



A new 700-square-foot metal roof, protected by highly durable PVF film, was installed at the Sea Crest Condos in Hilton Head, S.C., replacing the previous PVDF-coated roof which had become corroded over time due to the high salt spray environment of its coastal setting.

# Contending with Corrosion in Metal Exteriors

High-performing, long-lasting, and resilient, PVF film is the technology of choice for corrosive environments

Sponsored by Dupont | *By Barbara Horwitz-Bennett*

**C**ausing the country more than a trillion dollars in damages each year, corrosion is a major issue to contend with. Occurring as a natural process, oxides develop over time, weakening materials and making them vulnerable to a variety of performance and protection issues.

Metal exteriors are particularly vulnerable, especially in corrosive environments, where this type of deterioration can occur ten times faster than in average environmental conditions.

Defined as a chemical or electrochemical reaction between a material and its environment, corrosion causes deterioration of

building materials and its properties over time.

As the protective layer begins to exhibit cracks and peeling, the exterior is left exposed to reduced mechanical strength, structural damage, fatigue, and potentially reduced seismic performance. If the structure is compromised, the resulting required repair work can be substantial, causing a significant financial expense to building owners, not to mention the environmental considerations of rebuilding and repair.

Fortunately, corrosion is preventable, as Joseph Crissinger, CSI, CCS, CCCA, ASQ, a Spartanburg, S.C., construction specifications, materials, and building systems

## CONTINUING EDUCATION

AIA Continuing Education Provider 1 AIA LU/HSW 0.1 ICC CEU

### Learning Objectives

After reading this article, you should be able to:

1. Identify the unique performance properties of PVF film including durability, longevity, UV protection, formability, adhesion, cleanability, weathering, and chemical and stain resistance.
2. Discuss key case studies establishing the high-performance qualities of PVF film for metal exteriors.
3. Establish the life-cycle cost and environmental benefits of PVF film.
4. Compare PVF's key performance metrics and tests with coil coating alternatives.
5. Review other architectural applications that can benefit from PVF film.

To receive AIA credit, you are required to read the entire article and pass the quiz. Visit [ce.architecturalrecord.com](http://ce.architecturalrecord.com) for the complete text and to take the quiz for free.

AIA COURSE #K2211M

consultant, explains, “Isolating the metal or substrate from unacceptable conditions will usually prevent corrosion. That is where the proper protective (corrosion-resistant) coating comes in.”

### THE RIGHT COATING FOR CORROSIVE ENVIRONMENTS

While a number of exterior coating products offer a certain level of protection from these challenging environments, few are truly capable of shielding exteriors in these harsh settings. So, while some of the different paints and coatings may be sufficient under ordinary environments, when it comes to highly corrosive, coasting settings, a more robust solution is needed.

Polyvinyl fluoride (PVF) is a highly durable fluoropolymer capable of providing a long-lasting finish to a wide variety of surfaces exposed to harsh environments. Not only does it meet specifications for AAMA 2605, but the real proof of the pudding lies in the fact that it has been successfully protecting vulnerable surfaces for the past 60-plus years.

The polymer has been used in coatings that protect brake tubes and fuel lines in automotive applications due to its flexibility and resistance to rock spray and salt corrosion. PVF also has a long history of being made as a film, which has been specified into aircraft interiors since its invention due to its cleanability, durability, and excellent fire and smoke ratings.

Used for interior sidewall decorative panels, window shades, lavatories, bulkhead partitions, and more, the film offers a high level of interior design flexibility. PVF can be embossed and printed, supporting many texture designs, and can be tailored to various gloss levels, thicknesses, and finishes.

PVF film also has long-term track record protecting buildings. In fact, the film has demonstrated an unusually high level of long-term performance and durability in various highly corrosive environments.

Take the Okinawa power plant in Japan, for example. Situated less than 1,500 feet from the coastline in a high salt spray environment, and exposed to power plant smoke since 1986, the exteriors essentially look the same as they did upon installation 27 years



Delivering aesthetics and a high level of protection, a matte black PVF film covers 15 new metal roofs at the Spring Creek Ranch Hotel & Spa in Jackson Hole, Wyo.

ago. The PVF film- laminated walls and roof still deliver the same level of corrosion and protection. The plant has experienced practically no color fade as well, and has not required replacement of any panels.

The specification of such a long-term solution offers clear sustainability benefits. The extraction and manufacturing of materials occurs once and lasts for decades. The life-cycle embodied carbon, in turn, is significantly low and any panel replacements over time are extremely limited.

Testing and other long-term case studies have also demonstrated an extremely high level of resistance to harsh weather, UV light, chemicals and pollution. PVF film is highly resistant to stains, and is easy to clean and disinfect. As a dirt-shedding material, it retains a new, fresh appearance and doesn't require freshwater rinses in warranted exterior applications. Due to its hardness and cleanability, PVF film is also a great solution for wallcoverings in sterile environments like hospitals and healthcare facilities, as well as restaurants, hotels, and airplanes.

### METAL EXTERIORS

PVF film has distinguished itself as a superior solution for metal facades and roofs, particularly in harsh coastal environments with prolonged exposure to saltwater.

The polymer is highly inert, which makes it resistant to a wide variety of corrosive and chemical agents. It absorbs very little visible or UV light and is therefore highly resistant to photolytic degradation. Strong, flexible, and fatigue-resistant, the polymer is made without plasticizers and therefore does not promote growth of mold and mildew.

The material meets ASTM testing and performance standards including UV resistance, moisture absorption, strength, flexibility, clean ability, weathering, chemical and stain resistance. In addition, the film meets stringent smoke and fire codes.

Whereas paint requires a more involved application process, with a primer, topcoat, and often a third clear coat for extra protection, PVF film is applied via a single layer lamination process. The film, with adhesive, is laid down onto the metal coil and baked through an oven, setting the adhesive. The film is then part of the metal system, just as a coating would be, requiring no solvent drying time, or additional passes.

Continues at [ce.architecturalrecord.com](http://ce.architecturalrecord.com)

*Barbara Horwitz-Bennett is a veteran architectural journalist who has written hundreds of CEUs and articles for various AEC publications. [BHBennett.com](http://BHBennett.com)*



DuPont™ Tedlar® PVF films have proven long-lasting protection for interior and exterior architectural applications. Tedlar® superior durability helps safeguard a building from corrosion, pollution or chemical breakdown, and resistance to UV rays. Specify Tedlar® PVF surface protection film to extend the lifetime of metal, architectural fabric, or wall panels for your next project.