Maintenance Manual

CLEANING METHODS

Routine cleaning of the Alubond U.S.A ACP panel surface is recommended. It may be washed with water and mild detergent followed by a clean water rinse. The frequency of cleaning and the choice of suitable cleaning agent depend largely on the position of the building being cleaned and degree of contamination. Do not clean sun-heated surfaces (above 400 C) to avoid rapid drying which may lead to stain formation. The cleaning operation must be followed by a thorough rinse with clean water to ensure the removal of all remnants of the cleansing agent. A final wipe down by means of a sponge, leather or wiper is necessary to avoid water stains. The Alubond U.S.A ACP panel is resistant to industrial atmospheres and is self-cleansing in most environments. As with all claddings, improvements in durability is achieved by an annual wash down with warm water so to avoid the buildup of deposits. The Alubond U.S.A ACP panels is anti static and more self-cleansing than many of the alternatives.

Scope

This manual is applied to the cleaning and maintenance procedures for the external cladding of the Alubond U.S.A ACP panels on which Stove Lacquered - based Fluorocarbon (PVDF), Polyester, and Acrylic paints are coated.

Purpose

The purpose of this chapter is to assist project people such as architects, contractors, building owners, et al., who are concerned with and / or engaged in the cleaning and maintenance of the external cladding of the Alubond U.S.A ACP panels, especially in establishing safe and sound cleaning procedures.

General Notes

Not only Stove Lacquered - based fluorocarbon coating but also precolor, polyester acrylic resin or normal organic coatings onto aluminum will not show an appreciable amount of dirt collection; however the dirt and soil depends largely on the local atmospheric conditions where the building exists. In heavily industrialized area, coastal areas and the areas where construction works are being carried out, it might be necessary to increase the cleaning frequency, not only for the sake of appearance but also for the purpose of removing the dirt and soil likely to be detrimental to the coating surface. Very often, rainfall is effective to remove dirt and to keep the external cladding clean. In areas of low rainfall, this effect may not be expected and accordingly the cleaning frequency might be increased. Even in the same building, portions which are in direct sight at lower levels might be cleaned more frequently, and less obvious portions might be cleaned less frequently or in some instances hardly at all. And in these areas, detrimental components might be deposited on the coated surface. These factors would determine the cleaning schedule. In planning the actual cleaning schedule of the external cladding, the schedule might be adjusted with other cleaning operations for glass and painted aluminum components.

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Cleaning Frequency

Cleaning is required more often in the following areas in general:

Areas Of Low Rainfall

- Heavily industrialized areas
- The areas where construction works are being carried out
- Foggy coastal regions with frequent cycles of condensation and dryness. In foggy and coastal regions, frequent cycles of condensation and dryness take place and salty components and dirt tends to deposit. Especially, sheltered areas such as overhangs may be soiled easily because of lack of washing by rain.

Machine Cleaning

Once automatic wall cleaning machine is considered to be used, a pre-test should be done in the early stage of equipment design to confirm that there is no detrimental effect on the coating as well as to clarify the cleaning effect and frequency.

Cleaning Procedures

After project completion, construction soils including concrete or mortar etc., should be removed as quickly as possible. In most cases, the following suggested frequency would be required to keep the coated surface clean as good as it can remain.

Building Situated	Wash Frequency
Rural area	0.5 times / Year
Urban area	0.5 – 1 times / Year
Low rainfall and / or coastal area	1 times / Year
Heavily industrialized area	1 – 2 times / Year

Soil Removal

The simplest procedure would be water rinse with moderate pressure to remove the soil. If this does not remove the soil, then a concurrent water spray with sponge should be tested. If the soil is still adhering after drying, then a mild detergent or 5 - 10% IPA (Isopropyl Alcohol) solution will be necessary. In order to remove light soil, it is recommended to do some tests to determine the degree of cleaning actually necessary to accomplish the task. Prior to any cleaner application, a forceful water rinse from top to down is recommended as an initial step of tests. The lower water volume with moderate pressure is much better than the considerable water volume with little pressure. When cleaner is applied, physical rubbing with soft sponges or soft rags fully dipped into the liquid solution is also helpful.

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Clean Detergents / Solutions

When a mild detergent or 5 - 10% IPA solution is used for removing soil, it should be used with soft sponges and / or soft rags. The washing should be done with uniform pressure, and normally the operation is done with a horizontal motion first and then with a vertical motion. After washing, the surface should be thoroughly rinsed with clean water, and the rinsed surface is air-dried or wiped with chamois, squeegee or lint-free cloth.

Operation Sequence

Dripping of cleaner to the lower portions of the building should be minimized. When some rundown is unavoidable, the areas should be rinsed as soon as possible, to eliminate streaking. Generally, the clean and rinse operations move from top to bottom of the building. Avoid drips and splashes during cleaning. Remove dripping as quickly as possible. Note: In case of one storey or low elevation buildings, it is recommended to CLEAN FROM BOTTOM UP and RINSE FROM TOP DOWN.

Coating Protection

Always be aware that it is very difficult to remove sealant and machine oils after hardening. During construction, the protective film should be remained as long as possible, to protect the coated surface from stains caused by sealant and machine oils. If adhered, these stains should be removed as early as possible before hardening, with suitable detergents. Remarks A. Do not use strong organic solvents, such as MEK (Methyl Ethyl Ketone), MIBK (Methyl Iso-butyl Ketone), Triclene and paint thinner. B. Do not mix different cleaners. If cleaners needed to be mixed, please follow the manufacturer's instructions. Generally the cleaner containing abrasives cannot be used. Do not mix cleaners. Avoid excessive rubbing, as it may deter the surface gloss. C. Avoid extreme temperature to clean the coated surface. Heat may accelerate chemical reactions and may evaporate the water from solution. Extremely low temperature may give poor cleaning effects. On the contrary, cleaning under higher temperature may result in streaking or straining. Ideally, cleaning should be done on the shaded side of the building under moderate temperature.

Scratch Prevention

Make sure that Cleaning sponges or rags are grit free to prevent the coated surface from scratch. Avoid over cleaning or excessive rubbing.

Residue Cleaning

In the event adhesive residue is seen on the panels use.

Protective Film Removal

It is recommended to remove protective film within 3 months of installation if the protective film remover is exposed for a longer duration, there is a possibility of the film sticking to panels. In this event remove the film carefully in small steps and clean any residue as per above.

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Protective Peel-Off Foil

Unless otherwise specified, Alubond U.S.A is supplied with a factory applied peel-off foil for protection of the coated surface. Removal of the protective foil is recommended as soon as possible after installation. In hot weather conditions, some residual glue may stick to the stove-lacquered panel's surfaces. Please ask for specific instructions for removal.

Ozone Friendly

Neither during the production of Alubond U.S.A nor after being applied as a building cladding are volatile propellant agents of type CFC set free. Alubond U.S.A core material does not contain nitrogen, chlorine or sulphur. By means of its positive contribution to the protection of the environment, the choice of Alubond U.S.A for a huge variety of projects is brilliant.

Storage

Protect pallets during storage against rain, penetration of moisture or condensation. Pile pallets in stacks one on top of the other (do not place the panels in an upright position); Stacks must not comprise of more than 6 pallets of identical size. Avoid storage for a period of more than 6 months.

Directional Color Appearance

To avoid possible reflection differences, it is recommended that panels be installed in the same direction i.e. with the orientation of the marking shown on the peel-off-foil of the individual panels running parallel to each other. Also for a single project, use as much sheets as possible from one production batch to avoid even slight variations of color. If different batches at different times are to be used care must be taken to match the color of the previous batch before proceeding with the installation. In case of minor color deviation, it is advisable to use the new panels in a different row and / or away from the previous lot.

Recycling

Alubond U.S.A ACP is fully recyclable, i.e. both the core material and the aluminum cover sheets can be re-melted and used for the production of new material.

Alubond U.S.A FR-A2 Method of Statement

Type of Work

1.1 Spandrels
1.2 Copings
1.3 Flashing
1.4 Internal Wall Panels
1.5 External Wall Panels
1.6 Column
1.7 Soffits
1.8 Materials

Materials

Alubond A2 Sheets are produced with pre-painted Aluminum Coils, and manufactured by M/s. Eurocon Building Industries FZE , Hamriyah Free zone ,Sharjah , UAE . The panel is visually flat.

Paint Finishes

The A2 panelsare pre-coated normally in Kynar 500 PVDF coatingsfrom P.P.G/Akzo /Becker but others finishes such as polyesters are also available.

Packing & Shipping

The A2 sheets are dispatched from the factory individually covered with a 1.0 mm Plastic film applied at the coating stage. They are packed on wooden skids cushioned with Styrofoam wrapped in water resistant paper and protected on the top and sides with 13mm chipboard with metal banding. This ensures no damage on arrival at the factory. The skids will then be shipped to U.A.E. ports by containers.

Site Survey

The site will be surveyed from the datum levels supplied by the contractors using a the odolite and the building sizes returned to the drawing office.

Design Engineering

1) The site sizes will be applied to the previously approved drawings and the necessary amendments made.

2) Exploded workshop drawings will then be prepared for each different panels by Autocad and Microstation operatives.

3) Checks are then made to see that any changes in panel size do not affect the structural calculations. If major changes appear these will be notified to the contractors with the relevant amended calculations.

Manufacture

Sawing Sheets: The sheets will be cut to size on vertical frame saw with digital measurement to ensure accuracy, using a 203mm dia extra fine carbide tipped 60 tooth saw blade.

Alubond U.S.A FR-A2 Method of Statement

Routing

The sheet will be vee- grooved using the same vertical frame saw with a 83mm dia. Blade rated at 11,000 RPM. The Vee of the tooth angle will be 105 degrees and 0.51mm minimum will be left at the bottom of the groove..

Roll Forming

A 3 Roller pyramid type rolling machine is used to curve the Alubond A2 Panels. Usually, roller diameter from 152 mm to 64 mm can be used depending on the width of the panel. Multiple passes are made through the rollers increasing the curvature until the desired radius is achieved. For 6mm thickness a minimum radius 90mm can be achieved.

Assembly:

1) The corner cut outs are removed by panels.
2) The pre-painted panels are land bent to form trays and the four corners are reinforced with angles fixed in position with either cadmium Plated screws or aluminum pop rivets.
3) The attachments clips are all fixed like wise to the panels at approximately 300mm centers. These clips transfer the wind load on the panel to the structural supports. The clips are staggered from one panel to the next.

Transport to Site Storage:

The completed A2 panels are packed on the original skid with polystyrene in between each panel to ensure the panels re not damaged in transit to the site storage

Panel Renforcement:

Alubond A2 Panels may be stiffened to resist wind load and reduce panel deflection to that specified. Stiffeners in the form of Aluminium angles or I section are adhered to the rear face of the panel at 600mm centres. Stiffeners are fixed across the shortest distance and when screwed at each end liked to the support structure, act as miniature beams.

Installation on Site:

1) *Cradles*

Where necessary cradles and / or boson's chairs will be used for the installation where scaffolding is not available or practical

2) *Substructure:*

1) Settings out is carried out with the use of a theodolite or laser level.

Alubond U.S.A FR-A2 Method of Statement

2) The galvanized / Aluminium fixing brackets will be bolted (using G. I Anchor bolt M8 x 65mm long) to the concrete structure following the setting out lines.

3) The horizontal and vertical rails will be positioned working from both concerns towards the center of the wall face.

4) If required the rockwool insulation panels will be placed in position and the vapour barrier laid over the surface.

5) The prefabricated panels will be lung on the substructure and fixed with a single screw to ensure they do not shuffle. Other screws are fixed to slotted holes to allow for both vertical and horizontal expansions.

6) A spacer gange is used between adjacent panels to ensure a consistent gap between the panels.

7) A strained piano wire vertically down the building will ensure the vertical alignment of the first panel. The remainder will then follow accurately.

8) The center panel will be measured on site and fabricated to order. A variation of + 0r 10mm over a panel width of 1.0 meter will not be perceivable where as small variations in the panel gap would show up easily

Sealant

A U Channel will be placed between the panels and the joint sealed with Fire /Weather sealant.

Snagging

On the completion of each face or area, snagging will be carried out and substantial completion of work in that area taken from the contractor

Cleaning down

After all other trades have vacated the area the protective film will be removed and the panels joints cleaned down with soapy water. Cleaning of the panels should be carried out atleast twice yearly..

FR-A2 ACP STORAGE & HANDLING

Handling & storages:

The pallets must be handled carefully during transportation and unloading.

- Do not accept if the pallets are received in open condition. If received in damaged condition, then independent surveyor must be called and inspected for claims.
- On arrival of cargo please check if the cargo has arrived in good condition. In case the goods have arrived in wet condition, the packing needs to be unwrapped immediately to avoid further damage due to dampness. If found wet, the sheets need to be left to dry on its own. The sheets should be handled only once it is fully dried up.
- Upon arrival, the sheets should be completely protected from moisture during storage. The sheets should not be stored in wet/moist conditions be it in indoors or outdoors.
- While opening the packages, if any moisture /water particles are present in-between the sheet surfaces, then wipe with dry cotton sponges /clothes to remove that. Once again the sheets need to be left open to dry.
- Store the pallets stacked one over the other with a maximum of 4 pallets of the same format stacked on top of each other.
- The pallets should be stored only on flat surface in horizontal condition. Longer specification sheets should be stored at bottom
- Individual panels must be lifted off the pallet by two people holding all four corners and not dragged over each other. Carry the panels vertically. Wear gloves to avoid staining.
- No foreign particles should be there in between sheets while storage as this would leave scratches / marks on the sheet surface.
- In order to avoid the processing failures strictly follow the Alubond fabrication Instructions manual.
- If the sheets are are exposed to wet condition for a longer period (eg: more than 24 hrs) therefore the water penetrating to the core of the panel ,then the product warranty will not be applicable.
- If the sheets are exposed to a temperature of more than 90°c for more than one hour ,then the product warranty will not be applicable.

Alubond U.S.A
Fire Retardant Metal Composites

FR-A2 ACP STORAGE & HANDLING

Alubond U.S.A

The following should be observed with regard to the ALUBOND USA protective film:

- Storage of sheets exceeding 6 months should be avoided.
- Please make sure the protective film stays intact during transit or while handling the sheets. If the protective film is torn the area of the sheet exposed could accumulate dirt / dust further damaging the panels. In order to avoid that, manually stick the protective film &aluminum composite sheet edges together using high adhesion packaging tape. In case of an unlikely situation of protective film being received in totally damaged condition, please contact our technical team immediately for solutions.
- The protective film should not be exposed to direct sunlight or high variance in temperature as it would affect the durability of the protective film upon installation.
- Do not mark the sheet surface or protective film with inks (markers), tapes or labels. Solvent or plasticizer may penetrate the film and affect the lacquered surface.
- Should the protective film partially peel off during processing, dirtied edges can occur in course of time
- Remove protective film as soon as possible after installation. Protective film that remains on panels for an extended period of exterior exposure may cause difficult while removing the film.

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Figure 2. Samples

Results

The average specular reflectivity of the Alubond samples for the range of 300 nm to 2500 nm is shown in Table 2.

Table 2. Average reflectivity values

No	Material	Average Reflectance (300nm to2500nm)			Average Reflectance (Visible Light Spectrum - 390nm to 700nm)		
		Total	Diffuse	Specular	Total	Diffuse	Specular
1	ALM 102	57.9	55.4	2.5	42.3	39.9	2.4
2	ALM 103	64.6	61.8	2.9	39.7	36.5	3.2
3	ALM 104 CCL	65.3	63.0	2.3	55.0	52.7	2.4
4	ALM 106	54.5	53.0	1.5	39.2	37.2	1.9
5	ALM 107 CCL	63.5	61.1	2.3	48.8	46.5	2.3
6	ALM 108 CCL	55.2	53.3	1.9	38.5	36.4	2.1
7	ALM 109 CCL	65.6	63.7	1.9	45.3	43.0	2.3
8	ALM 112	69.6	67.1	2.4	52.5	50.5	2.0
9	ALM 113	58.2	56.3	1.9	40.9	39.1	1.7
10	ALM 115 CCL	61.4	58.3	3.1	45.4	42.9	2.5
11	ALM 143	14.7	11.9	2.8	9.0	6.2	2.8
12	ALS 117	67.4	65.9	1.5	40.2	38.2	2.1
13	ALS 119 CCL	30.2	27.5	2.6	14.8	12.0	2.8
14	ALS 120 CCL	30.2	26.9	3.3	12.3	9.1	3.2
15	ALS 122 CCL	18.5	16.2	2.3	16.7	14.4	2.2
16	ALS 124 CCL	27.6	25.4	2.2	11.6	9.1	2.5
17	ALS 125 CCL	64.5	62.6	1.9	67.5	66.0	1.5
18	ALS 126 CCL	69.6	68.0	1.7	64.0	62.6	1.4
19	ALS 130	10.9	8.1	2.8	6.7	4.1	2.6
20	ALS 137 CCL	20.1	17.6	2.5	10.9	8.2	2.6
21	ALS 142 CCL	43.3	42.2	1.1	15.4	12.9	2.4
22	ALS 377 CCL	72.7	71.2	1.5	31.8	29.9	1.9
23	JK 003 C	71.6	59.8	11.9	59.1	56.4	2.7