



Iron Work Protection



ENVIRONMENTALLY FRIENDLY



Bronze / Brass / Copper



Terra Cotta



Marine

PERMALAC EF is an air-dry crystal clear, durable lacquer with lower VOC and no solvent odor. Provides exterior protection on steel, aluminum, copper, silver, bronze, wood, terra cotta, concrete and polyurethane foam. UV and corrosion inhibitors assure endurance in harsh conditions ranging from arctic freezing, desert heat, salt air to acid rain. Air dries to the touch in less than 5 minutes providing durable finish in approximately one hour depending on the applied film thickness and temperature.



Sculpture Supply Canada

345 Munster Ave. Toronto, ON. M8Z 3C6 Tel (416)234-1075 Toll-free (866)285-5509

www.sculpturesupply.com

OVERVIEW

Permalac is a crystal clear, durable, air-dry coating. It can be used on exterior copper, brass and bronze surfaces to protect special architectural coatings and automotive (or motorcycle) trim. Contractors and manufacturers have had successful results applying it to builders' and marine hardware, lighting fixtures, bronze plaques, and steel signage. Permalac provides unusual under-film tarnish protection as well as superior resistance to ultra-violet light, and remarkable resistance to salt air atmosphere. Sculptors and artisans who fabricate custom designed fences from forged steel have found permalac to be especially effective as a sealant for certain proprietary oxidizing coloring processes that are used to create antique patina and smutting effects. Permalac should give satisfactory exterior protection for at least ten years under normal conditions. Considerably longer life is expected.

SURFACE PREPARATION

Most failures of clear coatings over copper, brass, bronze, and steel are not caused by the failure of the coating itself but rather the progressive staining and tarnishing of the metal underneath.

DEGREASING & CLEANING SOLVENTS

For Shop Refinishing: A good grade of inhibited Trichloroethylene.

For field refinishing: Cleaning Thinner #500

Surface Cleaner: Cleaning Thinner #69

PRODUCING A SATIN FINISH IN THE SHOP

New metal should be evenly abraded by belt sanding, strapping, grinding etc., for the rough satin finish. The metal should be then "dressed" with clean silicon carbide pads such as "Scotch-Brite" (3M Co.) and a suspension of powdered pumice in **Cleaning Thinner #69**. This produces a fine satin finish. Metal polishing compounds should not be used as they may contain other contaminants that are difficult to remove. The metal is then washed with Cleaning thinner #69 and wiped dry with clean cotton waste. At least two applications of Cleaning Thinner #69 should be made. If any dirt is found on the waste, the cleaning step should be repeated. **Note:** Complete evaporation of the #69 thinner before it can be wiped dry may cause streaking. In finishing large sections where this can be a problem, thinner #500 should be used instead of #69.

PRODUCING A HIGHLY POLISHED FINISH

Finishing a new metal to a highly polished mirror finish in an in-shop operation may be carried out by conventional buffing and coloring techniques. Following the final coloring buff, the metal should be degreased and cleaned as noted above using soft cotton pads instead of white cotton waste.

EASE OF REMOVAL

Should refinishing be required, the coating can be removed easily by conventional lacquer stripping techniques.

REFINISHING

Remove all existing lacquer residues by generously applying the stripper on all metal areas containing it. Follow the directions and all safety precautions prescribed by the lacquer stripper manufacturer. Note: In some instances, it may be necessary to use a brass wire to loosen stubborn old lacquer film. When this is done, brush strokes should follow the direction of the grain and care should be taken to avoid scratching the surface. When all the lacquer has been removed, wash the metal thoroughly with clean water and wipe dry with cotton waste leaving no trace of the lacquer remover or residue. Dry the metal thoroughly with clean cotton waste. Remove all stains (oxides, sulfides, or corrosion products) by using an abrasive such as aqueous slurry of 5% oxalic acid and powdered pumice. The slurry should be rubbed with the grain of the metal until all stains are removed. Stainless steel wool, bronze wool, or scotch-brite (3M pads) can be used for rubbing. Ordinary steel wools should be avoided as many have been treated with amino-type inhibitors, which may stain copper and brass surfaces. Hand rubbing can be substantially reduced by the use of power equipment. The acid-pumice slurry should be thoroughly rinsed from the metal surface with lots of distilled water and then wiped dry with clean cotton waste. Commercial metal cleaner should not be used because of the possibility of introducing harmful residues. The metal should be "dressed" and cleaned as described above. The application of Permalac should promptly follow the final cleaning. Avoid handling of the cleaned metal prior to the application and drying of Permalac.

APPLICATION

Spray application is the usual method, although brushing, flow coating, roller coating etc., may be used. Small parts may be coated with Ronci, or comparable equipment. Any dust collected on the cleaned metal should be blown or wiped off with a clean cloth before Permalac is applied. Permalac is applied in full coats.

DRYING TIME

Air dries to the touch in less than 5 minutes; may be forced dried faster at 2500 deg.F. Air-dries hard in an hour or so, depending on coating thickness, temperature, etc.

REDUCING

- Brush – Ready to use to obtain a level, smooth seal.
- Spray – Thin Permalac with #281 thinner, as needed. We recommend 4 parts of Permalac to 1 part #281 thinner. Make sure that the spray equipment is clean. **Note:** In some instances, for example on hot and humid days, the fast drying Permalac can trap moisture underneath the seal. This trapped moisture will manifest itself as a "cloudy" coating. Such cloudy coatings can be prevented by the addition of the slow drying #69 thinner, or an even slower #500 slow-dry thinner.

DRY FILM PHYSICAL CHARACTERISTICS

- For optimal protection, the dried film should have a thickness of 0.5-0.75 mils (ASTM D1400)
- Adhesion: The dried film should pass the crosshatching and scotch tape adhesion test 100%
- Hardness: Pencil hardness test rating is approximately "H"
- Flexibility: The dried film should pass bending on a 3/16 inch diameter mandrel (Federal Method 6223, part of Federal Method 141a).

ABRASION RESISTANCE

- Weight loss, 500 cycles: 31 milligrams (Taber Abrader)
- (Federal Method 6192)
- Gloss: (600 on copper alloy #110) – 95

CHEMICAL RESISTANCE

(10 is not change, 0 is failure)

- 1% TSP (Trisodium Phosphate) (24 Hours) 10
- 1% Tide (24 Hours) 10
- Synthetic Perspiration (24 Hours) 10
- 50% Alcohol (1 Hour) 6
- 10% Ammonia (1 Hour) 7
- 0.5% Ammonium Sulfide Solution (1 Hour) 9
- Boiling Water (20 Minutes) 6
- Gasoline (To Evaporation) 9

PERFORMANCE TESTS

Kitchen Dishwasher, with Electrosol:

- 25Cycles: No change in appearance.
- 50 Cycles: Some spotting and pitting. No significant change in gloss, adhesion, and hardness.

Accelerated Indoor Heat Aging: (6 weeks at 1580 deg.F)

- No significant change. Thermal Cycling: (10 cycles 3500 deg.F. to 100 deg.F)
- No significant change.

Salt Exposure: (300 hours)

(A variation of DIN #50021) Panels were immersed in 5% NaCl solution at 40 deg.C. at an angle of 60-75 degrees from the horizontal. No significant change in the coating and practically no corrosion creep at scribed X after 300 hours.

Weather Meter: (900 hours)

- No significant change in the coating except decrease in gloss.

Outdoor Exposure:

- Bronze statue, University of Kansas at Lawrence. Coated with Permalac. More than 5 years of exposure. No significant change in appearance.

DISCLAIMER

The information in this document was obtained from sources, which we believe are reliable and correct, but does not purport to be inclusive and shall be used only as a guide. The information is provided without any representation or warranty expressed or implied regarding accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, Peacock Laboratories, Inc., Sculpture Supply Canada Inc., and its employees do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of, or in any way connected with, the handling, storage, use or disposal of the product.

INDEPENDENT TEST RESULTS*

Salt Fog Testing:

The Permalac used in the salt fog testing was diluted with Toluene at ratios of 3,4 and 5 parts toluene to 1 part Permalac. After 72 hours of testing with many samples of each, the results are as follows:

- No noticeable visual degradation.
- No noticeable visual degradation when viewed under a microscope.
- An average of 5% degradation of the 3 to 1 and 4 to 1 concentrations when tested before and after using an infrared spectrometer in the range of 2 to 12 microns.
- No degradation of the 5 to 1 concentration using the same infrared reflectance test.
- No change in RF reflectance or transmission values after the salt fog testing.

UV Testing:

Permalac was diluted the same as in the salt fog testing. Many samples of each concentration have been tested and subjected to 40+ hours of intense UV light (1100 + W/M2).

Results are as follows:

- No noticeable visual degradation.
- No noticeable visual degradation when viewed under a microscope.
- No reduction in IR reflectance values when tested before and after using an infrared spectrometer.
- No change in RF reflectance or transmission values after the UV testing.
- No visual discoloration.

Adhesion Testing:

The adhesion tests performed on the Permalac were done according to the crosshatch tape test outlined by Sherwin-Williams Paints.

The results of the adhesion test are as follows:

- The Permalac in all concentrations passed with an excellent rating in all adhesion tests conducted. (The substrates the Permalac was applied on for our testing was aluminum and urethane.)

***Permalac test results conducted by Beyond Technology, Inc. on April 17, 2002.**



Sculpture Supply Canada

345 Munster Ave. Toronto, ON. M8Z 3C6 Tel (416)234-1075 Toll-free (866)285-5509

www.sculpturesupply.com