NORTHEAST DOCUMENT CONSERVATION CENTER

PHOTOGRAPHS

5.6 Storage Enclosures for Photographic Materials

INTRODUCTION

Paper or plastic? Folders or sleeves? Storage enclosures for photographic materials come in a variety of options, each with their own advantages, disadvantages, and precautions. When purchasing supplies for photograph collections, it's important to consider the type of print or negative, and its particular needs. Understanding the options available will help select the most appropriate housing for the item.

Properly chosen paper enclosures and boards can mitigate the destructive effects of pollutants and light on materials during exhibit. Enclosures are particularly important if the collection contains color photographs, nitrate film, or early safety film. For information on the nature of photographic film, see NEDCC Preservation Leaflet 5.1 *A Short Guide to Film Base Photographic Materials: Identification, Care, and Duplication.*

Whichever type of enclosure is used, photographic prints and negatives should never be handled with dirty hands. Skin oils and perspiration can damage emulsions, and cotton gloves can leave behind fibers, so nitrile gloves should be worn. In the absence of suitable gloves, wash and dry your hands thoroughly before handling photographic materials.

STANDARDS

Regardless of material or process, all enclosures used to house photographs should meet the specifications provided by the International Organization for Standardization (ISO). ISO 18902:2013 and ISO 18916:2007 provide specifications on enclosure formats, papers, plastics, adhesives, and printing inks, and require that storage materials pass the Photographic Activity Test (PAT). For more information, see http://www.iso.org/iso/home.htm.

Labels such as acid-free, lignin-free, or buffered do not guarantee that a material is safe to use with photographs. Even these chemically inert papers may be harmful to the photographic image; the only way to be certain of the stability of the paper is to purchase materials that have passed the Photographic Activity Test (PAT).

The PAT consists of two components: a test to detect image fading resulting from harmful chemicals in enclosures, and a test to detect staining reactions between enclosures and gelatin. As a general rule, suppliers will note in their catalogue if a product has passed the PAT. If an item does not state that it has passed, it does not necessarily mean that it has failed; it may simply not have been tested. If there is no information on PAT results, purchase materials from suppliers familiar with the special needs of photographs. Choose enclosures that are acid free, lignin-free or 100% rag, and not highly colored – dyes and colors can contain harmful additives.

PAPER MATERIALS

The quality of pulp used in the manufacture of paper and board for storage materials is important to the preservation of photographs. Many modern papers are made from groundwood, which contains lignin, and these papers are easily degraded by heat and light. As they degrade, these acidic papers produce harmful acids that can migrate to other materials.. Paper and board may also retain residual chemicals from the pulping process; sulfur and hydrogen peroxide can remain in the paper and be very damaging to all photographs.

With these concerns in mind, any paper product used for storage of photographs and negatives should be lignin-free and acid-free. Lignin-free papers are produced from cotton or linen, which contain no lignin, or from wood fibers that have had the lignin chemically removed. Enclosures constructed of paper in the neutral pH range (6.5–7.5) have no alkaline buffer. Buffered paper enclosures (pH 7.5–9.5) contain an alkaline material, such as calcium carbonate, that neutralizes acids as they form. Unbuffered paper enclosures are recommended for storage of color images, cyanotypes, and albumen prints due to their sensitivity to alkalinity.

When used on its own, the word "archival" implies long-term storage and a chemically stable material. If a catalogue or product states that something is archival without any other information, it is no guarantee of quality. It is safest to ask where the product comes from and how it is made.

An alternative to buffered paper and board are products which contain zeolites – such as MicroChamber or Artcare materials, both manufactured by Conservation Resources International. These trap acids and gaseous pollutants, segregating them from the objects in the storage environment. Research by the Library of Congress and the Getty Conservation Institute (GCI) has shown that papers and mat board with zeolites absorb more pollutants than their buffered counterparts. Unfortunately, there is no way to know when the papers are "full", but in standard storage conditions, research conducted by Conservation Resources has shown a lifespan of up to 100 years. See the following link for more research: http://nbframing.com/data/research-on-zeolites-artcare/.

Glassine enclosures (see Figure 1) are **not** recommended for the storage of photographs. Although acid-free and buffered, glassine is made with short groundwood pulp fibers and can contain additives which become acidic over time.

Figure 1: Photograph stored in glassine enclosure

Types of paper enclosures

Seamed Paper Envelopes are enclosures with one open end, often with a flap that opens over the top (see Figure 2). The seams in paper envelopes should be located at the sides or—if unavoidable—across the bottom. Any adhesives used in construction should be non-acidic and unreactive with silver.

Most envelopes come with a thumb cut, but those without are preferred. Thumb-cuts allow air to reach the photograph, and encourage users to grasp the photograph and pull it from the sleeve. When using seamed paper envelopes, use a paper sling inside to aid in removing the photograph and mitigate the effects of the seam.

Figure 2: Cabinet card stored in seamed paper envelope

Seamless Paper Envelopes are seamless enclosures without any adhesive. The envelope is formed with three or four flaps that fold over to produce a pocket, and is sometimes called a four-flap enclosure. The fourth flap, if present, closes the envelope completely, protecting the object within from dust and dirt. The construction of this envelope encourages the user to place the object on a flat surface to open it. These characteristics make seamless paper envelopes ideal for thick, fragile items such as glass plate negatives (see Figure 3)

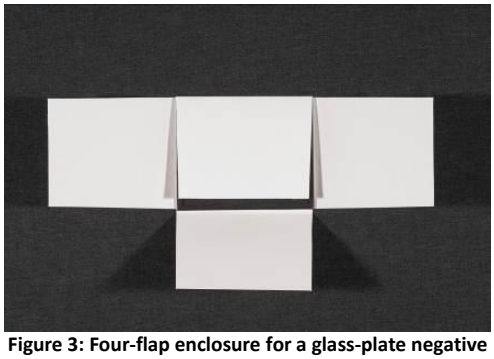

Figure 3: Four-flap enclosure for a glass-plate negative

Paper Folders are made by folding a sheet of archival paper in half. It is closed on one side only and must therefore be kept in a properly fitted box to hold the item effectively. If a paper folder is used for vertical storage in files, the photograph stored inside must be well supported to prevent sagging or curling. Folders are readily available in a variety of sizes, and are simple to make for large or mounted items.

Advantages of Paper Enclosures

- Enclosures are opaque, protecting the object from light
- Paper is porous, preventing the accumulation of moisture and detrimental gases
- Plastic enclosures are generally more expensive than paper
- Paper is an easy surface for writing on or labeling

Disadvantages of Paper Enclosures

- Paper envelopes make viewing difficult, requiring the removal of the object from the enclosure. This increases damage from handling, abrasion, and fingerprinting, especially in heavily used collections. If using paper, four-flap wrappers are preferred.
- In case of emergency, paper will not protect against water or moisture damage.

PLASTIC MATERIALS

Plastic enclosures of archival quality may be made of polyester, polypropylene, or polyethylene. They should not be coated or contain plasticizers or other additives.

Polyester is the most inert, dimensionally stable, and rigid of the three. However, polyester can generate static electricity, which attracts dust. Polyester enclosures should be free of any coatings or plasticizers. This is generally the most expensive type of plastic enclosure.

Polypropylene is available as rigid untreated sleeves, or soft surface-treated sheets used for binder storage pages and other uses (see Figure 7). Manufacturer specifications on the surface coatings of soft polypropylene products are proprietary information and not readily available, therefore this material cannot be properly evaluated or recommended.

Polyethylene is the most easily marred and least rigid of these plastics. High-density polyethylene (HDPE) is a translucent, milky plastic that is naturally slippery (see Figure 4). Low-density polyethylene (LDPE), the clear polyethylene used in some ring-binder storage pages, has incorporated anti-block and anti-slip agents, which could be damaging for photographs.

Figure 4: Cabinet card stored in high-density polyethylene enclosure

Polyvinylchloride (PVC) enclosures are unacceptable for archival photographic storage. This plastic, often referred to as vinyl, is not chemically stable and will cause deterioration of a photograph over time.

Types of Plastic Enclosures

Plastic Envelopes normally have heat-sealed seams, which eliminate any potential problem with adhesives. Both polyethylene and polyester envelopes are marketed by conservation product suppliers.

Plastic Folders may be successfully used in conjunction with paper envelopes, the polyester folder protecting the image from handling whenever it is removed from the paper envelope.

L-Velopes are a combination envelope-folder, being an envelope sealed on two adjacent sides. This allows for easy insertion and removal of objects, and provides more support than a folder. This design is particularly useful for smaller-format images (see Figure 5).

Figure 5: Carte-de-visite housed in polyester L-sleeve

Plastic Sleeves are open at two opposite sides and are made from polyester or polypropylene. Usually, these sleeves are a one-piece construction with a self-locking fold on one edge (also called top-flap or fold-lock sleeves). This fold allows easy insertion and removal of the photograph with no abrasion to the image. However, when these sleeves are stored in groups, the folds can lock onto adjacent sleeves, making retrieval of the photographs difficult.

Figure 6: Cabinet card stored in polyester fold-lock sleeve

Polyester Encapsulation encloses a photograph between two sheets of polyester, sealed on all four sides with a heat welder or an ultrasonic welder. For examples, see http://conservationresources.com/Main/section_17/section17_03.htm). Ultrasonic welders were developed and are still produced by William Minter, in Woodbury, PA.

Encapsulation provides physical support and protection from the environment. It is useful for storing fragile prints, especially those that are torn. However, encapsulation is not recommended for certain items which require more exposure to air, such as contemporary color photographs. Photographs adhered to chemically or physically unstable supports, like prints attached to acidic pages, are also not appropriate for encapsulation.

Figure 7: Polypropylene three-ring binder storage page for 3 ½ " x 5" photographs.

Ring-Binder Storage Pages are made to fit three-ring binders with slipcases (see Figure 7). They are available in a wide variety of formats, sizes, and materials, including polyester, polypropylene, and polyethylene. They are a functional alternative for small collections of uniform size that require frequent browsing.

Polyester Sheet/Mat board Folders are made of a sheet of polyester and a sheet of matboard of the same size, attached together along one long edge with double-sided tape. The matboard provides necessary support and the polyester allows the image to be easily viewed. These folders should be stored flat. They are particularly useful for storage of oversized photographs or photographs on rigid mounts. In time, these folders will probably need to be replaced or the double-sided tape will break down, releasing the polyester from the folder and possibly sticking to the object.

Polyester Sheet within a Paper Folder is a combination of paper and plastic which protects the image while allowing for easy access. This enclosure consists of a paper folder with a polyester sheet attached along an inner edge, opposite the centerfold. The attachment is made with double-sided tape. The polyester holds the object in place and protects it from dirt and handling, but allows for easy viewing and removal. The paper folder provides support to the image and protects it from light. These folders are especially useful for small, fragile prints. Over time the double-sided tape may release, or the adhesive can ooze out from under the carrier, necessitating folder replacement.

Advantages of Plastic

- Plastic allows the image to be viewed without being removed from the enclosure. This greatly reduces the chance of abrading, scratching, or fingerprinting the photograph, especially in heavily used collections.
- Moisture and sulphides in the environment react with most photographs to hasten their deterioration. Plastic enclosures protect the object from the atmosphere.

Disadvantages of Plastic

- Plastic enclosures can abrade and scratch photographs during insertion and removal. Matte or frosted surfaces are not recommended, as they are abrasive to emulsions. Low-density polyethylene also can cause problems with abrasion. Abrasion can be avoided by minimizing the removal of photographs from enclosures, using properly designed enclosures (such as self-locking sleeves), or using plastics that are naturally slippery (high-density polyethylene).
- Plastic enclosures can trap moisture and cause ferrotyping (sticking with resulting shiny areas) of some images. This is particularly problematic in storage environments with high relative humidity or in the event of a disaster involving water. Surface-treated polypropylene and low-density polyethylene are among the plastics more prone to ferrotyping.
- Plastic enclosures can be difficult to write on or label.
- Plastic enclosures can be flimsy and may require additional support, such as chemically stable Bristol board.
- Plastic enclosures with low melting points (i.e. polyethylene) can melt during extremely high heat, adhering themselves irreversibly to the materials stored inside them.

CONCLUSION

Photographic materials require a range of preservation considerations, depending on the type of process, age, and condition. Each of the enclosures available has its own advantages and disadvantages, which require careful consideration when purchasing. Sometimes, combining more than one format may be the best solution – putting plastic sleeves into paper envelopes, and so on.

The final choice of enclosure will depend upon careful assessment of the particular needs of a collection and available funds, taking into consideration the materials to be preserved, best practices, and institutional priorities. With proper storage, photographic materials can be preserved for future generations.

GLOSSARY

Acid Free: Acid-free or acid-neutral materials have a pH of 6.5 to 7.5 at the time of manufacture and will absorb a limited amount of acid before they themselves become acidic and begin to decay.

Archival: The word “archival” implies long-term storage and a chemically stable material. If a catalog or product states that something is archival without any other information, ask why it is described that way.

Buffered: Buffered or alkaline-buffered enclosures contain an alkaline substance (the buffer) to raise the pH of the paper so it can absorb and/or neutralize a certain amount of acid. The pH of buffered papers is 8.5 or higher.

Lignin-Free: Lignin is a natural component of wood that darkens when exposed to light and is a cause of brittle, acidic paper. Lignin-free paper is produced from cotton or linen, or other materials from which the lignin has been removed.

Molecular Trap or Sieve: A material that combines an alkaline buffer with either activated carbon or zeolites. These storage materials provide protection against environmental pollutants and by-products of deterioration not neutralized by alkaline buffers alone. Most commonly found products are under the MicroChamber name.

Photographic Activity Test (PAT): The PAT is an international standard test (ISO 18916:2007) for evaluating photo storage and display products and was developed by the Image Permanence Institute (IPI). Enclosures used for photographic materials must pass the PAT (this should be noted in the supplier catalog) and those that pass would be appropriate for other types of collection materials as well.

pH: The term pH is used to express acidity or alkalinity. It does not apply to plastics. The pH scale is logarithmic and runs from zero to 14, with 7 being neutral, below 7 being acidic, and above 7 being alkaline. For storage enclosures, a pH of 6.5 to 7.5 is considered neutral.

RESOURCES

Library of Congress Preservation Division
http://www.loc.gov/preservation/scientists/projects/NB%20Zeolite%20Report.pdf

International Standards Organization
http://www.iso.org/iso/home/store/catalogue_tc/catalogue_tc_browse.htm?commid=48420

ACKNOWLEDGEMENTS

This leaflet was produced with the assistance of Monique Fischer, Senior Photograph Conservator, NEDCC, based on earlier work by Gary Albright, conservator in private practice.