

## Storage Furniture

### Fabrication Materials and Standards

#### *What Materials Should Be Used in the Construction of Storage Furniture?*

Many of the currently available furniture choices contain materials that produce by-products that contribute to the deterioration of the items housed in the furniture. Opinion on what constitutes acceptable storage furniture is changing rapidly. If you are considering the purchase of furniture, you may want to consult a preservation professional for the most up-to-date information.

Steel storage furniture with various powder coatings is a safe choice, and many different types of furniture are available in this material. Museums often choose this material. Anodized aluminum storage furniture is another option and is considered by many to be the best choice, especially for highly sensitive items, but this tends to be the most expensive. Open chrome shelving, made of heavy-gauge, chrome-plated steel wire, is another suitable option, but because the wires can leave permanent marks on items that are not protected, boxing is required.

Until recently, furniture with a baked enamel finish was the recommended choice. Lately, however, questions have been raised about the possibility of the baked enamel coating off-gassing (giving off) formaldehyde and other harmful substances if it has not been properly baked. If you have this type of shelving, contact a preservation professional to see if this is a problem in your particular situation.

#### *Wood*

One of the most commonly used materials for furniture is wood. Unfortunately, storage of valuable items in direct contact with wooden storage furniture is discouraged because of acids and other harmful substances exuded by wood and some wood sealants. Even though some woods and wood composites are less damaging than others, all are problematic. Also, questions regarding how long various woods and sealants give off harmful substances still need to be answered. One solution to the problem is to coat wooden furniture with safe modern sealants. In addition to coating, shelves and drawers made of wood can be lined with an

effective barrier material.

The use of laminate and particle wood furniture is tempting because it is readily available and inexpensive. Furniture from these woods, however, is especially problematic because the wood warps under weight and contains many additives that off-gas, and because the brackets and joining hardware are often inadequate to provide sufficient support. Closed storage cabinets made of wood are even more of a problem because the closed environment intensifies the concentration of acidic and other vapors. If this type of cabinet is used, all inner surfaces of the unit should be effectively coated. If possible, the use of wooden furniture should be avoided.

### *Are Any Other Materials a Concern?*

Some storage furniture has gaskets in the doors or drawers to provide an airtight seal. If the gaskets are rubber, damage, such as corrosion or tarnishing, may occur to some items, especially those made of metal, due to sulfur vapors emitted from rubber. The preferred gasket material is silicone, preferably food-grade that has been heat-cured to remove solvent vapors.

### *What Construction Features Are Important?*

Regardless of the construction material chosen, storage furniture should have a smooth, nonabrasive finish. If steel furniture is painted or coated, the finish should be resistant to chipping, for chips will leave steel exposed and susceptible to rust. The furniture should be free of sharp edges and protrusions; exposed nuts and bolts are particularly hazardous. The furniture should be strong enough so that it will not bend or warp when filled. To protect collections from water damage in the event of a flood, the lowest storage area within the furniture should be at least four inches above the floor.

## **Types of Furniture and How to Choose**

### *What Types of Storage Furniture Are Available? How Do You Choose?*

Several suitable types of furniture are available. The most common ones are

described below. Specialty furniture, such as racks to hold canoes horizontally or lances vertically, are not covered here. A preservation professional should be contacted to deal with the special needs of items such as those, taking into account your particular situation. Choice of furniture is based on the types, sizes, and quantities of items you have. Remember to take into account the size (particularly the thickness) and shape of items *after* they have been fitted with supports and mounts. This may cause them to require greater storage space.

The choice of furniture can be influenced by conditions in your storage space, such as a lack of security or HVAC equipment. Issues of use, access, and staffing levels also are important considerations when selecting furniture. For example, if you have standard museum closed storage, where the space is often kept locked and public access is only by appointment and when accompanied by a staff member, your needs will be different than if you have open storage, especially where visitors are free to walk about, handle items, and study them within the storage area itself. With open storage you should avoid the use of cabinets with doors, and store items on open shelving instead. On the other hand, if you have closed storage and you anticipate having many visitors requesting to see the smaller items in your museum, it may be easier to accommodate them if the items are in a drawer than if they are on a fixed shelf, particularly if you are understaffed. Items can be seen more easily, quickly, and safely when they are in a drawer that can be pulled out for viewing and retrieval than on a fixed shelf, which may require that the items be moved. This facilitates access even when staffing is limited.

In general, the furniture selected should be as flexible and adaptable as possible to accommodate changing needs. Styles that stack or are adjustable are preferable. Nearly any type you need is available commercially from suppliers of museum, library, and office furniture.

### *Wardrobes*

Several wardrobe designs are available. These storage units are useful when only a few items need to be stored and when items are still in sound enough condition to be hung on padded hangers. Some of these units have shelves or drawers built into the lower or upper sections of the wardrobe, which are useful for small items such as shoes, sashes, or personal bags.

## *Cabinets*

When security and protection from dust are special concerns, cabinets with doors are often preferred. Cabinets are available in many different sizes and configurations. These are available with shelves or drawers (see below). Other variable features include glass doors for easy visual access, solid metal doors for reduction of light, gasket seals for reducing air flow, and shelves or drawers that are adjustable, sliding, permanent, or removable. The use of piano hinges for the attachment of the doors is advisable if opening them flat will facilitate safe removal of items from the cabinet. If cabinets are made of *uncoated* steel, rusting and mold growth can be a problem in areas with high humidity or fluctuating conditions. Mold growth can also be a problem in cabinets with doors. Unless the cabinets are well ventilated or the relative humidity is closely controlled and monitored, it may be better to avoid using these.

## *Shelves*

Shelving is one of the most frequently used types of storage furniture. It can be open or in cabinets with or without doors. Care should be taken to select shelving that is strong enough that it will not sag from the weight of the items stored on it. It should be easily adjustable so that the distance between shelves can be changed to suit the sizes of a variety of items, making maximum use of storage space.

Open shelving units that fit together so that shelves can be placed side by side or end to end to accommodate oversized items provide the most flexibility. The shelves should fit snugly in place so they do not move when items are placed on or removed from them. Shelving units should be bolted to the floor so they will not wobble or topple, and they may require additional reinforcement by attachment to the walls and ceiling as well. Shelf uprights and supports should never obstruct the removal and replacement of items, and cross-bracing should be kept to a minimum beyond structural requirements to allow easy access to oversized items.

Open steel shelving, frequently used in the restaurant industry, has shelves made of rigid parallel wires or mesh. They allow for maximum air circulation and minimum dust or moisture buildup but also permit light to penetrate. These shelves work well for *boxed* storage of light- to medium-weight items. Solid steel shelving systems have traditional sheet metal shelves. They offer greater support for heavy

items and have the advantage of blocking illumination from ceiling fixtures.

Shelves within cabinets can be either fixed or sliding. Sliding shelves are preferred by museum professionals because items on them are easier to see and access. They are particularly well suited to the storage of fragile items because they enable items to be seen fully without being touched. Sliding shelves, however, are very expensive, and most museums have fixed shelves.

A variation on this is a unit that has large trays, instead of shelves, that slide out easily for viewing or transport. The trays can be constructed of the same material as the cabinet, or they can be made from an aluminum frame that is covered with stretched fabric. The fabric allows for light-weight trays and also increased air flow. Large cabinets with shelves can be fitted with brackets for storage of rolled items on tubes. Many sizes of items can be stored rolled in this manner, although flat storage is preferable when possible.

Shelves are most suitable for the storage of items that are tall and dimensional and need to be viewed that way, such as woven baskets, ceramic pots, and models or dioramas. They also are suitable for collections of large or heavy items. Examples are snowshoes, rakes, hoes, and troughs. A disadvantage of shelving is that it is not as efficient a use of space as drawer storage in most situations. Drawers can be filled more tightly with items than shelves can, because items can be safely removed simply by lifting them. With shelves, on the other hand, items must be widely spaced, or you are forced to reach between items on a shelf and move items around others to remove them. This increases handling and the potential for damage.

### *Dustcovers for Shelves*

When open shelving is used to house uncovered items, hanging dustcovers can be attached to the outside of the shelving unit. Hook and loop fasteners such as Velcro work well for this, as do small magnets and binder clips. Dustcovers can be made from a variety of materials depending on your needs:

- Polyester film or polyethylene sheeting are sometimes preferred because one can see items through these materials, but they have a static charge that attracts dust.
- Muslin provides partial protection from dust and light without static. A low-cost alternative to this is the use of bed sheets. Both should be

- washed first to remove sizing.
- For optimal protection from dust, muslin covers topped with polyethylene sheeting are recommended.
  - For complete protection from light, covers made from opaque blackout cloth are recommended. The cloth should be washed first to remove sizing.

### *Drawers*

In many museums drawers are the preferred type of storage furniture. As already mentioned, this is because access to items in closed storage can be accomplished more quickly, easily, and safely, especially when the museum is understaffed. A disadvantage of drawer storage is that items tend to move as drawers are opened and closed, particularly those that are heavy or rounded. This problem can be solved, however, by the creative use of mounts and supports or the creation of “wells” in drawer linings (see below).

Many types, sizes, and depths of drawers are available. Drawers should be sturdily constructed so they will not buckle from the weight of their contents when full, or otherwise become difficult to open and close. They should be equipped with stops to prevent them from accidentally coming out of the cabinet. They should have ball bearings rather than slide-in grooves because these will allow them to open and close more smoothly, causing less vibration to items and eliminating the risk that the drawers will fall out of the grooves and become stuck. To reduce jarring, vibration, and sliding of items, drawers can be lined with polyethylene foam in roll form for cushioning. Smooth items, however, will slide, even on the polyethylene. This can sometimes be avoided by using two or more layers of polyethylene and cutting out an area from the lower layer(s) that is the shape of the item. This allows the item to sink down into a “well” and prevents it from sliding. This can be abrasive to some items such as those with loosely bound paints. In these situations, lining the well with an appropriate smooth material may be desirable. Depending on what is stored in the drawers, dustcovers or rear hoods may be advisable to prevent items from being damaged at the back of the drawer.

Drawers come in cabinets of various heights, which can be stacked. When security and protection from dust are special concerns, cabinets with doors are often preferred. Drawers work for the storage of a wide variety of items. They are

particularly suitable for the storage of items that need to be stored flat, such as sashes, jewelry, and vests, shirts, and dresses that are too heavy or deteriorated to be hung.

### *Oversized Flat Storage*

Selecting drawers for oversized items requires special attention to the functioning of the drawers. They should be lightweight and should open and close easily and smoothly without binding. They should also be suitable for the viewing of items within them if the items are too large and cumbersome to be removed for a brief examination. Drawers for extra-oversized cabinets can be specially made of lightweight honeycomb aluminum panels if a particularly large size is required. Flat tray storage work well for oversized items; the trays slide in and out of a cabinet so the item can be transported as well as stored and examined on the tray. For the best strength to weight ratio, the frame of the tray is made of aluminum, and the bottom of stretched fabric or Coroplast. Examples of items that one museum has stored in such a cabinet are a blanket, flags, and a buffalo hide. All these cabinets for oversized items are available commercially in standard or custom sizes and tend to be very expensive.

### *High-Density Storage Systems*

Many museums with space limitations and large collections use high-density storage systems, often referred to as compact or movable shelving. These systems minimize the amount of space needed by compacting ranges of open shelves and cabinets tightly together. The ranges slide along tracks so they can be moved apart to retrieve items on a particular range, and then moved back together again. By eliminating most of the distance between the ranges, more ranges can fit into a given area, and overall spatial requirements are reduced substantially.

These storage systems can be operated automatically by pushing a button to separate the ranges, or manually by using a hand crank to separate them. Manual systems are usually preferred because it is assumed they can be operated more smoothly, avoiding jolts that jar items, they require relatively little maintenance, and they can be used during power outages. Note, however, that moving systems, even the hand-operated ones, can be damaging to some items because of the

vibrations to which they subject them. Furthermore, items can be jostled off shelves, causing additional damage. Items that hang or are suspended in storage, such as garments, probably should not be stored in a movable system. If a high-density storage system must be used, a design should be chosen that minimizes these hazards for the types of items you need to store in it.

### *Things to Remember*

Several suppliers of preservation-quality storage materials and furniture are available. It is best to obtain catalogs from a number of suppliers so you can make comparisons of cost and assess the full range of available products. If you have questions about the composition of a product, ask the supplier for details. This information should be readily available. Also, call places that have installed the type of wardrobes, cabinets, or shelves in which you are interested and ask how they like them. If you require further assistance, contact a preservation professional.