



CHAPTER VII

SURFACE FINISHES

FINISHES

7. SELECTION OF FINISHES

It is strongly advised that only Surface Finishers in possession of the relevant SABS mark (mark holders) execute the surface finishing of Architectural Aluminium Products.

Specifiers are advised to insist on the AAAMSA Surface Finishing Certificate to ensure compliance with the relevant SANS Standards and thus receive confirmation of the quality of the surface finish supplied.

7.1 ANODISING

All anodising shall be executed in strict accordance with SANS 999.

It is imperative that the correct coating thicknesses (Coating Grades) are specified for the anodic layer as described in SANS 999 as follows:

Grade AA15 (Average coating thickness 15 micron) shall be used for products subject to mild atmospheric conditions and in rural environments that are free from industrial pollution and marine influence.

Grade AA25 (Average coating thickness 25 micron) shall be used for products used in the following cases:

- a. Western Cape (i.e. west of Hermanus) - within 25km of the sea.
- b. Southern and Eastern Cape- within 20km of the sea.
- c. Natal South Coast (i.e. south of Amanzimtoti) - within 15km of the sea.
- d. Durban area and Natal North Coast - within 25km of the sea.

In addition to the above, any site within 5km of a chemical or related process plant (i.e. pulp and paper mills, oil refineries, petrol-from-coal plants, steel mills and metallurgical process plants) meets the criteria for use of Grade AA25 (25 micron thickness).

Specifiers should note that wind-borne sand might be abrasive, leading to loss of anodised film by abrasion. Such areas might include the Western Cape Coast and the Karoo around Beauford West. In such areas Grade AA25 (25 micron thickness) may have to be specified. Specifiers and manufacturers should insist on Certificates of Conformance that the anodising has been executed in accordance with SANS 999.

7.2 POWDER COATING

All stages of powder coating shall be executed in strict accordance with SANS 1796.

All aluminium alloy extrusions, sheet or preformed sections shall be thoroughly cleaned with an alkaline or acid solution to produce a surface that is free from oil, grease or any other contaminant that might impair the performance of the pre-treatment. A chemical conversion pre-treatment shall be applied in accordance with the recommendations of the manufacturer of the chemical conversion pre-treatment.

The amount of chemical conversion pre-treatment to be deposited depends on the type used and shall be within the limits specified in SANS 1796.

The pre-treated aluminium alloy extrusions, sheet and preformed sections shall be handled with clean lint-free gloves, shall be stored in a clean, dry atmosphere and shall be protected from dust and abrasion.

The organic powder shall be applied and cured in accordance with the powder manufacturer's instructions. The application shall take place as soon as possible, and in strict accordance with SANS 1796. Delays may result in inferior adhesion or inferior weathering properties (or both).

The manufacturers of the architectural aluminium products are advised to use only powder coating applicators in possession of powder manufacturer's approved applicators certificates. In case of powder coating/anodising used in conjunction with structural glazing (flush glazing) the specifier, i.e. Architect, Quantity Surveyor, Developer or owner, shall insist that quality procedures for the finishes on all aluminium alloy extrusions, sheet or preformed sections, are executed and recorded in strict accordance with SANS 999 for anodising and for powder coating in strict accordance with SANS 1578 (powder) and SANS 1796 (application of powder coating).

7.3 INTERNATIONAL QUALITY STANDARDS FOR SURFACE FINISHINGS

Qualicoat®/Qualinod® is a quality label organization, recognized in countries of Europe, Asia, Australia, America and Africa, committed to maintaining and promoting the quality of surface finishes on aluminium and its alloys for architectural applications.

The label defines comprehensive quality requirements and monitors compliance by licensed plants worldwide. The Qualicoat®/Qualinod® quality requirements surpass certain SANS quality requirements. Manufacturers of Architectural Aluminium Products may be required to meet these standards when operating in the countries which recognise this quality label.

7.4 COIL COATING

Architectural Aluminium flat products are painted by “fully automatic coil coating process which consists of:

Multi-stage Chemical Cleaning: This chemical process includes acid and alkali cleaning, smut removal processes and detergent cleaning.

Chemical Surface Conversion: This chemical treatment of the aluminium surface ensures optimum bonding of paint to the metal surface.

Paint Application: The computer controlled roller application of paints and primers ensures a surface of evenness, smooth, blemish-free and uniform paint thickness.

Oven Cure: This ensures that the paint achieves their optimum properties of extended, high performance life.

Currently the following colours are available:

- Group I The Solid Earthtone Colours (Sand, Terracotta, Burgundy, Slate Blue, Azure Blues, Opal Green, Cloud Grey)
- Group II The Bright Whites and Pastels (Pure White, Pearl Cream)
- Group III The Metallics (Metallic Silver, -Bronze, -Champagne, -Silver Blue)
- Group IV The Corporate, Heavily Pigmented Colours (Turquoise Green, Deep Green)

PAINT CHEMISTRY

- Group I, II and III 70/30 PVDF/Acrylic blend Topcoat
- Group IV 50/50 PVDF/Acrylic Pigmented Coat plus 70/30 PVDF/Acrylic Clear Topcoat

Performance of Coil Coating		
Property	Performance	
	Polyvinilidene difluoride (PVDF)	Advance Polymer Systems
Coating Thickness	Group I 23 microns ±5 microns Group II 32 microns ±5 microns Group III 23 microns ±5 microns Group IV 40 microns ±5 microns	23 microns ±5 microns
Humidity Resistance Blistering (ASTM D 2247)	3000 hours Rating 10, No Blisters	1000 hours
Accelerated Weathering B: QUV (ASTM G53)	2000 Hours Colour: 5E Hunter Units Max. Chalking: Rating 8	500 Hours
Accelerated Weathering B: Dew Cycle Weatherometer (ASTM D3361)	1000 Hours Colour: 5E Hunter Units Max. Chalking: Rating 8	
Acid Salt Spray (ASTM B117)	3000 Hours Scribe: No Creepage	1000 Hours
Formability (ASTM D4145)	0T to 2T	0T to 2T
Pencil Hardness (ASTM D3363)	HB to 2H	HB to 2H
Specular Gloss (ASTM D2794)	20-35 at 60°	5J
Reverse Impact (ASTM D2794)	No loss of Adhesion	
Flame Test (ASTM E84)	Class A Coating	

7.5 MAINTENANCE OF SURFACE FINISHES

7.5.1 INTRODUCTION

These recommendations are intended to assist Architects, Contractors, Owners, Building Managers etc. who are concerned with the cure and maintenance of coatings to Architectural Aluminium installations. The suggested methods are an aid in establishing safe, sound cleaning and maintenance procedures. Although certain proprietary products are mentioned they are included merely as an aid in identifying such materials. No attempt has been made by AAAMSA to evaluate their effectiveness, nor does listing here constitute an endorsement.

The Aluminium Surface Finishers Association operating under the aegis of the Aluminium Federation of South Africa is the body which provides expert advice in matters related to finishing and maintenance of coatings for Architectural Aluminium.

7.5.2 GENERAL

- Anodic and Powder Coatings on aluminium do not normally show an appreciable amount of dirt collection. In many atmospheres dirt or soil would not indicate a detrimental risk to the coating, but cleaning and surface care may be desirable for the sake of appearance. Cleaning may become desirable in areas where heavy industrial deposits have dulled the surface, where materials from construction processes have soiled the surface or where cleaner run-down from other surfaces should be removed. Local atmospheric conditions as well as building location within a geographical area quite naturally have an effect on cleanliness. Very often, rainfall may be sufficient to keep exterior surfaces appearing clean and bright. These factors coupled with owner attitude regarding surface appearance probably would determine cleaning schedules. Areas that are in direct sight at lower levels would more likely be cleaned. Less obvious areas would be less frequently cleaned or in some instances, hardly at all. Cleaning of anodised and powder-coated aluminium may be scheduled with other cleaning. For example, glass coated aluminium components can be cleaned at the same time.
- Cleaning will be more often required in areas of low rainfall or in heavily industrialized areas. Foggy coastal regions with frequent cycles of condensation and drying may tend to give a build-up of atmospheric salts and dirt. In any climate, sheltered areas such as overhangs may become soiled because of lack of rain-washing. Thorough rinsing is especially important after cleaning of these sheltered areas.

7.6 CLEANING OF ANODIC COATINGS ON ARCHITECTURAL ALUMINIUM

7.6.1 CLEANING RECOMMENDATIONS (Anodic Coatings)

- Correctly identify the aluminium finish to be cleaned when selecting an appropriate cleaning method. Check specifications and/or as built drawings if in doubt as to finish.
- Never use aggressive alkaline or acid cleaners on aluminium finishes. It is important not to use cleaners containing trisodium phosphate, phosphoric acid, hydrochloric acid, hydrofluoric acid, fluorides, or similar compounds on anodised aluminium 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.
- 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 non-uniformity 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 the freezing temperatures or when metal temperatures are sufficiently cold to cause condensation.
- 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 and as long as practical.
- Cleaners containing strong organic solvents will have a deleterious effect on organic overlay coatings, but not on anodised aluminium. 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.
- 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 aluminium. 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 aluminium finish.

7.6.2 REMOVAL OF LIGHT SURFACE SOIL (Anodic Coatings)

Removal of light surface soil may be accomplished by alternative methods as described in (a), (b), (c) and (d). 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 the 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.

- (b) The simplest procedure is to flush the surface with water using moderate pressure to dislodge the soil.
- (c) If the soil is still present after air-drying the surface, clean the surface with a brush or sponge and water (concurrent spraying with water and sponging).
- (d) 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 with a vertical motion. The surface must be thoroughly rinsed by spraying with clean water and thoroughly dried.
- (e) 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 manufacturers safety recommendations.

7.6.3 REMOVAL OF HEAVY SURFACE SOIL (Anodic coating)

If surface soil still adheres after using procedures under 7.6.2, cleaning with the assistance of an abrasive pad can be employed.

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

- Hand scrub the metal surface using a palm-size 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 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.
- Scrubbing with a nylon-cleaning pad wet with surface protecting material is also suggested for removing stubborn soils and stains.
- 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 cleaner is permitted to dry on the surface.
- The rinsed surface is either permitted to air dry or is wiped dry with a chamois, squeegee or lint-free cloth.
- Use of power cleaning tools may be necessary for removal of usually heaving soils from large areas including panels and column covers. In such cases, an air-driven reciprocating machine fitted with Norton 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 connecting 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 followed by vertical passes). Areas, which are not accessible with the machine, must be manually cleaned as in Paragraph 7.6.1.

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 un-cleaned lower portions of the building any cleaner rundown to avoid staining.

7.7 CLEANING OF POWDER COATINGS ON ARCHITECTURAL ALUMINIUM

7.7.1 CLEANING RECOMMENDATIONS (Powder Coating)

Construction soils, including concrete or mortar, etc., should be removed as soon as possible. The exact procedure for cleaning will vary depending on the nature and degree of soil. Try to restrict cleaning to mild weather. Cleaning should be done on the shaded side of the building or ideally on a mild, cloudy day. Method of cleaning, type of cleaner, etc., of one component of the building must be used with consideration for other components such as glass, sealants, painted surfaces, etc.

- Over cleaning or excessive rubbing can do more harm than good.
- Strong solvents or strong cleaner concentrations can cause damage to painted surfaces.
- Avoid abrasive cleaners. Do not use household cleaners that contain abrasives on painted surfaces.
- Abrasive materials such as steel wool, abrasive brushes, etc., can wear and harm finishes.
- Avoid drips and splashes. Remove run downs as quickly as possible.
- Avoid temperature extremes. Heat accelerates chemical reactions and may evaporate water from solution. Extremely low temperature may give poor cleaning effects. Cleaning under adverse conditions may result in streaking or staining. Ideally, cleaning should be done in shade at moderate temperature.
- Do not substitute a heavy duty cleaner for frequently used mild cleaner.
- Do not scour painted surfaces.
- Never use paint removers, aggressive alkaline, acid or abrasive cleaners. Do not use trisodium phosphate or highly alkaline or highly acid cleaners. Always do a test surface.
- Follow manufacturers recommendations for mixing and diluting cleaners.
- Never mix cleaners.
- To prevent marking, make sure cleaning sponges, cloth etc. are grit free.

7.7.2 REMOVAL OF LIGHT SURFACE SOIL (Powder Coating)

Removal of light surface soil may be accomplished in several ways. Some testing is recommended to determine the degree of cleaning actually necessary to accomplish the task. Ideally, an initial step of forceful water rinse from the top down is recommended prior to any cleaner application. Significant benefit is gained with some type of surface agitation. Low water volume with moderate pressure is much better than considerable volume with little pressure. Physical rubbing of the surface with soft, wet brushes, sponges or cloth is also helpful.

- The simplest procedure would be to apply the water rinse with moderate pressure to dislodge the soil. If this does not remove the soil, then a concurrent water spray with brushing or sponging should be tested. If soil is still adhering after drying, then a mild detergent will be necessary.
- When a mild detergent or mild soap is necessary for removal of soil, it should be used with brushing or sponging. The washing should be done with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Apply cleaners only to an area that can be conveniently cleaned without changing position. The surface must be thoroughly rinsed with clean water. It may be necessary to sponge the surface while rinsing, particularly if cleaner is permitted to dry on the surface. The rinsed surface is permitted to air dry or is wiped dry with a chamois, squeegee or lint free cloth.
- Run down of cleaner (from any operation) to the lower portions of the building should be minimized and these areas should be rinsed as soon as and as long as necessary to lessen streaking, etc. from unavoidable run down, lower areas should be kept wet or flooded with water. Do not allow cleaning chemicals to collect on surface or to “puddle” on horizontal surfaces, crevices, etc. These should be flushed with water and dried. Always clean coated surfaces down from top to bottom and follow with a thorough rinsing with clean water. (With one story or low elevation buildings, it is recommended to clean from bottom up and rinse from top down).

7.7.3 MILD DETERGENTS

Mild soaps or detergents ruled safe for bare hands should be safe for coated aluminium. Stronger detergents such as some dishwasher detergents should be carefully spot tested. Some of the latter would necessitate rubber gloves, long handled brushes, etc. With any, the finish should be thoroughly rinsed with clean water and dried. Some mild cleaning solutions, which would comprise of selected wetting agents in water solution, are available for automatic building washing machines. These machines would have built in brush agitation, squeegee, filtration and recirculation; in some, a fresh water connection may be provided

7.7.4 REMOVAL OF HEAVY SURFACE (Powder Coating)

- Some type of mild solvent such as mineral spirits may be used to remove grease, sealant or caulking compounds. Stronger solvent or solvent containing cleaners may have a deleterious or softening effect on paints. To prevent harm to the finish, these types of solvent or emulsion cleaners should be spot tested and preferably the coating manufacturer should be consulted. Care should be taken to assure that no marring of the surface is taking place in this manner since this could give an undesirable appearance at certain viewing angles. Cleaners of this type are usually applied with a clean cloth and removed with a cloth. Remaining residue should be washed with mild soap and rinsed with water. Use solvent cleaners sparingly.

It may be possible for solvents to extract materials from sealants, which could stain the painted surface or could prove harmful to sealants; therefore, these possible effects must be considered. **Test a small area first.**

- If cleaning of a heavy surface soil has been postponed or in the cases of an especially tenacious soil, stubborn stains, etc., a more aggressive cleaner and technique may be required. Cleaner and technique should be matched to the soil and the painted finish. Some local manual cleaning may be needed at this point. Always follow the recommendations of the cleaner manufacturer as to proper cleaner and concentration. Test clean small area first. Cleaners should not be used indiscriminately. Do not use excessive, abrasive rubbing as such may alter surface texture or may impart a “shine” to the surface.
- Concrete spillage that has dried on the painted surface may become quite stubborn to remove. Special cleaners and/or vigorous rubbing with non-abrasive brushes or plastic scrapers may be necessary. Diluting solutions of Muriatic Acid. (under 10%) may be effective in removing dried concrete stains, however, a test area should be tried first and proper handling precautions must be exercised for safety reasons. Also, effective proprietary cleaners for concrete and mortar staining are available. Contact your supplier for further enquiries.
- Never Mix Cleaners – The mixing of cleaners may not only be ineffective, but also very dangerous. For example, mixing of chlorine containing materials such as bleaches, with other cleaning compounds containing ammonia, can result in poison gas emission.
- Always rinse after removal of heavy surface soil.