

## PRESERVATION LEAFLET

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### PHOTOGRAPHS

## 5.3 Care of Photographs

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#### INTRODUCTION

*Behold thy portrait! — day by day,  
I've seen its features die;  
First the moustachios go away,  
Then off the whiskers fly.*

*That nose I loved to gaze upon,  
That bold and manly brow,  
Are vanish'd, fled, completely gone—  
Alas! Where are they now?*

- Author Unknown. *Punch*, Vol. 12, 1847, p. 143.

This anonymous poet describes the disappointment of watching an image fade, less than ten years after the invention of photography. But these lines could have been written about photographs from any era—including the digital photography of recent years. Concerns about permanence and stability have always been part of the history of photography. Understanding the environmental and handling stipulations for photographs will slow their deterioration and enhance their stability and longevity.

#### TEMPERATURE AND RELATIVE HUMIDITY

Managing temperature and relative humidity (RH) is critical for the preservation of photograph collections. The unique deterioration characteristics of various photo processes dictate how long they can survive.

- Heat accelerates deterioration: the rate of chemical deterioration of most photographic materials doubles (approximately) with each 10°F increase in temperature.
- High relative humidity provides the moisture necessary for harmful chemical reactions, leading to much of the fading, discoloration, and silver mirroring visible in photograph collections.
- The combination of high RH and high temperature encourages mold growth and insect activity. Pest

management and mold remediation start with maintaining the appropriate environment.

- Extremely low relative humidity may lead to desiccation and embrittlement of certain photographic materials. This causes physical degradation such as curling of photographs and flaking of emulsions. Extremes are not the only danger; fluctuations in temperature and RH can cause structural damage to the photographic supports (paper or glass) as well as to the emulsion layer.

To best preserve photographs, the temperature should be maintained at a set point at least 70°F or below. As a rule, cooler and dryer settings are always better for collection materials. An often-recommended compromise between storage needs and staff comfort is about 65–70°F, while areas used exclusively for storage should be kept at a lower setting. Relative humidity for a mixed collection of photographs should be maintained between 30% and 50%, with fluctuations less than 10% a day.

Storing photographs in lower relative humidity can significantly improve the long-term stability of photographic processes. Cold storage is recommended for particularly vulnerable materials such as color photographs, nitrate film, or safety film from the early 20<sup>th</sup> century (acetate cellulose).

When materials are taken out of cold storage, they should be placed in a closed container, such as a Styrofoam picnic cooler and be allowed to acclimate overnight to room conditions before use. This avoids potential condensation and water on the object as it warms up. This is a good rule for any collection materials that are being transitioned from cold storage to warmer environments.

Temperature and humidity can be managed using various forms of climate control equipment. For more information, please see NEDCC preservation leaflet 2.1 *Temperature, Relative Humidity, Light, and Air Quality: Basic Guidelines for Preservation* and 2.2 *Monitoring Temperature and Relative Humidity*. There are simple measures that can be taken to moderate environmental conditions without sophisticated climate control systems.

- Avoid storing collections in attics (too hot) or basements (too damp). Often an interior room or closet offers the best environment.
- Collections should be kept off the floor, where they are more likely to be damaged by insects or water.
- Do not hang or store photographs on exterior walls, in bathrooms, or over heat sources such as fireplaces, radiators, or heating vents.
- Keep heat low in the winter, and encourage staff and visitors to wear warm clothing.
- Seal windows and doors to minimize exchange of outside air.
- Store photographs in folders, boxes, and cabinets. This moderates the effects of environmental fluctuations on the objects housed inside.

In addition to these measures, the use of air conditioners, dehumidifiers, and humidifiers can also be helpful. However, always make sure that adding equipment is improving conditions—not causing them to deteriorate further.

### AIR POLLUTION AND DIRT

Air pollutants contribute heavily to the deterioration of library and archival materials. Air purity is especially a concern in an urban environment. Pollutants can cause photographs to fade, while particulate matter can abrade the surface of the image.

Controlling air quality is difficult. Ideally, air entering a storage or exhibition area should be filtered and purified. Dust should be kept to a minimum, maintained with a regular cleaning schedule. Gaseous pollution can be removed by chemical filters or wet scrubbers as part of your HVAC equipment, and particulates can be mechanically filtered. Good air circulation is always necessary. Make sure air intake vents are not located near loading docks, parking lots, or other areas where vehicles emit exhaust. Keep exterior windows closed when possible.

Less obvious, perhaps, is the need to minimize interior sources of harmful gases. Photocopying machines, construction materials, paint fumes, cardboard, carpets, and janitorial supplies can all have an impact on collections. Work with facilities staff to identify and remove these unexpected sources of interior pollution, particularly outdated or obsolete equipment.

Cabinets and enclosures keep dirt and oils off collection objects and may help decrease the effects of pollutants. For example, enclosures with molecular traps (zeolites) or activated charcoal packets are item-level tools to combat the effects of pollutants. [MicroChamber](#) paper can also be used for making extra-protective enclosures. Metal cabinets, such as powder-coated steel cabinets, are preferred because wood often generates harmful peroxides. Inside the cabinets, photographs should always be stored in archival-quality sleeves.

For more information on this topic, see NEDCC preservation leaflet *4.1 Storage Methods and Handling Practices*.

### LIGHT LEVELS

Although light is one of the key ingredients in photographic processes, ongoing exposure to light will cause cumulative and irreversible harm to photographs. Light can cause permanent embrittlement, yellowing, and fading in prints and negatives. Direct sunlight is more damaging than indoor lighting sources like fluorescent tubes or incandescent (tungsten) lighting – however, all three emit dangerous levels of ultraviolet light. Since all forms of light are damaging, moderating light use is an important consideration of environmental management.

When you choose to display a photograph, keep in mind:

- Occasional or rotating display (rather than permanent display) is better for the preservation of photographs.
- Use copies or facsimiles whenever possible.
- Keep light levels as low as possible.
- Hang photographs where they will not be exposed to direct or indirect sunlight, or to unfiltered fluorescent lights. UV-absorbing sleeves can be used to filter fluorescent tubes (but should be periodically replaced) and UV-absorbing sheets can be placed over windows or in frames. Low UV-emitting bulbs are also available.

Certain types of photographs are more susceptible to light damage, depending on the printing process, type of carrier, and age of the print. Most color photographs fade rather quickly, while contemporary fiber-base black and white prints are essentially stable to light. The exhibition of nineteenth century photographs should be limited and carefully monitored. For more information, see [“Guidelines for Exhibition Light Levels for Photographs”](#)

### HANDLING

Simple precautions when handling photographs can reduce damage and wear to your collections. Although they can appear static, photographic emulsions are very sensitive. Oils and dirt from fingerprints can cause chemical damage like bleaching or silver mirroring, so it’s important to have clean, dry hands while working with photographic materials. Alternatively, clean gloves can also prevent dirt or stains. Proper enclosures (sleeves, album pages, etc.) provide protection from dirt while supporting prints and negatives.

Careless handling can cause physical damage, including abrasions or tears, so always support photographs with folders or mounts. Simply minimizing handling is an important strategy toward photographic preservation. Whenever possible, provide users with photocopies or photographic duplication.

When labeling a collection, use the reverse of the photograph, along the edge. An ordinary lead pencil is best for handwritten labels. On coated surfaces, like RC paper, use an archival-safe tool such as a Berol Prismacolor pencil in “non-photo blue 919”, a Berol china marker in “brite blue 167T”, or a PITT Faber-Castell Graphite Pure 2900B pencil.

## STORAGE SYSTEMS

Proper storage provides physical support and protection for fragile objects, acting as a barrier between a photograph and the potentially unstable environment. Appropriate storage materials prevent environmental issues and other factors of deterioration from affecting collection materials.

Storage enclosures must be unreactive to photographic chemicals, meaning that all materials must be stable and approved for archival use. In the past, a great deal of damage was done through the use of reactive storage materials: acidic paper sleeves made of groundwood pulp, dry rubber bands, rusting paper clips, pressure-sensitive tapes that are irreversible, and staining adhesives such as rubber cement or animal glue. Prints and negatives are extra sensitive to the stains and surface damage caused by these inappropriate materials.

### **Storage Enclosures**

When purchasing enclosures, there are two standards to follow which guarantee the stability of the material. The International Organization for Standardization (ISO) specifies the physical and chemical requirements for enclosure formats, papers, plastics, adhesives, and printing inks, as detailed in ISO 18902. Consumers should contact their suppliers to see if their products have met these requirements.

The Photograph Activity Test (PAT) involves a test to detect harmful chemicals in enclosure, and a test to detect staining reactions between enclosures and the gelatin layer of a photograph. Check for the PAT logo, which is established in ISO 18916. See <http://www.iso.org/iso/home.htm> for more details on these and other international standards.

Either paper or plastic enclosures may be used to house photographic materials. There are many types of both available from archival supply vendors, but keep in mind the different characteristics.

- Paper enclosures are opaque, which protect the item from light exposure, but may increase handling since the item must be removed to be seen.
- Archival paper is porous and stable, protecting the items from changes in environmental levels, and preventing any accumulation of moisture or gases.
- Choosing between buffered and unbuffered paper is less important than previously thought; both types of paper can pass the Photographic Activity Test (PAT) and selection depends on your usage.
- Avoid Kraft paper or glassine paper, which have high acidic levels.
- Plastic enclosures should be made of uncoated polyester, polypropylene, or polyethylene – other plastics may have components or coatings that off-gas and weaken as they deteriorate, damaging photographs and other archival materials.
- Always avoid polyvinylchloride (PVC), as it is very unstable.

- Plastic should not be used to store nitrate or older safety film negatives.

Avoid using adhesives that may cause chemical damage, such as rubber cement or pressure-sensitive tape. The self-stick pages of photo albums are often highly acidic and can permanently bond themselves to photographs – use corner mounts and acid-free paper instead. Also, avoid damaging fasteners such as paper clips, staples, or rubber bands. Because adhesives can be problematic, photographs that are stored in paper envelopes should be positioned with their emulsion facing away from the seam. Additionally, the seams on paper envelopes should be on the sides of the enclosure, not through the center.

Each photographic item should have its own enclosure, which isolates each photograph from any potentially damaging components in other photographs. Prints and negatives should not be in contact with each other in the same enclosure. Depending on their age, format, and material, negatives may need to be separated from their prints and placed in cold storage. Additionally, negatives that are noticeably degrading (bubbling, warping, etc.) must be stored separately from other materials. See [Leaflet 5.1 A Short Guide to Film Base Photographic Materials: Identification, Care, and Duplication](#) for more information on film based materials.

### **Storage Considerations**

Once materials have been properly housed in mats, folders, sleeves, or envelopes, they should be stored in cabinets or boxes of archival quality. Small boxes can be stacked two-high if necessary, but be mindful of the weight on each box and shelf.

- Horizontal storage is preferable for many photographic prints and oversize photographs. It provides overall support and protection to the images and prevents mechanical damage such as bending. Archival boxes with well-fitting lids can be stacked together.
- Vertical storage is often preferred for negative collections, but it can also be very effective for certain photographic print sizes. Glass plate negatives require vertical storage in order to prevent breakage. If broken or degrading, glass plate negatives may be stored horizontally. When using vertical storage, protect prints and negatives by placing them in acid-free folders. These folders should then be stored in hanging files or document storage boxes. Boxes should be housed on metal shelves or in metal cabinets.

Within each box, photographs and prints should be organized in similar sizes, making sure that everything is the appropriate height and width for that box. Boxes and shelves should be organized so that they are comfortably full, without being overcrowded or having empty spaces. Fillers can be placed in folders and boxes to minimize movement.

## CONCLUSION

The different chemical processes, techniques and materials created during the history of photography have produced a

wide range of specific storage and exhibition needs. As a result, the care of photographic collections require stricter guidelines than other archival materials. Understanding and controlling the

temperature, relative humidity, air pollution, light levels with proper enclosures can minimize deterioration and ensure longevity of one's photograph collections for future generations.

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## RESOURCES

- Lavédrine, Bertrand, Jean-Paul Gandolfo, John McElhone, and Sibylle Monod. *Photographs of the Past: Process and Preservation*. Los Angeles, CA: The Getty Conservation Institute, 2009.
- Lavédrine, Bertrand. *A Guide to the Preventive Conservation of Photograph Collections*. Los Angeles, CA: Getty Publications, 2003.
- [Image Permanence Institute Storage Guides](#)
- [Library of Congress](#)
- National Archives – [How Do I Store Glass Plate Negatives?](#)
- [Storage Technologies for Art, Science, and History](#)

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