

Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum

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VOLUNTARY GUIDE SPECIFICATION FOR CLEANING AND MAINTENANCE OF ARCHITECTURAL ANODIZED ALUMINUM

1. SCOPE

- 1.1 This recommendation 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, handrails, flagpoles and hardware.
- 1.3 Types of architectural anodized finishes are:

Clear Oxide
Integral Color
Electrolytically Deposited Color

2. PURPOSE

This information is intended to serve as a guide and will be useful to 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 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 depending on geographic area, environmental conditions, finish and location on the building. These factors and the owner's attitude regarding surface appearance determine 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 when appearance is of prime importance. 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 buildup 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 which requires more frequent cleaning than other metropolitan areas with more frequent rainfall.
- 3.3 In both wet and dry climates, recessed and sheltered areas usually become more heavily soiled because of the lack of rain washing. More 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 the succeeding maintenance is.

4. CARE AFTER INSTALLATION

Cleaning procedures to remove construction soils 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. Work should start 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 end of each drop regardless of the final cleaning materials employed. Only trial and error testing employing progressively stronger cleaning procedures can determine which will be most effective.

- 4.1.1 The simplest procedure is to flush the surface with 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 (concurrent spraying water and sponging).
- 4.1.3 If soil is still adhering, then 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 a vertical motion. The surfaces must be thoroughly rinsed by spraying with clean water and thoroughly dried.
- 4.1.4 MEK or similar clean-up 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 window, curtain wall and storefront assemblies. They must be used with great care and not 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 manufacturer's safety

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 such as Norton Bear-Tex No. 668 or 3M Scotch Brite No. 7447, thoroughly wet with fresh water or a mild detergent cleaner. Start at the top and work down, rubbing with uniform pressure across the metal surface in the direction of the metal grain. The 3M INSTA-LOK hand block No. 952 fitted with the nylon abrasive cleaning pad is convenient for hand scrubbing large flat surface areas.
 - 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 paragraph 6.1)
- 4.2.2 After scrubbing, the metal surface should be rinsed thoroughly with clean water or wiped with solvent to remove all solvents. It may be necessary to sponge the surface while rinsing, particularly if 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 NORTEN BEAR-TEX no. 668 or 3M SCOTCH BRITE no. 7447 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 dependant 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 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 remove promptly from uncleaned lower portions of the building any cleaner rundown 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 cause a later 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 until a satisfactory appearance is achieved. These stubborn surface soils should be scrubbed in a uniform direction using a nylon 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 finish.
- 5.2 Never use aggressive alkaline or acid cleaners on aluminum finishes. It is important not to use cleaners containing trisodium phosphate, phosphoric acid, hydrochloric acid, hydrofluoric acid, fluorides, or similar compounds on anodized aluminum surfaces. Always follow the recommendations of the cleaner manufacturer 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 cleaning nonuniformity can occur. Surfaces cleaned under these adverse conditions can become streaked or stained so that they cannot be restored to their original appearance. Also avoid cleaning in freezing temperatures or when metal temperatures are sufficiently cold to cause condensation.
- 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 so the building and rinse such areas as soon and as long as practical.
- 5.5 Cleaners containing strong organic solvents will have a deleterious effect on organic overlay coatings, but not on anodized aluminum. 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 into contact with the aluminum. Solutions of water and mild detergents should be used on windows. If for some particular reason, an aggressive cleaner is required for some other component of the building, extreme 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 result in an even more undesirable appearance or adversely affect the finish.

6. FIELD PROTECTION AND MAINTENANCE OF CLEANED SURFACES

6.1 Wipe-On Surface Protectants (Long Term)

General Information

When the anodized aluminum is clean and thoroughly dry, a wipe-on surface protectant may be applied. Such protectants properly applied can benefit architectural aluminum in two ways. First, it helps protect aluminum finishes and, second, it makes subsequent maintenance easier. It is very important that the manufacturer's recommendations be carefully followed when these surface protectants are employed. Clean aluminum only should be protected or soil can become 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 (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. For cloth application, 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 from top to bottom or left to right. A "sponge mop" with a soft diaper cloth wrapped on the sponge makes an ideal applicator for large, flat surface areas such as curtain wall panels. A 1/4" thick "felt" pad mounted on a squeegee (in place of a 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 with protectant material and squeeze out excess. Apply uniform edge pressure (as when using a squeegee) from top of panel moving in one vertical stroke to 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 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 job 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 the metal surface. Low atomizing and fluid feed pressures are suggested. Depending upon spray nozzle openings, pressures below 10 psg 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 horizontal surfaces.

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

6.1.2.4 Avoid getting protectant on 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 of 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, it is well to follow the manufacturer's recommendations for any specific product. However, certain procedures are common to most waxes. Clean surfaces only should be waxed, or soil can be 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 in appearance or when the wax coating softens or discolors, remove all wax with an appropriate compatible solvent or detergent and abrasive pad, then re-wax if desired. Estimated protection is 1 to 3 months depending upon exposure and environment.

7. EQUIPMENT AND PRODUCTS

The following list of proprietary equipment and products is included merely as an aid in identifying such materials and categories previously described. No attempt has been made by AAMA to evaluate their effectiveness, nor does listing here constitute an endorsement. The list is not considered to be all-inclusive; other products equally suitable for the intended purpose may be available. Responsibility for selection, determination of suitability, and proper use of any equipment, cleaning or coating product is left to the user.

7.1 Mild Soaps and Detergents and Non-Etching Cleaners

- Aluminum Cleaner HC-22 - Klenzade Products
Division of Economic Labs
Beloit, WI

- AMS # 35 - Aluminum Maintenance Systems, Inc.
22951 LaVadena Drive
Laguna Hills, CA 92563

- Cascade/ Ivory Liquid
Ivory Snow/Joy/Thrill - The Proctor and Gamble Company
P.O. Box 599
Cincinnati, OH

- Clepo 83-M - Frederick Gumm Chemical Company, Inc.
538 Forest Street
Kearny, NJ

- Fels Soap Granules - Fels & Company Division
Purex Corporation
73rd & Woodland Avenue
Philadelphia, PA

- Fleetline JC-5 - Oakite Products, Inc.
50 Valley Road
Berkeley Heights, NJ

- Ridisol 521[®] - Achem Products, Inc.
300 Brookside Avenue
Ambler, PA

7.2 Abrasive Cleaning Pads

- | | |
|------------------------------------|---|
| Bear-Tex No. 668 | - Norton Cleaning & Finishing Products
Troy, NY 12182. |
| Scotch Brite No. 7447 | - Building Services & Cleaning
Products Division |
| 3M INSTA-LOK Hand
Block No. 952 | 3M Company
St. Paul, MN |

7.3 Cleaning Machines

- | | |
|---|--|
| Sunstrand Model 1000a
or Model 1000F with
No. URM 2165 shoes and
URM 2119 back-up pads | - Sunstrand Machine Tool Division of
Sunstrand Corporation
Belvidere, IL 61009 |
|---|--|

7.3.1 This air-drive sander has two pads approximately 4" x 9". Between both pads of the Model 1000A is a perforated tube which sprays water unto the panel surface during cleaning. Hence, two 1/4" hose attachments are provided: One for water and the other for compressed air. This sander operates on 70-80 psig and 10-12 cfm. As with all air-driven motors, an in-line oiler must be provided between the compressor and the sander to entrain lightweight non-detergent machine oil (not to exceed 10SAE) in the air and thus provide lubrication for the sander. The lubrication rate is five (5) drops per minute through the sight glass of a fog type lubricator or one (1) drop every 2 minutes for drip type lubricator.

7.3.2 Air Compressor

For maximum efficiency, a compressor with about 100 psig capacity will be required; the air delivery rate required is determined from the number of tools that will be simultaneously operated. For example, 24 cfm could be required to operate two (2) sanders (each requiring 12 cfm). For small jobs and cleaning tests, a substantially smaller (50-75 psig and 4-6 cfm) portable compressor may be used. However, cleaning will require more time owing to slower action of the pneumatic sander.

7.4 Wipe-on Surface Protectants

- Aluma-Care - The Coricone Corporation
540 Frontage Road
Northfield, IL 60093
- AMS 300 Series - Aluminum Maintenance Systems, Inc.
22951 LaCadena Drive
Laguna Hills, CA

7.5 Waxes

- Aerowax - Boyle-Midway, Inc.
New York, NY 10017
- Beautifloor Liquid Wax No. 5051/Wax Emulsion/Wax Plate 12 - S.C. Johnson & Sons, Inc.
Carnu Street
Racine, WI
- Dupont 7 New Car Wax - E.I. DuPont de Nemours & Company
Wilmington, DE
- Paste Wax - Texize Chemicals, Inc.
Greenville, SC
- Triumph - Arcal Chemicals, Inc.
7320 86th Avenue
Seat Pleasant, MD
- X-OL - Turco Products
Division of Purex Corporation, Ltd.
Wilmington, CA

7.6 Gloves

- Buna-N Solvex - Edmont-Wilson Company
Coschocton, OH

7.7 Clean-up Solvents

- MEK Acetone
- Xylene Toluene