SELECTING MATERIALS FOR STORAGE AND DISPLAY

All collection users such as Collection Managers, Curators, Registrars, Archivists and Librarians often have to face with making difficult decisions regarding appropriate storage and display materials for the preservation of the historical and artistic materials under their care. It is essential that Collections Staff choose materials that properly house and support artworks without causing any damage or deterioration. However, navigating a museum or archival supply catalog can be difficult. To further complicate decision making, many materials marked "archival" or "acid-free" available through catalogs or in office supply and craft stores may not necessarily be appropriate for collections long-term preservation.

The following tables show what materials are acceptable for display and storage of collection objects. Remember that these materials can equally be found in museum objects and the acceptable material lists can act as a guide for the display and storage of these items too. Also note that many of these materials may be marketed under different product or trade names. When choosing products, if the material-type is unclear or if you have questions about its suitability for use with your collections, contact the manufacturer and/or a conservator.

PLASTICS

Not all plastics are suitable for use with collections. However, stable plastic materials that do not off-gas can be an ideal material for safely housing collections items, easing handling, and providing support. Bags, containers, boxes, and sheeting made of appropriate types of plastics all have useful applications in the museums, galleries, libraries, and archives.

Material Type	Material details
Polyethylene (polythene)	Used to make storage bags, enclosures, foams and sheets or as a spun bonded fiber product. Is chemically inert and very stable. Sometimes marketed under the brand names of Volara®, Ethafoam®, Trirod®, Colara®, Correx® or Tyvek®. Be careful of moisture condensing on polythene sheets and use buffering materials such as acid-free tissue between the object and the sheeting. Polyethylene is also available to

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	be cut into strips and used as straps to secure objects and books to mounts.
Polyester	Available in sheets, bags, or enclosures (sleeves). Sometimes marketed under the brand names Melinex®, Secol® or Mylar®. Sheets are sold under the brand name Remay®. They are very useful to store paper objects or photos in; being transparent, they are also useful for handling flat objects. Polyester can be found in straps to secure artworks to mounts.
Polypropylene (PP)	Used to make boxes, bags, and enclosures. Corrugated polypropylene boards are manufactured under the brand name Coroplast Archival®.
Polymethyl Methacrylate (PMMA)	Mostly available in sheets under the trade name of Perspex®, Plexiglas®, or Lucite®; it can be used for glazing. They are scratch-resistant and low static, as well as UV fileting.

Avoid using PVC (polyvinyl chloride) plastic because it deteriorates giving off hydrochloric acid. The plasticizers used in PVC can affect photographic materials such as slides, prints and negatives as well as rubber materials and modern plastics. Also best to avoid the use of cellulose nitrate, cellulose acetate (diacetate and triacetate) and polyurethanes.

FABRICS, THREADS AND PADDINGS

When selecting fabrics or padding materials, it is best to opt for undyed and sizing-free materials. Fabrics, threads and padding materials can be used in creating custom storage solutions for textiles and to support objects within boxes. Acid-free tissue can always be used in contact with materials for any of these solutions.

Material Type	Material details
Unsized, unbleached and undyed cotton	Can be purchased at any fabric supply store, archival catalogs and can be used for storage enclosures, padding, and in exhibition cases. Fabrics should be washed with a phosphate-free detergent before

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	coming in contact with collections. Cotton can also be found as a non-medical grade more elastic material called Stockinet®, it is good for stuffing to create padding within boxes or for covering exhibit mounts. And also available as unbleached calico sheets used for covering dust. Cotton can also be found as a twill tape, sold in different lengths and widths as well as undyed cotton string for securing objects.
Linen and jute	Can be found in fabric supply store and can be used for the same purposes as cotton. They contain more lignin and are more abrasive fibers, so their use is best if not in direct contact with the artwork.
Un-fused polyester wadding	Available in fabric and craft supply stores. Useful as a stuffing material when creating padding and cushioned supports for collections. Ensure it is covered with washed, unbleached cotton calico to prevent fibers catching on the surface of objects and small objects being lost within it.
Flexible extruded polyethylene or polystyrene foam	Available at craft supply stores and through archival catalogs. Can be used to make supports within boxes and to support collections with round bases (baskets, pots) on shelves. Mostly available under the name of Plastazote® and Ethafoam®, are inert and non-abrasive. Note that polystyrene can go yellow as it ages.

Avoid using wool and felt as they give off sulphur compounds that can tarnish metals, cause fading in feathers and ethnographic materials, as well as attracts insects. Do not use nylon threads or monofilament, also known as fishing line because at aging they fail and snap easily. Fishing line, if used in direct contact with objects other than hard metals and glass, should be used with padding placed between the object and the monofilament or it could cause object damage.

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ADHESIVES

Adhesives, even those marketed as "archival," should never be placed in direct contact with collections. Some tapes and glues can be used to make enclosures, other to seal display cases.

Material Type	Material details
Sellotape and double-sided tape (3M double stick tape)	Sold in various widths for multiple applications. Can be used to make boxes and enclosures.
Hot melt glues (ethylene/vinyl acetate copolymer types), HMG Cellulose Nitrate adhesive, UHU Clear	Useful for making boxes and acid-free cardboard enclosures.
HMG Paraloid B72 Acrylic adhesive, Evode Epoxy Resin	Can be used as adhesive for displaying materials.
Polytetrafluoroethane (PTFE) tape	Useful for display of framed materials. It can be stretched around the edge of glass before it is inserted into place. The tape relaxes and fills the gap between glass and frame so holding it in place.

Never use Polyvinyl Acetate emulsion (PVA) and Urea Formaldehyde adhesives because they give off acetic acid that can attack various materials, especially lead. Avoid using rubber adhesives as they give off sulphur and degrade by light exposure becoming brittle. Rubber sealants should also be avoided since they release acetic acid and harmful vapors.

PAPERS AND BOARDS

Paper and paperboards are used to make boxes, folders, support boards, and are also used as interleaving materials. These materials are marketed under several brand names. For museums, galleries, libraries, and archives collection preservation, materials that are marketed as both acid-free and lignin-free should be used. They can all be purchased from archival supplier. Foamex® boards can be used for display panels and acid-free paper framing tape is also available.
Note that any papers or enclosures being used to store photographic materials should pass the Photographic Activity Test (PAT) that is a predictive test of reaction between an enclosure material and photographic material.

Material type	Material details
Acid-free paper, tissue paper, cards	Papers marked as acid-free are pH neutral or slightly alkaline at the time of

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	manufacture (pH 6.0 – 9.0). Many papers marketed as acid-free are made from wood pulp and will become acidic over time and deteriorate when ageing, so it's important to check on them and replace when needed.
Lignin-free paper, cards	Lignin is a material found in wood pulp and is one factor that causes yellowing and brittleness in paper over time. Lignin can be removed in the paper-making process, making the paper more suitable for collections storage applications. This final product can be named as cotton-based papers.
Buffered paper	Buffered papers are appropriate for most storage applications but should not be put into direct contact with blueprints, cyanotypes, silver and other metals, textiles, and animal-derived materials (silk, horn, bone etc.). Buffered papers include an additive, usually calcium carbonate 3%, to make the paper slightly alkaline (pH 7.5-9.5). Buffering the paper assists in neutralizing acids that may form.
Unbuffered paper	Unbuffered papers are pH neutral and do not contain any buffering agent. These papers are less effective at absorbing acids produced by the environment or objects. Appropriate for use in instances where more alkaline papers might cause collections damage.
Zeolites paper	Zeolites are molecular sieves that are imbedded into paper or paperboard. Zeolites trap gaseous pollutants either present in the environment or those produced by the deterioration of the artifact. Testing has shown that paper artifacts and photographic prints enclosed in papers containing zeolites are provided additional protection. Sometimes sold under the brand

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	name Micro-Chamber®, these products are buffered.
Zero Grade MDF, Medite (MDF without binder), Sundela K Quality (not grade A), Marine Plywood	Those materials are acceptable as boards even though they should be treated with barrier foil or acrylic varnish since they can be source of organic acids.
Acrylic and polythene boards	Often found under the name of Perspex® and Correx® are stable and inert (see the above plastics table). They are solid strong resins that can be used to make mounts or supports instead of wood.

Ordinary paper, tissue paper, gummed paper, Foamcore® and glassine photo envelopes they become acidic over time causing organic objects in contact with them to discolor and deteriorate as well as accelerate metal corrosion and glass devitrification.

Wood and composite boards including plywood, chipboard, particleboard and hardboard should be avoided as they give off harmful phenol or urea formaldehyde which forms organic acids. Formaldehyde reacts with other materials to form formic acid, which is very destructive. Phenols and formaldehyde are also a heath hazard for people. In case it might be necessary to use wood, it is important to be sealed. Barrier foil is the best method: it is a gas impermeable metal foil sealed between layers of inert plastic film, such as PP004 (Moistop®) and Marvelseal 360®. Seal edges with aluminum tape. Do not pin through it because the foil must not be punctured. An alternative can be an acrylic varnish which does not give off harmful vapors. Dacrylate®, Sealbond RJ119® and Cuprinol Enhance® are suitable. Use at least 3 coats and allow them to dry thoroughly between applications.
When wood has to be applied, prefer seasoned spruce, mahogany, walnut, basswood, poplar, and balsa, or exterior grade plywood as well as MDF (medium-density fiberboard), both with formaldehyde-free adhesives.

ATTACHMENTS, LABELS, COATINGS AND PAINTS

Collections materials will sometimes need labeling and attached documentation. It is imperative that self-adhesive labels are not used as well as Velcro®, Blu Tac®, masking tape and sticky tape. Safe tested materials have to be used for mounts, such as coatings and paints.

Material Type	Material details
Polyethylene sheathed metal pins	Are acceptable to be used, if necessary.

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Spun-bonded Polyester labels	Also under the name of Tyvek® labels, can be tied on the materials using unbleached cotton tape or cord.
Ink and acrylic varnish (Paraloid B72®) dissolved in acetone	Can be used to write accession numbers on protected areas in discreate part of the object.
Two-part Epoxy Resins	Can be used as a sealant and to cover floors and surfaces in storage areas as it is resistant to UV, shock and vibrations, corrosion, low VOCs and thermal cycling.
Anodized aluminum, powder-coated steel, chrome-plated steel, baked enamel (only if it has been tested for proper baking by performing a methyl ethyl ketone rub test)	Any of these metals is acceptable to be used as meatal coating because they are resistant to corrosion, wear and don't release any VOCs.

Avoid using unsheathed metal pins that can cause accelerated corrosion if they touch metal objects or stain items they corrode directly. Any other metal that has not been sealed with appropriate sealants, might also be susceptible to chemical off-gassing or corrosion and thus should be avoided. Do not use oil or latex paints and varnishes.
Any sticky substance or adhesive applied directly to an object is non reversible and can cause chemical deterioration. Pressure-sensitive adhesives will fail with time, and labels will be lost.

*This guideline has been written and compiled by Emma Ziraldo

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