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High Performance  
Water-Based Field-Applied  
Organic Finishes for  
Architectural Restoration

# High Performance Water-Based Field-Applied Organic Finishes for Architectural Restoration

Ron Partridge, Sr. Account Manager Fluoropolymer Coatings NA, Arkema Inc. and Erin Neff, Director of Marketing and Business Development, APV Engineered Coatings Inc.

## Introduction

In 1965, Kynar 500 based architectural finishes were first introduced to the market and over the next 30 years became the architectural coating of choice for major architectural firms worldwide. When the American Architectural Manufacturers Association (AAMA), now FGIA (Fenestration and Glazing Industry Alliance), publication 2605 was adopted in 1998, it created the highest standard available for organic coatings on architectural metals.

Kynar 500 liquid-based finishes are only applied in a factory to metal (coil and extrusion) substrates because the coating technology must be baked at over 375°F.

Although baking does improve the coating performance, it also limits the possibility to specify a high-performance organic coating for other original equipment manufacturer (OEM) building products like wood, vinyl and fiberglass. In addition, specifiers and architects could not select a truly high-performance Kynar polyvinylidene fluoride (PVDF) coating system for air-dry field-applied restoration projects.

## Kynar Aquatec – The Next Generation of PVDF Coatings



In 2001, Arkema began to develop a novel emulsion coatings technology that was later named Kynar Aquatec. The original goals of the program were to develop an air-dry coating resin that would have similar long-term performance to a Kynar 500 finish system but was water based, required no baking and would film-form at ambient temperatures. In addition, it was necessary to develop the field performance history with this new technology in order to demonstrate that the weathering performance could be similar to what

### Overview of the KYNAR Aquatec Product Line

Product	Kynar Aquatec ARC	Kynar Aquatec FMA-12	Kynar Aquatec CRX
Description	Highest PVDF level, thermoplastic	High PVDF level, thermoplastic	Highest PVDF level, Two component crosslinkable
PVDF: Acrylic weight ratio	70:30	50:50	70:30
Functional group level	Thermoplastic	Thermoplastic	%OH = 0.53 (OH# = 18 or OH eq wt 3178) on total solids
MFFT, approx.	26-28 °C	12-14 °C	15 °C
Target applications	Highest weatherability, low bake, OEM applications.	High weatherability, low bake, OEM & field applications. (e.g., reflective roof coatings)	Highest weatherability, low bake, OEM & field applications, with enhanced hardness, solvent and abrasion resistance.
Years of Florida exposure	>19	>13	>9

the architectural community had come to expect from a Kynar 500 finish system.

These objectives and ensuing technical work led to the commercialization of the first Kynar Aquatec grade, Kynar Aquatec ARC, in 2005. This coating resin found its earliest uses in metal restoration projects and protecting OEM building products. In 2009, Arkema launched its next grade, Kynar Aquatec FMA-12, for cementitious and other substrates where breathability or greater elastic properties were needed. Arkema's most recent offering in the Kynar Aquatec line is Kynar Aquatec CRX. This resin was developed for applications requiring greater hardness, abrasion and chemical resistance, since it can be cross-linked with a second component, typically an isocyanate.

Kynar Aquatec is an innovative platform of resins used by coating formulators to make premium, weather-resistant and water-based coatings. Coatings formulated with these emulsions can provide the durability and performance of traditional factory applied Kynar 500 based coatings. With a variety of resin grades, these coatings can easily be applied to a variety of substrates, including metals, plastics, wood, concrete, stucco, exterior insulation and finish systems and previously painted surfaces.

Now, the extreme performance of a Kynar 500 based coating is available in a low volatile organic compound (VOC), SCAQMD Rule 1113-compliant, air-dry system: either field-applied or factory-applied.

Nineteen years ago, a side-by-side comparison of Kynar Aquatec to Kynar 500 finishes was started using the same inorganic pigments, with the only difference being the resin binder used. As shown in figure 1, there is almost no difference in color or chalking for both resin systems. This demonstrates that Kynar Aquatec based coatings can perform similarly to

a Kynar 500-based finish.

### Highly Resistant to Film Erosion

Figure 2 demonstrates a Kynar Aquatec based coating's ability to resist film erosion after outdoor exposure. Both formulations shown utilize cobalt blue pigment, which is not affected by ultraviolet light and does not block UV from penetrating the coating surface. Therefore, any degradation of the coating from weathering is related to the resin binder system only. After seven years of South Florida 45-degree south exposure, the metal substrate is completely showing through the 100 percent premium acrylic-based coating, while the Kynar Aquatec based coating is still intact with minimal color fade and no film erosion.

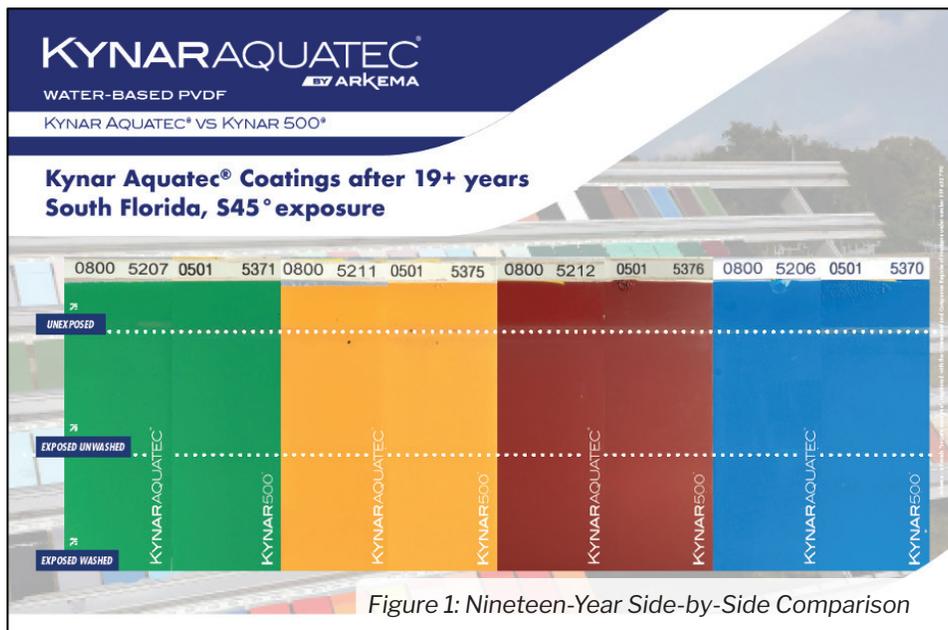
Protecting the substrate from weathering is one of the primary purposes of a coating. Since PVDF coatings maintain its original film thickness, the substrate is being protected for the long-haul against the elements.



Figure 2: Seven-Year South Florida Film Thickness Comparison

### Quality Control Through Licensing

Similar to the Kynar 500 license program that was started in 1965, Arkema has adopted a license program for its Kynar Aquatec family of water-based PVDF resins. The license program ensures that the performance of the final coatings meets Arkema's requirements to be considered and promoted as a Kynar Aquatec based finish. Since CSI Division 09 96 00 (high performance coatings) contains many different paint chemistries, from acrylic to polyurethane to epoxy to silicone, how do you know what you are getting in terms of long-term performance? The answer is Kynar PVDF resin-based finishes from a licensed





coating-manufacturer have been tested and proven against “high performance” coatings in the category and have raised the bar for performance.

### FRSA's New Building Protected by Kynar Resin-Based Coatings

For the new FRSA building completed in July 2020, nearly the entire envelope is completely protected by Kynar PVDF based coatings. PAC-CLAD donated the roof, gutters and downspouts, which are all protected by a Kynar 500 finish system in a Copper Penny color.

In addition, the stucco façade is completely protected by NeverFade Façade Restoration Coatings with Kynar Aquatec, manufactured by APV Engineered Coatings. Since 2009, APV has been a licensee of Arkema's Kynar Aquatec resin. The company began formulating and field-testing PVDF-based coatings in 2005.

### Kynar Aquatec-Based NeverFade Coatings – Proven Technology You Can Count On

NeverFade Façade Restoration Coatings from APV Engineered Coatings are water-based, low VOC façade restoration systems that provide the durability of a factory finish in a field-applied product. The topcoats are uniquely formulated with Kynar Aquatec PVDF resin, complex inorganic pigments and high-performance UV-blocking additives for long lasting durability and color retention. Because of the chemistry, NeverFade does not fade or breakdown under UV; it also maintains a hydrophobic surface that innately resists mold, mildew and dirt pick up.

The NeverFade Façade Restoration Coating System includes both topcoats and compatible primers (see figure 3). NeverFade Original Topcoat is ideal for concrete, EIFS, stucco, masonry, fiber cement, composite materials and vinyl building exteriors. NeverFade Metal Restoration Topcoat is formulated for use on ferrous and non-ferrous metal surfaces. NeverFade 2K Performance Topcoat is used in more demanding applications that require greater chemical resistance, hardness and abrasion performance.

NeverFade coatings have been benchmarked

Figure 3: NEVERFADE Product Line Overview



of color and gloss. The home was last inspected in 2019 and figure 4 shows a photo of APV gathering color and gloss data between the wood sample and the weathered façade. After ten years, there was no visual difference in color or residual chalking on the surface. The façade also had no dirt pickup or mold growth. Due to the performance of the coating system, the property owners have significantly reduced their maintenance upkeep on the home's exterior.

The following project photos demonstrate the versatility of NeverFade coatings to protect multiple substrates.

against other high-performance coatings such as 100 percent acrylics, urethanes and FEVE-based coatings. After fifteen years of research and development, APV established the ultimate coating system that dramatically extends the lifecycle of buildings compared to other coating systems.

Sold in Florida through master distributor, Lazer Manufacturing, APV offers NeverFade with a 15-year product-and-labor guarantee. If the coating fades by a  $\Delta E$  of five or higher, the company will replace the product and cover the labor cost of re-coating. This warranty is unique to the architectural coatings industry.

### Standing the Test of Time in the Gulf of Mexico

APV's oldest project on the coast of Sanibel Island, Fla. in the Gulf of Mexico is a conventional stucco exterior that required constant maintenance by the homeowner due to dirt pick-up and mold growth. In July 2009, the stucco was power washed to remove contaminants, then primed with APV's W-1500 universal primer, and top coated with NeverFade Original formulation. When the house was painted, the contractor coated a small wood sample to be kept in the garage, away from the elements and used for later evaluation

multiple substrates.

### Other NeverFade Projects Examples

Bostik, Inc., and Lazer Manufacturing have been proud partners of the FRSA and its members for over 30 years and thankful to be a part of their "Family Tradition." We were thrilled when asked to participate in the construction of its new facility. Bostik is the 130-year-old sealant and adhesive division of Arkema. Bostik takes pride in offering innovative solutions and high-performance products to the professional contractor. Bostik is the only recommended supplier of sealants and adhesives for Kynar PVDF resin-based protected surfaces.

Using Bostik High Performance advanced 915 chemistry, Bostik has been able to assist quality metal roof panel manufacturers and fabricators in meeting and exceeding Florida Building Code (FBC), as well as the nation's most rigorous Miami-Dade County uplift performance requirements for metal roofing. In addition, due to the unique chemistry and strong adhesion to Kynar PVDF coated surfaces and the Miami-Dade and FBC approvals, Bostik 915 was chosen for the new FRSA building. Bostik 915 is paintable, no primers are necessary, has quick cure time, as well as great joint

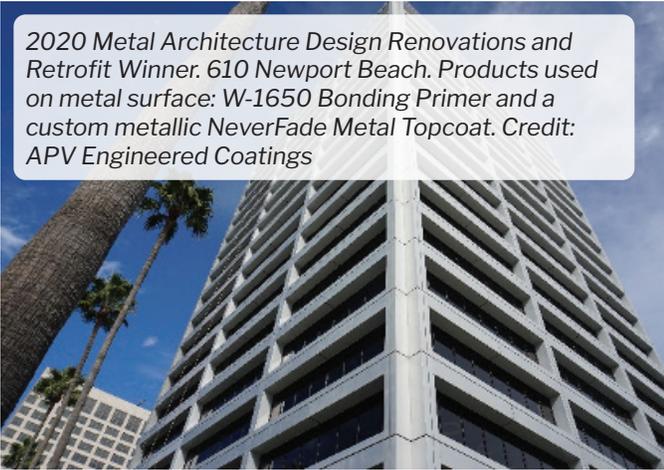


Figure 4: Sanibel Island House Original and Ten Years Later



Another Sanibel Island project. Products used on concrete: W-1500 Universal Primer and a custom NeverFade Original Topcoat. Credit: APV Engineered Coatings

2020 Metal Architecture Design Renovations and Retrofit Winner. 610 Newport Beach. Products used on metal surface: W-1650 Bonding Primer and a custom metallic NeverFade Metal Topcoat. Credit: APV Engineered Coatings



Project: Jewish Adoption and Family Care Options (JAFCO) Sunrise, FL. Products used on concrete: W-1500 Universal Primer and an orange custom color of NeverFade Original Topcoat. Credit: APV Engineered Coatings



movement and exceptional elongation. Bostik 915 is available in a variety of colors and on the new FRSA building, Bostik provided a crossover color request for Copper Penny. Whatever the application, roofing, windows, doors, whatever the substrate, wood, concrete, metal, Bostik has been the high performance tested and trusted choice of quality industry professional manufacturers, contractors and applicators.

We are also proud to provide Bostik's PRO-MS 50 product, which is an industry leading, high performance, hybrid sealant demonstrating properties such as color stability and long-lasting elastomeric qualities

for building envelop architectural grade applications. Pro-MS 50 is asphalt compatible, non-yellowing and provides tenacious bonding to difficult substrates.

Primary applications include all types of roofing, window and door perimeter sealing, siding and trim, flexible flashing materials, metals and much more.

In addition to the high performance 915 and Pro-MS products, Bostik offers a complete line of professional adhesive and sealant products to meet specific project substrates and necessary performance requirements that you can find on their website, [www.bostik.com](http://www.bostik.com).

## Sustainability Never Looked So Good

As you may have heard in the news, evidence has accumulated that PFAS Surfactants, a family of manufactured chemicals not otherwise found in nature, might be persistent in the blood-streams of animals. In fact, the United States EPA and many states are looking at this matter closely. It is important to note that Arkema's Kynar Aquatec and Kynar 500 FSF resins are manufactured through an innovative and patented process that uses no PFAS Surfactants or any other fluorosurfactants whatsoever.

Ron Partridge is a Sr. Account Manager in the Technical Polymers Business unit at Arkema. Ron is responsible for the sales of Kynar PVDF polymer into the NA coatings market. He has over 30 years of experience in the polymer industry in sales, business development, technical service and R&D. Ron has worked for Arkema for the last 17 years. He received his BS degree in Chemistry and Materials Science from The State University of New York at Stony Brook in 1984.

Erin Neff is Director of Marketing and Business Development for APV Engineered Coatings. She is responsible for generating new business accounts and managing key product development projects in strategic markets, including flexible films and textiles, architecture and building products. Erin also oversees external communications, public relations, advertising, as well as website and digital marketing efforts. She has been with the company since 2008. Erin has a Bachelor of Science degree in Business and Marketing Management from the University of Akron. She is a NACE-Certified Coating Inspector and is certified in sales and negotiations in professional selling via Sandler Training.

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