial plugging of ink jet orifices and ink supply channels within a printhead. The net result will be poor print quality, irrecoverable printhead damage, and printer downtime.

Gels are the most difficult contamination problem to identify and control. UV curable inks can form gels under certain environmental conditions – small amounts of UV light, agitation, extreme temperatures, or oxygen depletion. The capture and retention of gel contaminants is critical to the proper operation of a UV curable printer.

Filtration philosophy for proper ink formulation

We should consider filtration of UV curable ink jet inks as a two-stage filtration process with each stage accomplishing different tasks.

In most applications, Pall recommends a carefully selected prefilter and final filter arrangement. This method provides the overall lowest cost per liter for filtration, ensures gel capture and retention, reduces formulation bottlenecks, and yields ink with consistent quality in every lot.

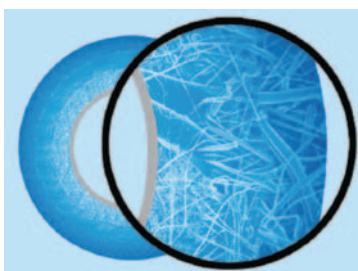
A properly selected prefilter preconditions the ink and protects the final filter from premature plugging. The primary function of the prefilter is to economically remove a wide range of contaminants, including some gel capture and retention. If selected properly, the prefilter will remove raw material contaminants that vary from batch-to-batch and can possibly slow down the formulation process.

The final filter is used to remove contaminants in a very narrow range (near the pigment size range), without removal of desirable pigment particles. As such, the final filter (beta-rated removal performance) has a finer removal rating than the prefilter. A final filter with a thick, continuous media structure will effectively capture and retain gelatinous materials not captured by the prefilter. These key attributes, along with a carefully selected prefilter, will assure ink quality and low cost per liter for every batch.

Filtration technology recommendations

Prefilter: Nexis® A filter cartridges – Pall's Nexis A filter cartridges are all-polypropylene depth filters with a multi-zone media matrix. The depth filter technology effectively and economically captures a wide range of contaminants, providing valuable protection from premature plugging on the final filter. The Nexis A filter features a proprietary CoLD Melt™ (Co-Located Large Diameter) fiber technology to enhance the filter's strength. This technology intertwines larger fibers within a fine fiber matrix to provide additional strength and resistance to compression.

See www.pall.com/pdf/IJ1788.pdf



Nexus A filter cartridges

Attribute	Benefit
Continuous gradient pore structure	Optimized structure effectively removes a wide range of contaminants
Incorporated prefilter layers will remove larger materials	Longer service life and lower filtration cost per liter
Beta-rated at >99.9% efficiency	Consistent protection of final filter

Final filter: Profile® Star filter cartridges –

Profile Star filter cartridges feature an innovative design that combines the exceptional dirt-holding capacity of a depth filter with the high flow capability of a pleated filter. Profile Star filter technology has an optimized pleat structure that will allow for even, serial flow yielding low clean pressure loss and long service life, even with higher viscosity UV curable inks.



Profile Star filter cartridges



See www.pall.com/pdf/IJ_1769b_Profile_Star.pdf

Attribute	Benefit
Thick, continuous (non-layered) media structure	Good gel capture and retention
Media structure is optimized for filtration of dispersions	Accurate removal of oversized contaminants without removal of desirable colorants
Fixed pore structure	Contaminants are permanently trapped with filter structure and will not unload during operation



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