



## **Caring for metal objects**

The primary means by which metals deteriorate is through corrosion. Most metals corrode on contact with water, acids, alkalis, salts, oils, metal polishes and other chemicals. They will also corrode when exposed to gases. Other causes of deterioration to metal objects include breakage, impact accidents and scratches from mishandling.

Metals like gold and silver corrode less readily than metals like iron, copper, tin, and lead. Because metal is electrically active, galvanic corrosion can occur when two metals are in direct contact with each other. The less noble metal will contribute electrons to the more noble metal creating an electric circuit. This causes preservation of the more noble metal and corrosion of the less noble metal.

### **Cleaning and Handling**

One of the sources of damage to metal is improper handling. Oils and acids that are continuously secreted through human skin are deposited on metal surfaces during handling, where they cause corrosion and pitting matching the pattern of a person's finger print. Metal objects should always be handled with clean white cotton gloves or nitrile gloves to prevent sweat from passing through to the object. If items are handled with bare skin they must be carefully cleaned before storage or display to remove deposits and prevent corrosion from skin acids and oils.

Careless handling can also lead to denting, bending, or breaking metal artifacts. It is best not to overestimate the strength and resiliency of metal pieces; they are often weaker or more brittle than anticipated. Extra caution in handling can prevent serious damage that can be expensive to repair.

Metal objects should be kept free of dust, debris, and oily residues. In general, it is not a good idea to routinely polish or aggressively clean metal pieces. Each time a piece is polished or cleaned a thin layer of the surface is removed by abrasion or is dissolved away by strong chemicals in the cleaning solutions. Repeated polishing or cleaning with chemicals will gradually remove plating, surface decoration, engraving, maker's marks or monograms. As an example, a wire brush on an electric drill to remove rust on old iron objects may remove important surface features like maker's stamps or signs of previous use.

### **The Environment**

A controlled environment is one of the most important elements in the preservation of metal objects. Excessive humidity is a leading contributor to the corrosion of metal. Relative humidity should be kept below 55 percent where at all possible. Dehumidifiers and air conditioning can be employed to limit the amount of moisture in the air if practical. If such options are not feasible, avoid storing your items in places such as basements or roof spaces where the temperature fluctuations can be extreme and the relative humidity likely to be too high. Metal artifacts from archeological digs such as bronze and iron should ideally be kept at an even lower relative humidity, below 40 percent.

Fine dust and debris in the air can accumulate on metal surfaces where it can attract moisture and encourage corrosion.



Gasses from car exhaust, off-gassing rubber products, and cigarette smoke can cause silver and copper alloys to discolor and corrode. Acidic gases from wooden cabinets can also cause metal corrosion. Vapours produced by plywood, MDF and other products that off-gas formaldehyde cause lead alloys and other metals to corrode.

### **Storage and Display**

Metal cabinets and shelving should be used for the storage of metal objects rather than wooden cabinets as wood and wood products, like plywood may emit acids and other gasses that cause metals to corrode. Acidic newsprint and cardboard boxes also should be avoided. Acid-free, lignin-free wrapping paper and boxes are better. Clean, soft cotton cloth can also be used to wrap objects.

Storage containers should be suitably padded to prevent direct contact with other metal surfaces that can lead to corrosion. Padding also prevents physical damage such as dents and scratches.

Metal objects, even large ones like machinery or automobiles, should always be covered to protect from dust build up. Clean cotton sheeting can be used to make removable dust covers.

Where necessary provide support for the object(s) to avoid stress on damaged or weakened areas. A conservator can advise on support requirements.

### **For further information**

If your object requires special attention you may contact an objects conservator at the email address below. They can advise about the safest means by which to stabilise, conserve and restore your object.

[conservation@anmm.gov.au](mailto:conservation@anmm.gov.au)