
# Metal objects

## Including swords and edged weapons

*(See separate information sheets about medals and medallions, ordnance, and outdoor heritage*

## What are metal objects?

Military metal objects can include weapons, clocks and watches, signs, plates, buttons, badges and regalia, electrical equipment, buckles, jewellery, tools, cutlery, coins, armour and honour boards. Some of these items are made of metal alone, while others are made from metals combined with other materials.

## What are metal objects made from?

There are many different types of metal including brass, bronze, copper, silver, lead, tin, aluminium, iron, steel and zinc. These metals may be cast or wrought and can be joined by soldering, welding, brazing or fasteners such as bolts or screws. The metals might have been intended to be bright in use or they may have a patinated, plated, varnished, waxed, oiled or painted coating either for decorative reasons or to protect against corrosion. These coatings have as much historic importance as the metal does, and should be retained and preserved.

Many metallic heritage items have a ‘patina’ on them – a coloured film of stable metal corrosion. This is sometimes part of the object’s history and should not necessarily be removed.

## What are the main threats to metals?

* high humidity
* dust
* salts and pollution
* skin oils and sweat
* neglect
* incorrect attempts at repair or cleaning
* excessive or aggressive polishing
* commercial metal polishes
* theft and loss (if small and portable).
* light (affects organic components, not the metal)

**Over-polishing**

This electro-plated nickel silver (EPNS) commemorative cup has been polished so often or with aggressive polishes that the silver plate has been worn away in patches, revealing the brass beneath.

Silver is a very soft metal and is easily worn away by commercial preparations such as Silvo.

Do not use commercial silver cleaning liquids. There are gentler alternatives, such as polishing cloths, on the market.

## How do these threats damage metals?

* Metals can suffer from dents and scratches.
* Corrosion or rust can affect metal. This will be different colours on different metals:
	+ iron and steel – orange rust or black corrosion products, ‘pustules’ or ‘weeping’ if corrosion is active
	+ copper, brass and bronze – green corrosion or dark brown tarnish
	+ lead, tin, zinc and aluminium – white
	+ silver – black tarnish
	+ gold – generally does not corrode
* Water, dampness, humidity, pollution and salts can cause serious corrosion of metals.
* Corrosion will be faster in wetter areas and near the sea.
* Abrasive cleaners can scratch metals and leave disfiguring residues.
* Chemical cleaners strip metal from an object.
* Metals items stored together or loose in a drawer can dent or scratch each other.
* Dust promotes corrosion by holding moisture onto the metal.
* Dissimilar metals in contact can cause accelerated corrosion of one of the metals (galvanic corrosion).
* Light will fade paints.
* Insects can attack organic components, especially in conditions of high humidity.

**Sticky Tape and Metal**

Adhesive residues from sticky tape adhesive have corroded the silver of this engraved commemorative tray.

Note the more usual patchy, grey silver tarnish forming in other areas. Once polished, this tray should be packed with corrosion inhibiting materials or coated with microcrystalline wax to prevent the tarnish
re-forming.

**Extremely corroded objects**

Extremely corroded objects should be placed in protective storage (such as a padded archival quality box with supports) so that no further deterioration occurs. This Turkish Water Bottle from Lone Pine, Gallipoli is in a fragile state, but it tells an important story about that military campaign. Often old corrosion is no longer active and does not require treatment or cleaning.

*Photo courtesy Australian War Memorial*

**Should I paint metal objects?**

This freshly painted museum object looks brand new and has lost all evidence of its use. It no longer tells the story of its history. It is very rarely necessary to repaint historic metal objects, especially when they are kept indoors.

**Corrosion is part of an object’s history**

There is corrosion at the bottom of this iron trolley underneath the original paint; however it is not getting worse. This means that it is stable and does not need to be treated.

The colour and the appearance of the paint is an important part of the object’s history and should not be removed.

By keeping the trolley in a dry area it should be possible to keep the corrosion stable.

*Photo courtesy Royal Women’s Hospital.*

**REMEMBER**

* Patina is an essential component of many metal items and can be very easily removed
by over-enthusiastic polishing.
* Before you do ANYTHING, consult a metals conservator.
* Before you start, ALWAYS look at the list of resources at the end of this fact sheet. There will be detailed information already available.
* Never give up – something that looks ‘hopeless’ can often be recovered.
* All metals will age – it is the speed at which this happens that you can influence.
* It is not a disgrace for a metal item to look its age and reflect its history.
* If a metal item has been in or close to the sea, consult a conservator.

**The colour and appearance of the paint is an important part of the object’s history and should not be removed.**

## General Principles

### Handling

**DO**

* Always wear cotton or nitrile (not latex) gloves to handle metals, as acid from your fingers will cause surface corrosion.

**DON’T**

* Lift metal objects by their handle. The join is one of the weakest parts.
* Handle polished metals with bare hands. Acid from your fingers can mark them. Don’t use water, sand, grit, shell or shot blasting on metals.

### Storage

**DO**

* Keep metals in a clean and dry place away from extremes of temperature, light and humidity.
* Store metal items in boxes made from acid-free cardboard. Hoop pine plywood may also be used for large items but must be coated (see below).
* Use corrosion prevention storage materials for polished metals: they will protect them but should be changed every few years. You will find a list of corrosion prevention storage materials at the end of this flyer.
* Wrap metals if it is not possible to buy corrosion prevention storage materials. Materials such as polyethylene or polypropylene (not PVC) plastic bags; acid-free, alkaline buffered tissue paper or well washed cotton and linen fabrics such as sheets, handkerchiefs or tea towels may be used, but it is likely that tarnish will still occur.

**DON’T**

* Store metal objects in a damp or humid environment as this will cause corrosion.
* Store metal items in chipboard, plywood or timber cabinets, as the vapours can accelerate corrosion.
* Seal objects in plastic bags as it traps moisture in and accelerates corrosion. If you want to use bags for storage, choose polyethylene bags with holes punched in the bags or corrosion inhibiting plastic bags (punching holes is not necessary with these bags).
* Store metals in PVC – it corrodes metal.
* Store weapons in leather scabbards or with leather or web slings attached.

**Where can I buy acid-free boxes, tissue paper and other museum quality products?**

Museums Australia (Victoria) has compiled a Museum Suppliers list. This contains the contact details of speciality suppliers which sell materials for the proper storage and display of heritage items. See: [www.mavic.asn.au](http://www.mavic.asn.au)

### Display

**DO**

* Ensure that display boxes are lined with acid free cardboard.
* Coat the interiors of timber or plywood storage and display boxes with several coats of shellac, clear acrylic or low volatile organic compound (VOC) acrylic paint which must be allowed to dry for three months before the metals are installed.

**DON’T**

* Use unpainted timber, MDF, Plywood or particle board as these materials give off acidic vapours which will tarnish and corrode metals.
* Use PVA adhesives, wood glues, fresh paint or varnish inside frames or show cases.

### Cleaning

**DO**

* Consult a conservator to determine what type of metal you are dealing with – there are many different types of metals and alloys (metal compounds). They all require different approaches to cleaning.
* Undertake research before cleaning metals to find out the original colour and patina.
* Only use silver cloth to clean silver, copper and brass items if absolutely necessary for display or ceremonial purposes.

**DON’T**

* Clean important metal items yourself – they deserve professional care.
* Clean metals unless you have corrosion prevention storage materials.

## To polish or not to polish?

All shiny metal objects will tarnish if the conditions are right. The only way to remove tarnish is by cleaning, but every cleaning will remove a thin layer of metal. So it is important to:

* Use the least aggressive cleaning materials and methods. Most commercial products are NOT suitable for historic objects
* Protect the freshly polished surface so that it does not re-tarnish.
* It is common to see plated silver objects which have been polished so often that the silver or gold plating has been removed.
* Always document all treatments.

## What is wrong with commercial polishes?

* Abrasive cleaners such as Silvo, Brasso, toothpaste, chrome polishes or bicarbonate of soda (baking soda) are aggressive and remove a layer of metal with each cleaning.
* Commercial dips, pastes, washes and creams for cleaning silver, pewter, copper, brass and stainless steel may contain ammonia or acid as well as other chemicals, and remove too much metal.
* If polishes are not removed very thoroughly they can leave an unsightly white residue which will also harbour corrosive chemicals.
* Never use the baking soda (bicarbonate) and aluminium foil or similar techniques you may find on the internet – they remove large amounts of metal. Food based cleaners such as tomato sauce, vinegar, molasses, treacle or juice are acidic and will remove metal in an uncontrolled way and should not be used.
* Files, steel wool, wire brushes and synthetic abrasive pads will remove a lot of metal and scratch the metal. They should never be used.
* Many commercial cleaners also contain silicone waxes or inhibitors which are not easily removable and will cause a patchy appearance.

**Cleaning products**

The polish residues left from abrasive cleaners can be very difficult to remove and harbour corrosive chemicals. This image shows these ugly residues (the greenish-white stains in the crevices). The Australian War Memorial recommends against using any commercial polishes on metal objects.

## What should I use for silver, copper, bronze and brass?

Shiny silver, copper, bronze and brass objects can be polished with silver or jewellery cleaning cloths. When polishing, ensure that you change to a new clean section of the cloth frequently to avoid polishing the metal with its own tarnish. Even light polishing removes some metal, so after polishing it is important to stop the tarnish re-forming so that the item does not need to be polished again. There are three ways of doing this:

Wrap the item in silver cloths or bags sold for silver jewellery or cutlery.

Dry packing. Seal the item with a desiccant (a material that removes moisture from the air). This will remove the moisture that causes corrosion. See image at right where silica gel conditioned to a low humidity is being used to keep metals dry.

Coat the item with micro-crystalline wax (Renaissance wax) or a clear synthetic varnish such as Incralac. No coating lasts forever, and if not applied properly, will not protect the item.

Documentation of all the materials you have used will be a big help when the coating needs to be replaced.

## What should I use for iron and steel objects?

Iron and steel objects with stable corrosion do not need treatment.

Dry packing – seal the item with a desiccant which will remove the moisture that causes corrosion.

If you are unsure about the stability of an unpainted iron or steel object, you can remove the loose corrosion with a nylon brush, warm the item in the sun and then coat the item with fish oil diluted 50:50 with Shellite, which is an effective and reversible corrosion treatment. Don’t use fishoil on painted metals as it will remove the paint. Personal Protective Equipment must be worn when using these chemicals.

**Dry packing**

These unstable metal objects in Heritage Victoria’s collection are packed in an air-tight container with a cotton bag of conditioned silica gel at the base. The humidity indicator strip shows that the relative humidity inside the box is about 10%, which will prevent corrosion. The indicator strip will also show when the silica gel needs to be reconditioned to 10% RH. This type of storage is the best way to preserve ‘weeping’ iron.

**Use of metal files**

The metal on this bronze bell has been badly scratched and the patina has been removed – probably by the use of a metal file.

**Silver Dips**

Silver dips can cause serious damage. The silver plating on this teapot has been lost due to some kind of aggressive liquid cleaning technique. Note the fine scratches in the remaining silver from repeated, aggressive polishing which reduced the thickness of the plating, making it more vulnerable to the dip.

### Conserving a precious metal honour roll

*Before After*

This fine honour roll is made from copper plaques in a wooden frame. When it was constructed, the copper plaques were chemically coloured (‘patinated’) to resemble brass and bronze, then coated with a varnish made from natural resin to give further subtle colour effects.

Over time, rain from a leaking roof caused the varnish to dissolve and run in some areas, and the surface became stained. A misguided attempt to polish the metal at the words “...War 1914 – 1919” removed the patination from this area, revealing the natural pink colour of the copper.

The Williamstown Historical Society is the custodian of this precious metal honour roll. Thanks to its care and foresight, a qualified conservator was employed to undertake the delicate work of removing the disfiguring stains.

*Photos Courtesy Hobson’s Bay Council*

## Swords and edged weapons

It is preferable to store swords and edged weapons separately from their scabbards, as they tend to rust inside scabbards. It is important that both items are carefully labelled to make it clear which scabbard belongs with which weapon. Sharp items are dangerous and must be stored safely to remove the risk of accidents.

This sword has corroded after being stored inside its scabbard. This is because the timber of the scabbard holds dampness and acidity against the metal.

The dents on the edge of this sword may have been caused during battle and should be retained. They may also have occured by accident – sharped metal edges are brittle and easily damaged. Do not get historic edge weapons re-sharpened as this will remove a lot of original metal.

**Are your swords legal?**

According to Victorian legislation a sword is defined as any thrusting, striking or cutting weapon with a long blade having one or two edges and a hilt or handle. Swords are prohibited weapons under the Control of Weapons Act 1990 and are illegal for individuals or organisations to possess, import or sell without an exemption or approval.

Since 2004, museums accredited through the Museums Accreditation Program (MAP) of Museums Australia (Victoria) are granted an exemption to hold historic swords. Other organisations must apply individually for a Chief Commissioner Approval.

A museum that wants to seek an approval should contact:

Regulation Support Unit

Licensing Services Division

Victoria Police

GPO Box 2807, Melbourne Vic 3001

The licensing division of Victoria Police may also be able to answer further questions.

Phone: 1300 651 645.

**RSLs and swords**

The Victorian Branch of the RSL (Anzac House) has an arrangement with the Licensing Division of Victoria Police which provides for the recording, storage and secure display of swords by sub-branches. Please check with Anzac House to ensure your sub-branch is complying with these conditions. RSL Sub-Branches or Memorabilia Officers who have questions about the obligations in relation to swords, firearms or other ordnance should contact Anzac House on (03) 9655 5555.

**RESOURCES**

There are publications available with more detailed information.

‘Recognising Metals and Corrosion’, Canadian Conservation Institute:
[www.cci-icc.gc.ca/caringfor-prendresoindes/articles/metals-metaux/index-eng.aspx](http://www.cci-icc.gc.ca/caringfor-prendresoindes/articles/metals-metaux/index-eng.aspx)

‘Looking after Silver’,
Powerhouse Museum:
[www.powerhousemuseum.com/pdf/preservation/looking\_after\_silver.pdf](http://www.powerhousemuseum.com/pdf/preservation/looking_after_silver.pdf)

reCollections: Caring for Collections Across Australia:
[www.collectionsaustralia.net/sector\_info\_item/3](http://www.collectionsaustralia.net/sector_info_item/3)

Corrosion prevention storage products

‘Products and Suppliers List’,
Powerhouse Museum:
[www.powerhousemuseum.com/pdf/preservation/products\_and\_suppliers.pdf](http://www.powerhousemuseum.com/pdf/preservation/products_and_suppliers.pdf)

Impregnated silver and brass storage bags can be purchased at department stores. Brands include Hagertys, Silverguard and Inca.

Corrosion intercept bags:
[www.underraps.com.au/intercept\_pages/corrosion\_intercept.html](http://www.underraps.com.au/intercept_pages/corrosion_intercept.html)

Storage bags and showcase linings can be made from activated charcoal fabric (see Powerhouse Museum list for suppliers).

Oxygen free storage, KeepSafe
Anoxic storage:
[www.keepsafe.ca/new-main-menu/products/oxygen-free-display-storage/anoxic-storage/](http://www.keepsafe.ca/new-main-menu/products/oxygen-free-display-storage/anoxic-storage/)

Where can I get this and other fact sheets? The DPC Preserving war heritage and memorabilia fact sheets provide information about the care and conservation of a range of heritage material. They can be downloaded at [**www.dpc.vic.gov.au/veterans/factsheets**](http://www.dpc.vic.gov.au/veterans/factsheets)

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