

## **Care and Handling of Bronze Objects**

### **Definition**

Bronze is an alloy of copper and tin, and may contain minute quantities of zinc and lead.

### **Handling**

Always handle bronze objects with white clean cotton, vinyl or latex gloves. Hands carry grease and oils that may cause corrosion. Fingerprints can etch the surface or disturb wax coatings. Personal jewelry, such as rings and watches can scratch the patina.

### **Applying Accession Numbers**

For reasons of identification, accession numbers must often be applied to objects in museum collections. The number should be applied to an inconspicuous area with an acrylic resin paint (reversible in solvents) over an isolating layer of a clear acrylic lacquer (20% Rohm & Haas Paraloid B-72 in xylene or acetone is suggested, with a barrier coat of Paraloid B-67 in petroleum benzine). Adhesive paper labels and adhesive tape should not be used, as they can cause corrosion and are apt to fall off as well, especially in areas of fluctuating humidity.

### **Relative Humidity**

Keep bronze objects as dry as possible, ideally at 42-46% RH. This may not be possible in collections where metal is mixed with organic materials, such as wood, ivory, textile, or paper, but a maximum RH of 50% is recommended. Inspect bronzes periodically to watch for corrosion. Bronze sculptures which are displayed indoors may exhibit corrosion initiated by chlorine, while outdoor bronze sculptures are most susceptible to damage by sulfur. Chlorine is present in the air in the form of chloride ions, especially in marine environments. Chlorides can also be introduced to the metal surface from direct handling if hands are not clean and free of oil, dirt and perspiration. Sulfur is present in the air in the form of sulfur dioxide, which, in the presence of moisture, can convert to sulfuric acid and etch the metal surface.

Bronze objects that appear to have “bronze disease” (cupric chloride) should be immediately placed in a dry environment (.35-40% RH) to arrest the action of the corrosion. Bronze objects that have had “bronze disease” and have been treated by a conservator should also be stored and exhibited in a dry environment and periodically examined for recurrence of active corrosion. Micro-environments may be necessary for this immediate action, and for long-term preservation, especially in institutions with non-climate-controlled conditions (see information about preparing micro-environments below).

### **Packing**

Bronze objects may be wrapped in polyethylene bags or wrapped in soft, acid-free tissue for packing. Interleaving should be used between the metal and plastic, such as soft wrapping tissue, to prevent condensation or transfer of impurities in plastics or bubble-wrap texture in soft coatings. Do not use buffered paper or calcium carbonate coated papers as these can encourage corrosion. Saran Wrap® or any unknown plastic should not be used for wrapping bronze objects, since many plastics contain chlorine (a known corrosion initiator). Expanded polyethylene foam products may be used for packing around bronze objects. Hard dense foams can sometimes scratch highly polished metal surfaces. Foams of unknown composition should never be placed in direct contact with a metal surface.

If a bronze has been cast in more than one piece and all the pieces are secure, there is no need to take it apart for shipping. However, if there are loose or moveable parts, these either must be padded and secured or removed and packed separately. The display mount may need to be removed for safe transport.

The interior of wood crates should be sealed with moisture-cured urethanes or 2-part epoxy paints, especially for longer trips, because acids in the wood may encourage corrosion. Polyethylene plastic crates (Hardigg or Advanced Packing are recommended brands) may be used in place of wood.

### **Microclimates**

Microclimates can be used for exhibition, storage, or travel. A microclimate is any airtight container made of inert material. Examples of microclimates are enclosed clear acrylic vitrines, Hardigg/Advanced Packing crates, or, for short-term use, a Rubbermaid® container or polyethylene zip-lock bag. The relative humidity in the microclimate can be adjusted with a desiccant such as silica gel. Art-sorb, also a type of desiccant, is often considered more effective than silica gel because it absorbs moisture more effectively at higher relative humidities. It is available in bead, sheet and cassette form. (Product literature, and references below describe the use of silica gel and Art-sorb, and make suggestions for the calculating the quantity of silica gel per cubic foot). “Indicator” type silica gel (which changes color when wet) can be useful. A small amount of the indicator type can be mixed with the less expensive non-indicator type to take advantage of the color change. An inexpensive paper RH indicator strip may be used to get good approximate reading of the relative humidity in the microclimate. See WACC Technical Leaflet: “Microclimates for Storage of Three Dimensional Objects” for more information. Iodine indicator gel beads have replaced the previously available hazardous cobalt indicator gel beads.

**Materials and Suppliers**

*Please note: These are sample suppliers. In some cases, materials may be purchased from other vendors. The following information is not an endorsement or recommendation of any individual supplier.*

**Silica gel: Indicating or Non-indicating**

University Products  
517 Main Street  
P.O. Box 101  
Holyoke, MA 01041  
800-628-1912  
<http://www.universityproducts.com>

**Gore-Tex® tiles**

W.L. Gore & Associates, Inc.  
555 Paper Mill Rd.  
Newark, DE 19711  
888-914-4673  
<http://www.gore.com>

**Art-sorb:**

Talas  
330 Morgan Ave.  
Brooklyn, NY 11211  
212-219-0770  
<http://www.talasonline.com>

**Packing Containers**

Advanced Packaging Inc.  
4818 Seton Dr.  
Baltimore, MD  
888-206-5250  
<http://www.advpack.com/index.php>

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**Further Reading**

“Silica Gel” by Raymond H. Lafontaine  
CCI Technical Bulletin #10  
Canadian Conservation Institute  
613-998-3721 for copy

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