



Conserve O Gram

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Caring for Outdoor Bronze Plaques, Part II: Cleaning and Waxing

Preparation for Cleaning and Waxing

Before you start to clean and wax your plaque, refer to Conserve O Gram 10/4, “Caring for Outdoor Bronze Plaques, Part I: Documentation and Inspection.” Only after you have carried out all the documentation and inspection procedures that are outlined here can you commence with cleaning and waxing.

This Conserve O Gram provides instructions for cleaning and waxing bronze plaques, protective measures that can be carried out without a conservator. It does not address the following: missing bolt heads, peeling or flaking coatings, or graffiti. If your plaque has any of these problems, or other problems not addressed here, call a conservator.

Introduction to Cleaning and Waxing

Periodic cleaning and waxing can retard the rate of corrosion on bronze plaques. Wax serves as a protective barrier against moisture; it also serves as a removable interface should graffiti or some other material be applied or deposited. Note that the plaque may look different after cleaning and waxing. It may appear darker and less green in color, but it will not look new. You cannot restore the original appearance of a plaque with wax; restoration work should be carried out by a conservator.

You should inspect your plaque and apply a

protective coating of wax on an annual basis. In marine environments or in areas subject to high rainfall or humidity, bi-annual work may be required. Conversely, in arid environments, work may be carried out on a two-to-three-year schedule. If the plaque is subject to frequent winds that blast the surface with air-borne abrasives or dusts, waxing may be necessary on a more frequent basis. Your inspections will help determine maintenance frequency.

The procedures for cleaning and waxing outlined here are for “cold” waxing (“hot” waxing involves heating the plaque with a propane torch and should only be carried out by a conservator as part of a full conservation treatment). Procedures are carefully detailed and should be followed as written. Cleaning and waxing should be carried out on a bright, dry, warm day (hot days with full sun are ideal). Water from cleaning and solvents in wax will evaporate quickly in this weather.

Preparation

1. Wear an apron or old clothes.
 2. Wear proper protective gloves and a respirator fitted with fresh organic vapor filters when waxing.
 3. Spread out a drop cloth beneath the plaque and lay out all your supplies in the order in which you will be using them.
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4. Wrap the metal ferrules of all your brushes with duct tape to avoid scratching the bronze with the ferrule. Those brushes that will be used for waxing or buffing should be labeled “wax” for re-use.

Cleaning

1. Begin cleaning with dry, clean, soft bristle brushes. Small stencil brushes and bamboo skewers may be useful in dislodging dirt and debris from interstices of letters and other sculpted areas. Brush away all loose dirt and debris.
2. Flood the substrate surface (usually masonry, but also may be wood or metal) beneath the plaque with clean water to prevent absorption of cleaning effluent. Keep the area flooded during the entire cleaning operation.
3. Scrub the plaque with water and a small amount of a non-ionic detergent. Use natural or plastic bristle brushes. Scrubbing will remove dirt packed in interstices and loosely adhered corrosion products.
4. Rinse the surface after washing and make sure no cleaning effluent remains. Water can either be poured over the plaque or it can be sprayed on with a hose or garden pump sprayer.
5. You may want to repeat the cleaning operation if the plaque is especially dirty.
6. Allow the plaque to dry thoroughly before waxing. If there is a lot of water left on the surface, use a clean sponge or rag to blot—not wipe—the water off. A hair dryer can accelerate drying if necessary.

De-ionized or distilled water (the latter is commonly sold in grocery stores) is more aggressive for cleaning than tap water and is recommended for use on bronze plaques. However, de-ionized or distilled water should not be used for cleaning plaques mounted on highly polished stone, marble, limestone, or concrete as the water can cause slight surface etching.



Don Burciaga cleaning plaque, King Kamehameha I statue, Hilo, Hawai'i. (Glenn Wharton & Associates, Inc.)

Detergents increase the wetting action of water, thereby increasing its ability to remove soiling materials. Non-ionic detergents are low in toxicity and can be easily rinsed from surfaces. They are sold in concentrated form and only a small amount is added to water to create good sudsing action.

Waxing

1. Tuck strips of aluminum foil (double thickness works well) in between the plaque and the substrate, surrounding the plaque as best as possible, to protect the substrate from wax.
2. Using a paint stirring stick, scoop about a half a cup of wax out of its container and place in a plastic container (with lid). Pour a petroleum solvent (in about the same amount as the wax) through a funnel into the container, and mix thoroughly with the stirring stick to get rid of all the lumps; this will take at least 5 minutes. The resulting slurry should be the consistency of heavy cream. Label the container “wax” with a permanent marker.
3. If the substrate surface below the plaque has dried, flood it again with clean water and keep it flooded for the duration of the waxing process to avoid stains from wax drops.
4. When the plaque is completely dry from cleaning, apply the wax slurry with a large round natural-bristle brush. Apply a thin layer to the entire plaque, making sure to get the wax into all interstices and on all edges. Do not apply too much wax; only a small amount is needed. “The less the better” is the general rule.
5. Take care not to get wax on surrounding surfaces.
6. Wait for the solvent to evaporate. It will have evaporated sufficiently when the plaque appears dry and when the solvent odor has weakened.
7. Remove all excess wax with paper towels or a clean rag and spend time removing accumulated wax from interstices; this step is critical since accumulated wax will turn white and flake off the surface over time.
8. Buff the surface of the plaque with a clean cotton rag and use plenty of pressure. Buffing compresses the wax, making it more durable and providing a soft sheen. Use a toothbrush to buff interstices of letters and other sculpted areas.
9. Apply a second layer of wax and buff, following the same procedure outlined above.
10. Carry out a final buffing with a horsehair shoe-polishing brush, making sure to brush over the entire surface.



Waxing a plaque, Saint Paul's Church NHS, Mt. Vernon, NY. (Judith M. Jacob, NPS)

Wax is a solid or semi-solid material that is slightly greasy to the touch and not soluble in water. Conservators use commercial paste waxes that are composed of natural and synthetic waxes in petroleum solvents for coating bronze plaques.

Note: The solvents used for diluting wax and cleaning off old wax are hazardous materials. Be sure to wear your respirator, fitted with fresh organic-vapor cartridges and appropriate gloves when working with these solvents.

Petroleum solvents are materials used to dissolve wax. They are derived from petroleum, a thick flammable mixture of gaseous, liquid, and solid hydrocarbons found beneath the earth's surface. Petroleum solvents can be purchased in hardware stores.

Clean-up

1. Rinse out cleaning brushes. Keep them together for future use.
2. Rinse out wax brushes in the solvent. Since the brushes will be used only for waxing, they do not have to be perfectly free of wax. Store brushes in zipper-lock bags to keep them clean and together.
3. You can keep the strips of aluminum foil for reuse.
4. You may have diluted wax left over. This can be saved for the future, at which time it may be necessary to replenish the solvent. (You can also pour the excess solvent from cleaning brushes into the wax container.) Close the wax and mixing containers and make sure lids are tight fitting. Place the containers in a plastic bag, seal, and then place in a second plastic bag and seal.
5. Make sure solvent evaporates from rags and containers before storing them (with waxing supplies) or disposing of them.

6. Store all waxing materials together so they are easily accessible for the next application. Store wax and solvents in a flammable storage cabinet.

Note: Solvents, solvent rags, and containers of solvent for disposal are considered hazardous waste. Consult with your park HAZMAT Coordinator to arrange for proper disposal.

Documentation

Make a record of the cleaning and waxing and add to the plaque's file. Include the date, specific materials used, and any noted change in condition since the last waxing.

Reducing Wax Build-up Prior to Re-waxing

1. Over time, wax will build up in interstices of the plaque. When this occurs, excess wax should be reduced using petroleum solvents and clean cotton rags.
2. Dip the rag in the solvent and rub it over the surface. The solvent will dissolve the wax and the rag will absorb it.
3. Keep using a clean area of the rag to dip into the solvent.
4. Bamboo skewers and toothbrushes can be used to dislodge wax in the interstices of letters and sculpted areas.
5. This process may take a while, but you should be able to notice the difference once wax build-up has been reduced.
6. New wax can be applied in the same manner as that outlined above.

Supplies

- Drop cloth
- Buckets
- Garden pump sprayer
- Sponges
- Hair dryer
- Non-ionic detergent (one of the following)
 - Igepal® CA-630
 - Triton® XL-80N
 - Chemique® Ion-417
- Wax (one of the following)
 - Butchers® White Diamond Bowling Alley Wax (clear)
 - Trewax® Paste Wax (clear)
 - Johnsons® Paste Wax (clear)
- Cleaning brushes (tape all metal ferrules with duct tape)
 - Scrub brushes (plastic or natural bristle)
 - Toothbrushes (used are fine)
 - Large round natural-bristle brushes
 - Large stencil brushes
- Waxing brushes (tape all metal ferrules with duct tape and write “wax” on the shafts)
 - Large round natural-bristle brushes
- Buffing brushes (write “wax” on handles)
 - Toothbrushes (used are fine)
 - Horsehair shoe polishing brush
- Bamboo skewers
- Aluminum foil



Materials used for cleaning and waxing: scrub brushes, bamboo skewers, waxing brush, toothbrushes for buffing, and horsehair shoe polishing brush. (Judith M. Jacob, NPS)

- Empty containers for mixing wax and for rinsing out wax brushes (old plastic take-out or packaged-food containers are fine)
- Funnel
- Paint stirring sticks, write “wax” on one end
- Petroleum solvent (one of the following)
 - VM&P Naphtha
 - Mineral spirits
 - Stoddard’s Solvent
- Clean cotton rags
 - Old t-shirts and cotton diapers work well
 - When laundering, do not use fabric softener; it reduces the cotton’s ability to attract dust and to absorb liquids
- Paper towels, as highly absorbent as possible
- Container for storing supplies and zipper-lock bags

- Solvent-proof gloves (nitrile works well)
- Respirator with fresh organic-vapor cartridges

Note: This Conserve O Gram recommends the use of specific commercial products. Should any of these products be removed from the market, a similar product can be used. One can find similar products by consulting with conservators and asking questions of product manufacturers and conservation supply store employees.

Sources of Supplies

1. Hardware stores
2. Art supply stores
3. Conservation supply stores or websites, such as:
 - Conservator's Emporium
<http://www.consemp.com>
 - Conservation Resources International
<http://www.conservationresources.com>
 - Conservation Support Systems
<http://www.silicon.com/~css>
 - Talas
<http://talasonline.com>

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