# The Innovation Behind Water-Based PVDF Coatings





#### Water-Based vs. Solvent-Based Coatings

Water-based coatings are known for being low in volatile organic compounds (VOCs), hazardous air pollutants (HAPs) and odor, giving them both environmental and health-and-safety advantages over solvent-based coatings. Solvent-based coatings, on the other hand, are known for their ease of application, high-performance characteristics and superior film-forming characteristics.

Some users of high-performance architectural coating technologies believe that water-based coatings do not provide the same ease of use, long-lasting durability, extreme weatherability and color-retention properties as solvent-based coatings.

While that may be true in some cases, it is not the rule, as evidenced by advanced technology developed by APV Engineered Coatings. Our company's vast expertise with water-based polyvinylidene fluoride (PVDF) resin chemistry, optimizing coating rheology, compounding knowledge, and weathering of complex inorganic pigments, has resulted in a water-based, high-performance coating system, <u>NeverFade® Facade Restoration Coatings</u>.

As an advanced coating restoration company, Stuart Dean has partnered with APV to bring long-term performance, aesthetics and eco-friendly solutions to their clients.

### The Role of Solvents and Water in Coatings

In coatings, the purpose of solvents or water is to dissolve or disperse other contents in the formulation, which include resin, pigment, and additives. Once the coating is applied to a surface, the solvent or water evaporates, leaving the solids content in a dried film formation on the substrate.

The type of solvent used depends on the coating formulation and application or curing parameters; but in general, they offer an efficient means for dissolving and dispersing raw material components, and they evaporate rapidly. Solvent-based formulations have an inherently low surface tension and will wet out on most substrates without the use of additives.



"Some users of high-performance architectural coating technologies believe that waterbased coatings do not provide the same durability and weatherability as solvent-based coatings. But this is not the case with APV's NeverFade® Facade Restoration Coatings."

"The type of solvent used depends on the coating formulation and application or curing parameters." Chemists formulating water-based coatings must understand the characteristics of the polymer chemistry, impact of rheology modifiers and appropriate co-solvents to optimize a continuous film formation. Water can replace solvents in coatings to help reduce emissions and VOCs, but these coatings generally still contain a small percentage of co-solvent to help this process.

# PVDF Resin Technology Adapted for Water-Based Coatings

Kynar Aquatec<sup>®</sup> PVDF resin, a tough engineering thermoplastic with a proven record of performance in extreme conditions, is the backbone of the water-based NeverFade used on the office building, 610 Newport Center Drive project in Newport Beach, CA, that was applied by Stuart Dean.

However, the first generation of the PVDF resin (Kynar 500<sup>®</sup>), invented 50+ years ago, is hard resin technology that is dissolved in solvents to help develop factory-applied OEM coating systems.

It requires 400-500°F baking temperature to react and cure, therefore it is only applicable for metal surfaces that can withstand these high temperatures. While this resin technology has unprecedented weathering performance in the field and is well-established in the global architectural industry, its high baking temperatures created limitations.

The architectural industry's demand for a PVDF-based coating system that can be field-applied, air-dried, and used



on multiple substrates, coupled with environmental regulations and health-and-safety concerns associated with high VOC emissions, prompted the resin's manufacturer, Arkema®, to create a waterbased version of the resin: Kynar Aquatec®, which now has nearly 20 years of identical performance to Kynar 500 in harsh outdoor environments.

"The architectural industry demanded a PVDF-based coating system that could be field-applied, air-dried, and used on multiple substrates while also meeting environmental regulations and addressing health-and-safety concerns associated with high VOC emissions."

## Safety and Environmental Regulations

When working with solvent-based coatings, proper respiratory protection must be used, and care must be taken with respect to flammability.

Water-based coatings offer less stringent safety practices, and are low in VOCs and odor, allowing them to be applied with minimal impact to the safety and comfort of the contractors and building occupants. They also can help coatings professionals reduce their disposal of hazardous waste and meet environmental regulations, such as SCAQMD Rule 1113 VOC limits in Southern California for water waste runoff.

In the case of the office building on Newport Center Drive, Stuart Dean experienced no complaints of disruption from odor while occupants regularly utilized the building during the installation of NeverFade<sup>®</sup>. In addition to minimizing odor, HAPs and VOCs during the coating installation, using water-based NeverFade made cleanup easier; water could be used to clean equipment and workers' hands instead of solvents or paint thinner.

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# Get the Best of Both Worlds with NeverFade® Façade Restoration Coatings

NeverFade<sup>®</sup> Façade Restoration Coatings with Kynar Aquatec<sup>®</sup> provide the best of both worlds: a water-based system that is field-applied, user-friendly, and low in VOCs, combined with the long-term weathering performance needed for exterior architecture components exposed to harsh environmental conditions. In fact, we offer a 15-year product-and-labor warranty covering color fading and chalking at APV.

Projects like the Newport Beach application are a testament to the industry's growing reliance on these high-performing, water-based exterior restoration coatings to sustainably lengthen the life of the building façade.

<u>Talk to us</u> about your architectural coating needs today and get a quote on a custom formulation.