



Service One, Inc. Technical Paper

Maintenance and Restoration of Architectural Aluminum

Resin Coated Aluminum

METAL CHARACTERISTICS AND DESCRIPTION OF REFINISHING METHODS

Most architectural aluminum produced in the last 30 years is either protected with an anodized coating or a painted finish. On Commercial projects, the resin coating, or painted finishes are a durable, baked on finish, typically containing Kynar 500. Kynar 500 is a revolutionary fluoropolymer coating and is used on aluminum panels, extrusions, column covers etc, and are commonly manufactured under trade names, which include Alucobond, Polycron III. Duracron, Duranar, Fluoropon, Duralite and Steel-O-Bond, to name just a few.

These factory-applied finishes are applied with electrostatic spray over aluminum and then oven cured for a low maintenance product. They ARE NOT MAINTENANCE FREE! If these surfaces are not cleaned periodically (twice per year in some environments is a minimum and up to 3 years is generally the longest period of deferred maintenance allowed before permanent staining will occur)

Once discoloration or scratches are apparent, re-coating of painted aluminum is incorporated in the color refinishing process. The varieties of coatings we use depend on colors, metallic qualities and sheen. They are computer matched to the original color. Our coatings are the most durable custom finishes available for on-site refinishing. Doors and entrance areas, under normal conditions, will need refinishing every one to three years.

COMMON CAUSES OF SURFACE DETERIORATION

Ultraviolet deterioration, pitting, corrosion, oxidation, neglect, scratches, leeching of curtain wall sealant and factory pollutants, chalking and fading of the finish, sand and salt abrasion and abrasion due to pedestrian traffic. If resin coated aluminum is cleaned properly and on a regular basis, it should never need refinishing. Neglect is the most common cause of deterioration.

RESTORATION OF KYNAR COATED FINISHES

Repainting Kynar 500 finished aluminum should only be a last resort when the finish cannot be restored through restorative cleaning procedures. Kynar ADS is an expensive field applied system which can endure often times as long as the factory applied coatings.

Service One has developed a proprietary process that effectively restores the original painted finish and luster of sun faded, oxidized or chalking Kynar coatings. Call for an evaluation and sample of this inexpensive technology breakthrough!

Anodized Aluminum (Duranodic finishes)

The anodizing of architectural aluminum is a process used to protect the aluminum substrate from corrosion. Bare or uncoated aluminum extrusions (also referred to as mil finished aluminum) will rapidly begin to oxidize when exposed to air, and combines with oxygen and humidity to naturally form a coating of aluminum oxide, which typically appears as a white film or deposit, and thus starts the early stages of corrosion.

Aluminum oxide is a near diamond hardness (on the Mohs hardness scale it is a 9, diamonds are the hardest, at 10). Aluminum oxide in its mineral form is used for abrasives polishing, and sandpaper. Other than diamonds, it is among the hardest mineral in the world.

For the past 50 years, the preferred method of protecting architectural aluminum and its alloys from corrosion is to form a uniform layer of Aluminum oxide about 1 to 3 microns thick (about 200 to 500 mg/ft².) by anodizing in a sulfuric or chromic acid bath while subjecting the aluminum substrate to an electric current (the aluminum is the anode). This oxide film is then sealed with hot aqueous solutions and, to create different colors off dark brown, black or gold, a dye is added.

Since the process is all performed in large tanks, with thousands of square feet per production run, it is difficult to control coating weight, thickness and color uniformity from panel to panel. The Architectural Aluminum Association has standards for color variation and thickness of the anodic coating, and allow for a fairly large variance in color, slightly apparent "waviness", as this is a natural characteristic of anodized aluminum.

Although the aluminum oxide film is very durable and has incredible abrasion resistance, the manufacturing process is inherently susceptible to thickness variations and thus corrosion resistance varies from panel to panel. Since the aluminum oxide coating during the anodizing process does not cover 100% of the aluminum substrate, the second step seal the pores. Over time, microscopic portions of this sealer deteriorate or wear off from abrasion and weather, and give pollutants such as silicate runoff from adjacent concrete a reactive surface to combine with.

COMMON CAUSES OF SURFACE DETERIORATION

Deterioration of anodized finishes occurs from inorganic deposits from silicates emanating from rain runoff, (especially from adjacent surfaces such as precast concrete), silicone sealants, or contact with dissimilar metals and metal salts.

"Panel edge staining" is a naturally occurring problem that happens to anodized aluminum paneling and facades. These semi-permanent stains dull the anodized surface. Organic staining which is tenaciously adhered to the anodized surface and is the by-product of years of acid rain, humidity, pollutants from airborne hydrocarbons, incompletely combusted hydrocarbons and runoff from window cleaning operations. The problem can be further compounded by oils from sealant leeching at silicone caulk joints, which pollutants adhere to.

Other causes include deterioration from ultraviolet light, neglect, penetration or deterioration of the factory applied electrolytic finish due to excessive oxidation, scratches, vandalism, acid rain, auto and factory pollutants and abrasion such as a high volume of pedestrian traffic. Entrances and doors receive the most abuse and thus, often require higher frequencies of color flashing and refinishing.

Duranodic Aluminum is generally sealed after it is restored, using a variety of proprietary sealers.



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