*Print Collection Preservation Guide*

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PIERCE
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editions
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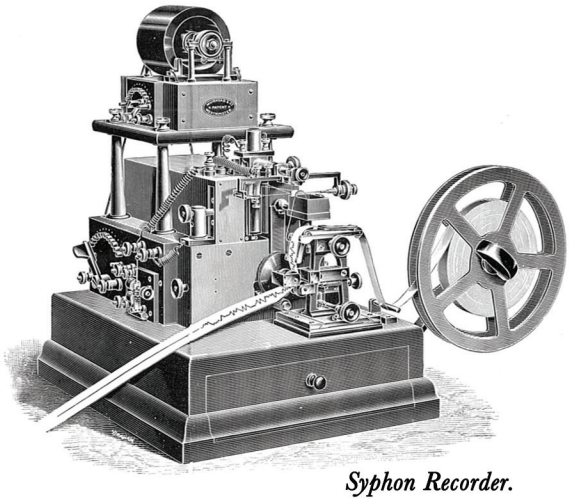
## What is an inkjet print?

Inkjet prints are generated using drops of ink emitted from a nozzle onto a paper surface. Although this method was first developed in 1867 to record telegraph transmissions by physics Lord Kelvin, it was only in 1984 that the first desktop inkjet printer became commercially available. Personal computing along with enhancement in print quality and inclusion of color made this technology one of the major ways in which digital images are now reproduced.



*Syphon Recorder.*

**Inkjet prints are also called pigment prints or giclee prints by some photographers and media artists. And since inkjet paper is not light sensitive technically it is not a photographic method. Therefore some debate that a digital camera file when made into an image using an inkjet printer should be called a print, and not a photograph.**

Image credit: Gray, A. (1908). Lord Kelvin: an account of his scientific life and work. London: J. M. Dent & co..

All inkjet prints are created from colored dot patterns on paper (or other supports). High-end inkjet printers often use pigment-based inks of various tones (such as light greys, light cyan and light magenta) as well as other hues (such as orange, red, green, blue or violet) in addition to the basic cyan, magenta, yellow and black colorants. This gives inkjet printing the capacity to produce an improved range of colors. Ink tends to be readily absorbed in plain-paper prints, resulting in images that are not sharp.

To receive the ink on the surface of the paper without diminishing color and line quality, dedicated papers for inkjet printing were created with a special thin layer of coating - the image receiver layer (IRL). The paper coatings are typically mineral particles in a starch or polymer binder. These coated papers absorb the inks and are still able to achieve sharp photographic images found in traditional resin-coated, fiber-based, and silver-gelatin papers traditionally used in analog photography.

## How to identify a fiber-based inkjet print?

Fiber-based inkjet prints in particular look and feel like "fiber prints" from traditional chemical darkroom. They have a slightly porous surface and a semigloss appearance once printed. Most fiber-based papers are whitened with an inert variant of barium sulfate, which makes this paper chemically stable and gives it a warm white color that baryta papers are known for. The back of a fiber-based inkjet print is usually plain paper with a slightly rough texture that comes from the wood fiber it is made from as opposed to the modern photo papers with plastic coated backing. The whiteness of baryta papers tends to remain the same over long periods of time specially if maintained in cold temperature storage.

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Why we've chosen Epson Exhibition Fiber Paper (EFP) for our editions:

Epson introduced its Exhibition Fiber paper to the market in November of 2007. It had been in development since early 2005. It emulates as closely as possible a traditional air dried F surface gloss photographic paper in an inkjet format. It's smooth surface creates high reflectivity that produces deep blacks (dMax greater than 2.5) which makes it among the blackest paper yet produced and exceeding the tonal range of traditional chemical papers. This type of paper is popular amongst photographer because it is a perfect blend of the traditional look of darkroom papers with the creative control of inkjet printing. If used coupled with UltraChrome HD ink sets from Epson, Wilhelm Imaging Research rates the permanence of color prints up to 200 years; and black and white prints at up to 400 years.

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### Basic storage and handling instructions

- Gloves should be always used. That is why a pair of cotton gloves is included in each package.
But avoid touching the image area of prints even with gloves.

- Hold prints at edge or underneath if possible with a a secondary support such as a mat board to prevent flexing of the print.

- Fiber-based inkjet prints should never be rolled. That is why our prints are always shipped flat and never in a tube.

- Collections should be store in a medium humidity and low temperature environment. 20°C (68°F) / 30% to 50% RH

- Exposure to air should be minimal. Prints should be covered by plastic films or other non-abrasive materials to minimize airflow across the print's surface or framed behind glass.

- Do not stack prints directly on top of each other. Interleaving should be done with very smooth materials such as plastic films.

## Signs of deterioration on a fiber-based inkjet print

The environmental conditions in the storage and display of inkjet prints play a critical role in the deterioration process. Interestingly, light that is quite detrimental to silver-halide photographs, has a much lesser effect of pigment inkjet prints. On the other hand, atmospheric pollution which is not a real factor for silver-halide photographic prints can be a major problem for inkjet prints. Specially porous-coated inkjet prints continuously absorbs pollutants from the air that can react at a later time deteriorating the image and paper support.

Yellowing: Heat is the most common cause for discoloration of papers. Fiber-based inkjet papers can be prone to yellowing and deterioration of the ink receiver coatings. Lower temperatures can retard decay. Exposure to light, pollutants and poor quality storage and framing materials however can dramatically accelerate the damage resulting in significant yellowing, loss of contrast and overall reduction in the quality of the print.

Fading: Both light and pollutant along with heat can generate deterioration on an inkjet print. One common effect is “overall fade” - where the print gets lighter in color and it’s pigments fade at equal rates. The print retains its original set of hues but looks lighter. Fading inkjet prints are hard to detect specially when a non-faded comparison is not available.

Color Shift: Color shift can occur on inkjet prints if an specific pigment fades faster than others. The loss of magenta for example causes the image to shift in color to a more greenish tint. Even slight amounts of color shift will be considered unacceptable to collectors.

Cracking: A common issue on traditional photographic prints exposed to dry environments and bent flexed during handling. Low moisture also can make the surface layers of inkjet prints brittle and exacerbated with any flexing of the print. Same embrittlement effect can be cause if inkjet prints get exposure to light and pollution. In extreme cases portions of the print’s surface can flake off with the slightest flexing of the print.

Abrasion: This is a great concern for inkjet prints since pigments sit on or close to the surface. Even the back of another print, a plastic sleeve or an interleaving paper can act as an abrasive during transport or storage. Examples of abrasion manifestation are: gloss increase in certain areas of a print (polishing); removal of pigment from paper surface (colorant loss); or black ink smeared into lighter areas of the print (smear).

Scratches: Unlike abrasion which is caused by the motion of a broad surface over a large area of the print, scratches are caused by a small pointed area such as the corner of another print or a finger nail. The pigment-based ink resides inside a clear binder such as gelatin or polyvinyl alcohol which protect the pigmentation from deteriorating but rough surfaces can still damage the binder causing scratches or a loss in gloss. Such damage is hard to detect except in low angle light.

## Recovery of Fiber-based pigment inkjet prints from water damage:

When wet, inkjet prints are significantly more sensitive to damage. Prints should be removed from stacks or enclosures to dry individually. This will allow it do dry much faster and avoid unnecessary further damage from bonding to other prints and colorant bleed or transfer. If the offending water was clean no additional rinsing is necessary. But if prints have been exposed to contaminants such as sediment or salt rising should be gentle in clean water. Fiber-based pigment inkjet prints may be very gently blotted to remove excess water, but no wiping or heavy pressure as the pigment, coating or paper fibers may be torn away from the surface. Prints that have been water damaged even after being stabilized and dried are more prone to damage. Access to such prints should be limited and surrogates should be created to minimize handling. Digitization can be extremely useful in this case but must executed judiciously to ensure no further damage to the inkjet print.

## Prioritization for preservation:

To concentrate efforts on the more vulnerable inkjet prints in case of an emergency, enclosure warning labels should clearly identify the different types of inkjet prints. This would save time and valuable resources since the sensitivity of inkjet prints on photo-coated papers varies greatly, depending on the combination of materials used in the making. Fiber-based pigment inkjet prints are considered a moderate risk during a recovery situation. Compared to dye-based inks, pigment inks fare better during water damage. But priority for intervention should be given to inkjet prints, as any other paper with mineral or pigment surface coatings. The paper coating that controls ink absorption and give inkjet papers increased gloss and opacity, as well as the smooth hard finish suitable for printing is its most vulnerable component, often blocking or sticking together when wet requiring immediate attention in a flooding or leak situation.

## Storage for Inkjet Print Collections:

Inkjet Prints can be severely damaged on contact with water. In order to avoid damage by flooding collections should be stored on higher shelves or upper floors. Even though it is only effective for a limited time, storage housing may mitigate damage until prints can be quickly moved to safer conditions. Having prints inside boxes and individually sleeved can help prevent pigments from being transferred from one print to the next.

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*Sources and further reading:*

For more information of inkjet print preservation:
Digital Print Preservation Portal (n.d.). Retrieved from http://www.dp3project.org/

For more information on preservation of digitally printed images:
RIT. Image Permanence Institute (2018) IPI's Guide to: Preservation of Digitally-Printed Images
http://www.dp3project.org/webfm_send/886

For more information on the
Venosa, Burge and Nishimura Effect of Light on Modern Digital Prints: Photographs and Documents:
http://www.dp3project.org/webfm_send/620

For more information on Epson Exhibition Paper:
Reichmann, M., Reichmann, J., Briot, A., & Woodworth, A. (2016, September 30).
Epson Exhibition Fiber Paper. Retrieved from
https://luminous-landscape.com/epson-exhibition-fiber-paper/

For more information on longevity of prints:
(2016, October). Inkjet Prints: one for the ages? Photo district News. Colume36. Issue 5. pg 73.
Retrieved from http://www.wilhelm-research.com/Articles/one_for_the_ages/one_for_the_ages.html

For more information on how to identifying inkjet prints:
RIT. Image Permanence Institute (2019). Graphic Atlas. Identification.
http://www.graphicsatlas.org/identification/?process_id=43#objectview

(n.d.). The inkjet paper surface guide. Retrieved from
https://www.redrivercatalog.com/browse/The-Inkjet-Paper-Surface-Guide.html

For more information on longevity of inkjet prints:
Fischer, Monique C. 2007. Creating long-lasting inkjet prints. Topics in Photographic Preservation
12: 77-85. http://resources.conservation-us.org/pmgtopics/2007-volume-twelve/12_15_Fischer.pdf

Northeast Document Conservation Center. Creating Long-Lasting Inkjet Prints. (n.d.). Retrieved from
https://www.nedcc.org/free-resources/preservation-leaflets/5.-photographs/
5.4-creating-long-lasting-inkjet-prints

The American Institute for Conservation of Historic & Artistic. Topics in Photographic Preservation.
Volume Thirteen (2009)
http://resources.conservation-us.org/pmgtopics/2009-volume-thirteen/13_28_Gadomski.html

For more information on the history of inkjet printing:
Johnson, H. (2005). Mastering digital printing. Boston, MA: Thomson Course Technology PTR.