

## Contents

EPSON Archival™ Inks are used in the professional "P"-series EPSON Stylus Photo printers and in select models of the professional graphics EPSON Stylus Pro models. This technical brief will provide detailed information on the following topics:

- ▶ EPSON Archival Ink Technology
- ▶ Comparison of different types of ink
- ▶ EPSON MicroCrystal Encapsulation Technology

## EPSON Archival Ink Technology—Comparison of different types of ink

EPSON Archival Ink Technology uses pigment inks, but includes a breakthrough technology that combines the advantages of conventional pigment inks with the advantages of dye inks. The key differences between the types of inks are:

Key Differences	EPSON Archival Inks	Conventional Pigment Inks	Dye Inks
<b>Typical use</b>	Photography (Fine Art and Print for Pay) and wide format ink jet printer market where archival printing and Photo Quality output is required	Wide format ink jet printer market for outdoor signage; NOT optimal for photography	Standard with desktop ink jet printers; photography, presentations, artwork, etc.
<b>Lightfastness</b>	Extremely high lightfastness, approximately 200 years	High lightfastness, over 100 years	Poor to excellent lightfastness <sup>1</sup>
<b>Short-Term Stability</b>	Highly stable, with nominal short-term color shifting	Highly stable, with nominal short-term color shifting	Good stability, with minimal short-term color shifting
<b>Waterfastness</b>	Extremely waterfast	Very waterfast	Waterfast on many specialty papers (not plain paper)
<b>Color Gamut and Gloss</b>	Superb color gamut and gloss due to even reflection of inks when using EPSON RC (Resin Coated) media	Lowest color gamut and dull (no gloss) prints due to uneven reflection and high scattering	Superb color gamut and gloss due to even reflection of inks from the paper
<b>Durability</b>	Good durability because pigments are coated with resin and are fixed on specialty media	Susceptible to scratching because pigment particles sit on top of the paper	Extremely durable, since inks are absorbed into the paper
<b>Media choices</b>	Wide media selection: matte, watercolor, and RC photo type papers	Limited media selection: limited to signage media only	Greatest media selection: plain, matte, and RC photo and high gloss paper types

<sup>1</sup> The EPSON Stylus Photo 870/875DC/1270 printers with Genuine EPSON Photo Inks and EPSON Premium Glossy Photo Paper or Matte Paper—Heavyweight provide the highest level of lightfastness, 10-26 years (as rated by Wilhelm Imaging Research), when framed under glass. This is 5 to 25 times more lightfast than prints from Hewlett-Packard®, Canon®, or Lexmark® printers.

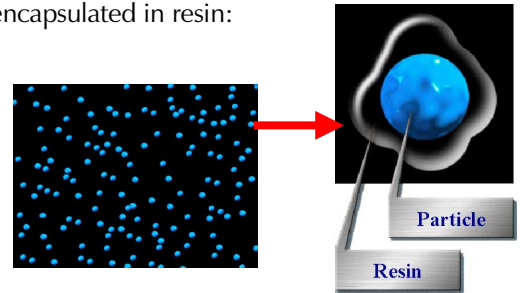
As the chart indicates, the EPSON Archival Inks combine the lightfastness, short-term stability, and waterfastness advantages of conventional pigment inks with the color gamut, durability, and wide selection of media advantages of dye inks.

## EPSON Archival Ink Technology—EPSON MicroCrystal Encapsulation Technology

EPSON MicroCrystal Encapsulation Technology is a breakthrough technology that overcomes many of the shortcomings of pigment inks, while maintaining the lightfast, waterfast, and stability advantages.

With this exclusive, patented technology, each pigment crystal is encapsulated in resin:

- ▶ EPSON uses a unique resin polymer which pulls the particles apart so that they are suspended in the solution and never coagulate.
- ▶ Because of this unique mixing method, each pigment particle is completely encapsulated.



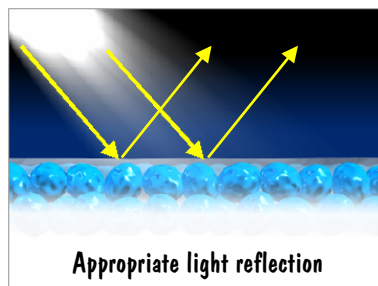
This technology offers the following advantages:

1. **Greater color gamut:** Because each pigment particle is completely encapsulated in the resin, EPSON's pigments are evenly distributed. With conventional pigment inks, the covering/coating of the pigments is random and less consistent, which results in uneven distribution.

Because EPSON resin-coated pigments are evenly distributed, they produce a higher color gamut that even rivals that of dye-based inks. For this reason, EPSON inks can print on RC glossy media, while conventional pigments inks cannot because of their erratic distribution and placement on the paper.

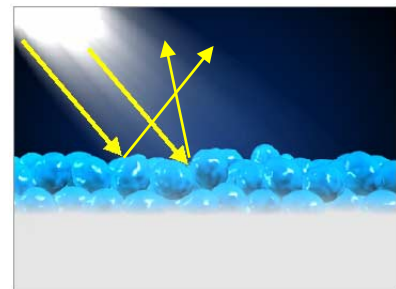
EPSON's MicroCrystal Encapsulation Technology:

- ▶ Even distribution of particles results in higher color gamut and higher gloss for a smooth image appearance



Conventional Pigment Inks:

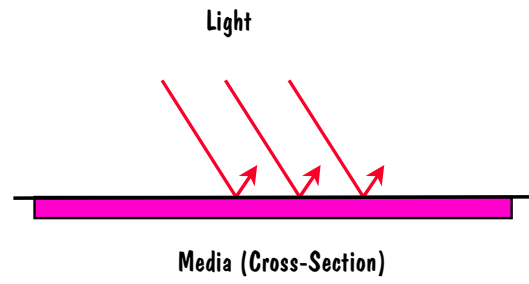
- ▶ Pigments either penetrate into the crevices of the media or lay on the surface (much like oil paint on a canvas)
- ▶ Uneven distribution results in lower color gamut



Dye based ink, on the other hand, is absorbed into the media, and the even reflection of light results in a greater color gamut and gloss as the eye perceives the full spectrum of colors (much like a watercolor painting).

Dye-Based Ink:

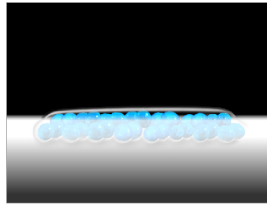
- ▶ Color molecules are absorbed into the media for even reflection



**2. Greater durability:** With EPSON MicroCrystal Encapsulation Technology, the resin pulls the pigment into the crevices of the media. Because the pigments reside in the crevices of the media, prints are more scratch-resistant.

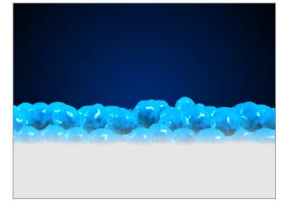
EPSON's MicroCrystal Encapsulation Technology:

- ▶ Pigments are fixed on specialty media by the polymerizing resin and are more durable and scratch-resistant

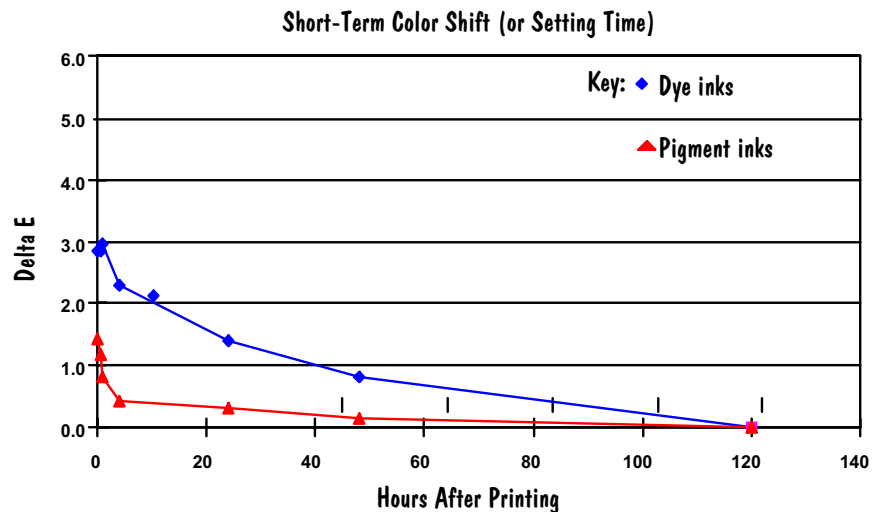


Conventional Pigment Inks:

- ▶ Pigments lay on top of the media and are easily scratched



Stability of Pigment Inks and Dye Inks: Pigment inks provide higher short-term stability because they have much faster setting time than dye-based inks, which results in a lesser color shift.

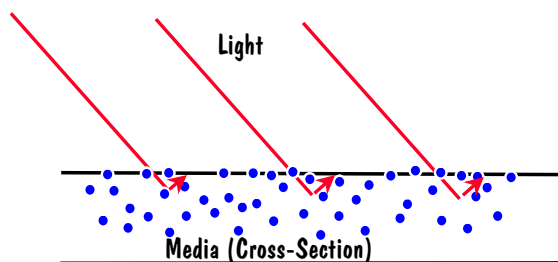


A rating less than 3% delta is only noticeable to the trained eye. A rating less than 2% delta is unnoticeable to the human eye.

**3. Unprecedented gloss for RC (Resin Coated) Photographic Prints:** EPSON RC media is specially designed to provide the highest gloss with the EPSON Archival Inks.

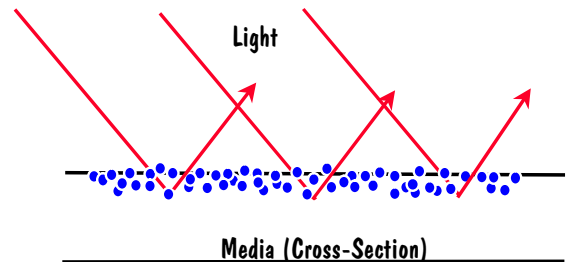
Un-Optimized Media:

- ▶ If third-party fine art papers are used, pigments will penetrate the media, but may go too far into the crevices, resulting in lower gloss



Optimized Media:

- ▶ EPSON RC media allows the pigment particles to penetrate the paper but keeps them close to the surface for the highest gloss



Additionally, third-party fine art papers are not recommended for use because they may damage the printers with excessive dust. EPSON offers a variety of media compatible with the Archival Inks.

**4. Better lightfastness:** EPSON Archival Inks have a higher lightfastness rating than conventional pigment inks.

EPSON's MicroCrystal Encapsulation Technology:

- ▶ An extremely light-resistant material protects the pigment particles and minimizes light damage



Conventional Pigment Inks:

- ▶ Because pigments exist in a solid particle state, they have good lightfastness, however, over time the outer color fades, leaving color only in the interior portion of the particle.



Lightfastness of the EPSON Archival Inks is rated up to 200 years or more before noticeable fading occurs, under normal indoor fluorescent lighting conditions, in a glass frame, when using Genuine EPSON Archival Inks and compatible EPSON matte papers; 140 years or more using compatible EPSON Premium Semigloss Photo Paper or EPSON Premium Luster Photo Paper under same conditions. Results will vary based on lighting or atmospheric conditions, humidity, color intensity, color range, and print media. These tests were performed by Seiko-Epson Corporation. Testing by Wilhelm Imaging Research, Inc. is in progress.

Prints will resist fading even longer when stored in an album or in dark storage.

## Summary

EPSON Archival Ink offers the following benefits:

- ▶ Longest life—lightfastness up to 200 years
- ▶ High degree of stability after printing
- ▶ Widest color gamut of any pigment ink
- ▶ Strongest durability
- ▶ Highest gloss that allows the widest media selection, including matte, watercolor, and RC photo type papers—other pigment inks can only be used with matte papers.