

Restoration and Maintenance of Architectural Metals

By Jim Ryan

Real estate managers and building owners recognize that well-maintained buildings increase tenant satisfaction and building image. Buildings are assets, and the value to the owners and tenants increases with the use of durable materials that can be economically maintained, such as anodized aluminum, stainless steel, and coil-coated aluminum. Architects are fond of incorporating these architectural metals into curtain wall design; and, as a result, they are commonplace in contemporary architectural design.

The use of anodized aluminum and stainless steel in exterior building design dates back to the 1960s, when metal curtain wall designs became popular with architects and developers. Some of the most renowned buildings in the United States utilize metal prominently in their curtain wall, including the John Hancock building, the Inland Steel building, and the Willis Tower (previously Sears Tower) in Chicago; the Westinghouse building in Pittsburgh; and the Equitable building in Atlanta, to name a few.

Proper maintenance is the only assurance that the metals incorporated into these curtain



This clear anodized aluminum building in Grand Rapids, MI, is in the process of being cleaned.



Close-up of painted aluminum cleaning contrast.



Restoration is progressing from both corners of the façade on this anodized aluminum Century City high-rise.

Demarcation between restored and unrestored areas of this clear anodized aluminum building is apparent.



walls maintain their intended appearance and luster. All surfaces exposed to the atmosphere collect soil, dirt, and atmospheric pollutants, depending upon the geographic area, environmental conditions, and location of the building. In extreme cases, heavy surface oxidation, surface roughening, and iridescence can develop. The accumulation of surface soils and atmospheric pollutants increases the surface roughening, staining, and discoloration of the finishes. The decorative metallic appearance of these finishes can only be maintained by periodic cleaning. If left unmaintained, the oxide coating of anodized aluminum will be attacked by these chemical deposits; and in the latter stages of unmaintained aluminum, corrosion in the form



Painted composite panel restoration after.

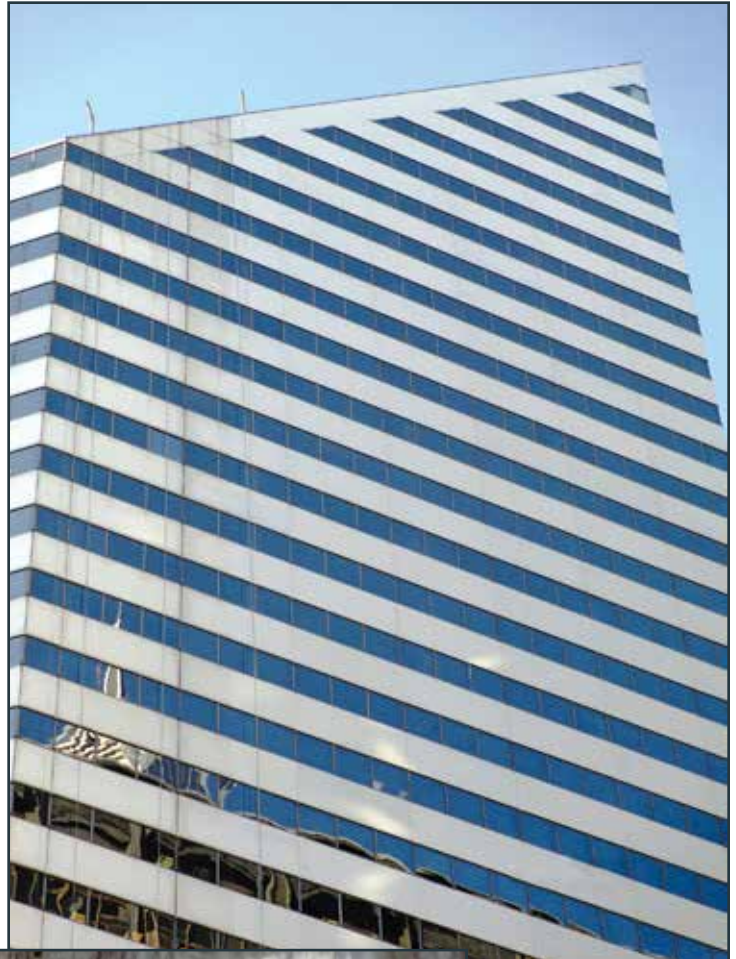


Painted composite panel restoration before.

of pitting can develop. With respect to stainless steel, these same contaminants can create corrosion in the form of red rust spots. It is generally believed by building managers that stainless steel cannot rust; however, lesser grades of stainless steel will corrode in the presence of atmospheric pollutants and moisture.

Maintenance should be figured into the life cycle costs or operations budget of each and every building in which architectural metals are used in the configuration of the curtain wall. Proper maintenance, initiated from the beginning, will prevent permanent damage caused by neglect and ensure maximum life expectancy of the finish. Material and finish information should be obtained from the metal supplier or finisher to ensure that the metal is cleaned properly for a material of its type. Cleaning procedures should be initiated as soon as practical after construction or installation to remove construction soil and accumulated environmental pollutants. Alkaline building materials such as concrete or mortar should be removed from the architectural metals and glass to prevent staining, corrosion, or etching of the metal and glass.

In the event that a building façade incorporating architectural metals is neglected for a period of years, it will be necessary to employ restorative techniques to return the metal finish to its intended appearance. In the case of anodized aluminum and stainless steel, these methods generally require the use of abrasive materials and procedures to remove heavy soil buildup, oxidation products, and tenacious pollutants from the neglected metal panels and extrusions. With the advent and extensive use of Kynar finishes in the 1980s, a new cleaning challenge was presented to building managers, owners, consultants, and contractors alike. Abrasive cleaning methods should not be utilized on coil-coated



Painted curtain wall restoration cleaning in progress on a Chicago building.

A marked contrast is apparent after cleaning of a stainless steel building in Denver.



Note contrast before (top) and after (bottom) restoration of black anodized aluminum.

aluminum or painted finishes, due to the likelihood of scratching or abrading the coating. Extra care must be taken in the cleaning of these sometimes delicate finishes. The use of strong chemicals or acid-based cleaners should not be permitted under any circumstance, regardless of material. These cleaners will very likely permanently damage the finish of the architectural metals and glass on a curtain wall in the form of corrosion, discoloration, or etching. Adjacent landscaping will also likely be damaged due to runoff of these aggressive cleaning solutions.

The American Architectural Manufacturers Association's (AAMA's) 609 specification for the cleaning and restoration of architectural metals outlines basic procedures for the cleaning and maintenance of architectural metals, with emphasis on anodized and coil-coated aluminum. Although the AAMA specification provides guidelines for cleaning, the selection of a contractor with specialized knowledge and experience in the field of the restoration and maintenance of architectural metals is imperative to ensure optimal results. The AAMA cleaning specification in the hands of three or four inexperienced contractors could result in three or four very different interpretations and results. There are many documented cases in which the local window cleaner convinced a property manager that he had the know-how to clean or restore a metal curtain wall system, only to fail miserably and/or permanently damage the appearance and finish of the expensive curtain wall materials.

There are numerous cases in which buildings were neglected for extended periods of time, and restorative cleaning techniques did not

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restore the finish to an acceptable level of appearance. Also, negligent cleaning procedures implemented by inexperienced contractors have created these very same situations: The metal could no longer be restored. In these cases, the application of field-applied architectural coatings may provide the desired result. Though this process is far more costly than restorative cleaning, it does have advantages in the selection of virtually any custom color available. When it is at all possible, the original factory finish should be retained, as these finishes are far more durable and lasting than air-dry field applications of architectural coatings.

No less important, the contractor selected for this specialized work should have extensive experience and certifications in access solutions as they relate to the use of scaffolding, swing stages, aerial equipment,

and related safety requirements. Every building is different with respect to roof suspension systems, tiebacks, roof access, and overall building design. This experience is equally as important as the knowledge that the contractor has in the area of the cleaning and maintenance of architectural metals.

Consultants—with the assistance of the manufacturers, finishers, and fabricators of these curtain wall systems—should be able to provide guidance to building owners, property managers, and contractors to ensure that these expensive assets are maintained to safeguard a long, productive service life. 

Jim Ryan

Jim Ryan has been engaged in the curtain wall restoration field for more than 25 years. In 1997, he founded Alumitec Ltd., of Chicago, IL, and is its president. The company specializes in the restoration, cleaning, and maintenance of architectural metals and curtain wall systems. Ryan previously served as vice president for the Midwest region for AMS Architectural Technologies for 13 years.



NRCA Recommends Polyiso Be Specified by Thickness, Not LTTR

The National Roofing Contractors Association (NRCA) recommends that designers specify polyisocyanurate (polyiso) insulation by its desired thickness, not R-value. It also maintains that designers should specify polyiso using an in-service R-value of 5.0-per-inch thickness for heating conditions and a 5.6-per-inch thickness for cooling, based on the predominant condition for the building use and climate.

Long-term thermal resistance (LTTR), which is used by the Polyisocyanurate Insulation Manufacturers Association (PIMA) in its reporting of R-values, may be more appropriate for laboratory analysis and research comparisons rather than for roof system design, the NRCA opines.

CPI Expands Emissions Calculating Tool

The Center for the Polyurethanes Industry (CPI) of the American Chemistry Council (ACC) has expanded its Regulatory Compliance Assistance Program (RCAP) by upgrading the interactive tool designed to help manufacturers, processors, and other users of diphenylmethane diisocyanate (MDI) and polymeric MDI (PMDI) in calculating emissions. This tool aids users in complying with mandatory reporting to the U.S. Environmental Protection Agency (EPA) by estimating emissions from typical process applications and activities. Users who exceed the threshold limits set by EPA are required to submit a Form A or Form R to the EPA and the designated state agency by July 1 each year.

The RCAP can be used by companies in their Toxic Release Inventory (TRI) reporting. CPI expanded the tool in its “diisocyanates” category to address 12 additional examples of emissions from various applications, including the manufacture of air filters, appliances, trucks, automobiles, boats, doors, mobile homes/motor homes, packaging, rebond foam, spray foam, spandex, and water heaters.

The interactive tool is available free of charge on CPI’s website. To learn more about this tool and for more information about MDI emissions, visit <http://www.americanchemistry.com/polyurethane>.