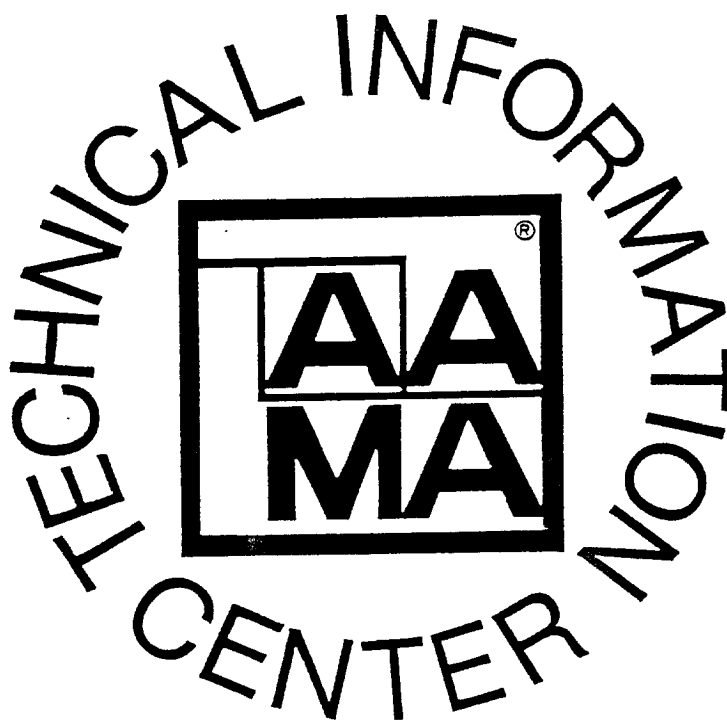


Voluntary Guide Specification for
**CLEANING AND MAINTENANCE OF
ARCHITECTURAL ANODIZED ALUMINUM**



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1. SCOPE

1.1 This guide specification outlines methods, equipment and materials applicable for cleaning anodized aluminum after construction and for subsequent periodic maintenance.

1.2 The methods outlined herein are intended for use on anodized architectural products whether rolled or extruded shapes, including window and door frames, store fronts and entrances, curtain walls, mullions, columns, panels, hand rails, flag poles and hardware.

1.3 Types of architectural anodized finishes are: Clear Oxide, Integral Color, and Electrolytically Deposited Color.

2. PURPOSE

This information is intended as a guide for architects, owners, building managers, contractors and others in the building industry who are interested in the proper care and maintenance of anodized aluminum. Herein are described safe, practical methods for the cleaning, maintenance and protection of architectural anodized aluminum.

3. GENERAL

3.1 As with any finished building material, aluminum requires reasonable care prior to and during installation and periodic cleaning and maintenance after installation. Although anodized aluminum possesses exceptional resistance to corrosion, discoloration and wear, its natural beauty can be marred by harsh chemicals, rough conditions or neglect. Such conditions usually affect only the surface finish and do not reduce the service life of the aluminum. However, the marks resulting from such mistreatment may be permanent. All surfaces, exposed to the atmosphere, collect soil and dirt, the amount of which may vary depending on geographic area, environmental conditions, finish and location on the building. The owner's attitude regarding surface appearance determines the type and frequency of cleaning required. The aluminum cleaning schedule should be integrated with other cleaning schedules for efficiency and economy. For example, both the glass and the aluminum curtain wall can be cleaned at the same time.

3.2 Cleaning may be required more often in one geographic area than another. More frequent cleaning will be required in heavy industrialized areas as compared to rural areas. Seasonal rainfall can affect washing frequency by removing water soluble deposits and less adherent soil. In foggy coastal regions, frequent cycles of condensation and drying can create a heavy build-up of atmospheric salts and dirt which may adhere tenaciously. In climates where the rainfall is low, the opportunity for atmospheric washing of the surface is minimal. Los Angeles, for example, has a unique combination of limited rainfall, temperature fluctuation, smog and condensation. This situation requires that cleaning be done more frequently than in other metropolitan areas where rainfall is more frequent.

3.3 In both wet and dry climates, recessed and sheltered areas usually become more heavily soiled because of the lack of rain washing. Frequent and longer periods of condensation also occur in protected areas increasing the adhesion of the soil. This is particularly true of soffit areas on overhangs, bottom areas of fascia panels, sheltered column covers and the like. Periodic maintenance inhibits long-term accumulation of soil which, under certain conditions, can accelerate weathering of the finish. The more frequently aluminum is cleaned, the easier and less costly succeeding maintenance is.

4. CARE AFTER INSTALLATION

Cleaning procedures to remove construction or accumulated environmental soils and discoloration should be initiated as soon as practical. Depending upon the degree of soiling, several procedures are possible.

4.1 REMOVAL OF LIGHT SURFACE SOIL

Removal of light surface soil may be accomplished by alternative methods as described in 4.1.1, 4.1.2, 4.1.3 and 4.1.4. Only trial and error testing employing progressively stronger cleaning procedures can determine which will be most effective. Begin the cleaning process at the top of the building by rinsing an area the width of the stage or scaffolding to the ground level in continuous drop with forceful water spray. This should be done at the beginning and the end of each drop regardless of the final cleaning materials employed.

4.1.1 The simplest procedure is to flush the surface with water using moderate pressure to dislodge the soil.

4.1.2 If the soil is still present after air drying the surface, clean the surface with a brush or sponge and water (concurrently spraying the surface with water and sponging).

4.1.3 If soil still adheres, a mild detergent cleaner should be used with brushing or sponging. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. The surfaces must be thoroughly rinsed by spraying with clean water and thoroughly dried.

4.1.4 Clean-up with MEK or similar solvent wiping is recommended if it is necessary to remove oils, wax, polish and other materials.

CAUTION: MEK and similar solvents may damage organic sealants, gaskets and finishes used on windows, curtain wall and storefront assemblies. They must be used with great care and should not be allowed to come in contact with organic materials. Their use must be avoided on anodic finishes protected by clear organic coatings. Organic solvents should be used only in accordance with manufacturers safety recommendations.

4.2 REMOVAL OF HEAVY SURFACE SOIL

If surface soil still adheres after using procedures under 4.1, cleaning with the assistance of an abrasive pad can be employed.

CAUTION: These procedures must not be used on surfaces with a factory applied clear organic protective coating (lacquer) unless the clear coating has deteriorated and should be removed.

4.2.1 Hand scrub the metal surface using a palm-sized nylon abrasive cleaning pad. Thoroughly wet with clean water or a mild detergent cleaner. Start at across top and work down, rubbing with uniform pressure the metal surface in the direction of the metal grain.

4.2.1.1 Scrubbing with a nylon cleaning pad wet with surface protectant material is also suggested for removing stubborn soils and stains (See 6.1).

4.2.2 After scrubbing, the metal surface should be rinsed thoroughly with clean water or wiped with solvent to remove all residues. It may be necessary to sponge the surface while rinsing, particularly if the cleaner is permitted to dry on the surface.

4.2.3 The rinsed surface is either permitted to air dry or is wiped dry with a chamois, squeegee or lint-free cloth.

4.2.4 Use of power cleaning tools may be necessary for removal of unusually heavy soils from large areas including panels and column covers. In such cases, an air-driven reciprocating machine fitted with abrasive pads can be employed. During this operation, the surface being cleaned must be continually wetted with clean water or mild detergent cleaning solution to provide lubrication and a medium for carrying away the dirt. The cleaning solution may be applied to the panels by sponging or brushing. Water may be applied in the same manner by spraying from a hose or by utilizing the water connection on the cleaning machine. The machine is moved over the metal by the operator with a sufficient number of overlapped passes to effect maximum cleaning. The direction of travel with the cleaning machine is dependent largely upon the geometric configuration of the surface being cleaned. However, when possible, the machine strokes should be made first in one direction and then in a direction perpendicular to the first; (e.g., horizontal passes followed by vertical passes). Areas which are not accessible with the machine must be manually cleaned as in paragraph 4.2.1.

4.2.4.1 Rinsing - After an area has been machine scrubbed, it must be rinsed with clean water and thoroughly scrubbed with a fairly stiff bristle brush. While still wet, a final water rinse without brushing completes this cleaning operation. The rinsed surface is either permitted to air dry or is wiped dry with a squeegee, chamois or lint-free cloth. It is important to promptly remove any cleaner rundown from the uncleaned lower portions of the building to avoid staining.

4.3 INSPECTION

It is suggested that the building owner provide an engineer or representative to inspect the cleaning work to ensure satisfactory clean appearance of the building.

4.3.1 Metal seams, crevices, sills and any other area that may trap water, cleaner or dirt must be cleaned and thoroughly dried. These "trap" areas must be hand-wiped with absorbent towels or cloths to prevent rundown streaks or puddling which will later cause discoloration.

4.3.2 Inspect metal surfaces for any discoloration or stains not removed during cleaning operations. Soil or discolorations still remaining should be manually cleaned in accordance with sections 4.1 and 4.2 until a satisfactory appearance is achieved. Stubborn surface soils should be scrubbed in a uniform direction using a nylon cleaning pad and cleaner solution.

5. CLEANING PRECAUTIONS

Here's a common sense summary of cleaning recommendations for architectural aluminum finishes.

5.1 Correctly identify the aluminum finish to be cleaned when selecting an appropriate cleaning method. Check specifications and/or "as-built" drawings if in doubt as to the finish.

5.2 Never use aggressive alkaline or acid cleaners on aluminum finishes. Do not use cleaners containing trisodium phosphate, phosphoric acid, hydrochloric acid, hydrofluoric acid, fluorides, or similar compounds on anodized aluminum surfaces. Always follow the cleaner manufacturer's recommendations as to the proper cleaner and concentration. Test-clean a small area first. Different cleaners should not be mixed.

5.3 It is preferable to clean the metal when shaded. Do not attempt to clean hot, sun-heated surfaces since possible chemical reactions on hot metal surfaces will be highly accelerated and non-uniform. Also, avoid cleaning in freezing temperatures or when metal temperatures are sufficiently cold to cause condensation. Surfaces cleaned under these adverse conditions can become so streaked or tainted that they cannot be restored to their original appearance.

5.4 Apply the cleaning solution only to an area that can be conveniently cleaned without changing position. Thoroughly rinse the surface with clean water before applying cleaner. Minimize cleaner rundown over the lower portions of the building and rinse such areas as soon as practical.

5.5 Cleaners containing strong organic solvents will have a deleterious effect on organic overlay coatings, but not on the anodized aluminum itself. The possibility of solvents extracting stain-producing chemicals from sealants and affecting the function of the sealants, however, must be considered. Test a small area first.

5.6 Strong cleaners should not be used on windows and other building accessories where it is possible for the cleaner to come in contact with the aluminum. Solutions of water and mild detergents should be used on windows. If an aggressive cleaner is required for some other component of the building, care must be taken to prevent the cleaner from contacting the aluminum finish.

5.7 Do not use excessive abrasive rubbing to remove stubborn stains. Such procedures can produce an undesirable appearance or adversely affect the finish.

6. FIELD PROTECTION AND MAINTENANCE OF CLEANED SURFACES

6.1 WIPE-ON SURFACE PROTECTANTS (Long Term)

When the anodized aluminum is cleaned and thoroughly dry, a wipe-on surface protectant may be applied. Such protectants, properly applied, can benefit architectural aluminum by protecting the aluminum finish and simplifying subsequent maintenance. It is very important that the manufacturer's recommendations be carefully followed when these surface protectants are employed. Only clean aluminum should be protected to prevent soil from becoming embedded in the protectant, creating an unsightly appearance. Estimated protection period is 12 to 24 months depending upon exposure, environment and maintenance routine.

6.1.1 Typical Application Procedures

(Manufacturer's recommendations should be followed.)

6.1.1.1 Wipe - A soft lint-free cloth (cloth baby diapers are ideal) folded into a pad-like shape is the most efficient applicator to use around windows, doors, entrances, extruded shapes and irregular surfaces. Thoroughly wet the cloth with suitable material and wring out excess. Fold the damp (not dripping wet) cloth and wipe briskly with uniform surface pressure. Always wipe in a uniform, single-direction pattern from top to bottom or left to right. A "sponge mop" with a soft cloth or sponge wrapped around the top makes an ideal applicator for large, flat surface areas such as curtain wall panels. A 1/4 inch thick "felt" pad mounted on a squeegee (in place of the rubber wipe blade) is also satisfactory for coating large panels. The applicator "tool" must span the entire panel width to avoid overlap marks. When using a felt pad applicator or sponge mop wrapped with a diaper cloth, saturate the applicator fabric with protectant material and squeeze out excess. Apply uniform edge pressure from the top of the panel moving in one vertical stroke to the extreme bottom. An extension handle will permit top to bottom application of tall panels in one stroke. Full uniform pressure on the applicator will provide a uniformly "wet" surface without runs, sags, drips or streaks. Apply additional material to the applicator only prior to beginning a full top to bottom stroke to avoid overlap marks. Areas which are not accessible or convenient for the applicator such as corners, edges, configured shapes and narrow extrusions should be hand coated using a folded lint-free cloth.

6.1.1.2 Spray - The use of spray equipment is practical only for well protected areas or in-plant applications. Overspray is not easily controlled at outdoor sites, creating a need for masking and other precautionary measures. Application by conventional or electrostatic spray guns must be performed under properly controlled conditions. A single spray pass will uniformly wet the metal surface. Low-atomizing and fluid-feed pressures are suggested. Depending upon spray nozzle openings, pressures below 10 psig are usually ideal for maximum efficiency.

6.1.2 Precautions

6.1.2.1 Always coat a small area first to develop application technique.

6.1.2.2 Do not permit puddling or accumulation of protectant on the horizontal surfaces.

6.1.2.3 To avoid hand irritation, it is recommended that polyethylene or solvent resistant rubber gloves be worn.

6.1.2.4 Avoid getting protectant on the glass, plastic and newly painted surfaces. Masking is suggested whenever practical.

6.1.2.5 A proper solvent must be used for clean-up and for removal of protectant from glass or anodized surfaces.

6.1.2.6 Read "Cautionary Information" on container carefully.

6.1.3 Frequency

The type and frequency of cleaning and coating will vary with the amount of atmospheric soil and dirt accumulated on the surfaces and the owner's desires regarding appearance. Periodic re-application and wipe-on surface protectants will assist in maintaining the appearance and will reduce the cleaning required. Whenever possible, the aluminum maintenance should be integrated with the glass cleaning for efficiency and economy. Estimated protection period is 12 to 24 months depending upon exposure, environment and maintenance routine.

6.2 WAXES (Short Term)

Waxes can best be used on such applications as handrails, doors, window frames, entrances and other readily available areas. It is generally not practical to use these materials on high-rise portions of the building. Because of the many different waxes available, follow the manufacturer's recommendations for any specific product. However, certain procedures are common to most waxes. Only clean surfaces should be waxed to prevent soil from becoming embedded in the wax. Liquid and paste waxes should be applied with a soft clean cloth. If buffing is required, use another soft cloth. The clean appearance of the waxed finish can be prolonged by periodic rinsing with clean water or wiping with a clean, damp cloth. When the waxed finish begins to dull or when the wax coating softens or discolors, remove all wax with an appropriate compatible solvent or detergent cleaner and abrasive pad, then re wax if desired. Estimated protection period is one to three months depending upon exposure and environment.