

# SPECIFYING ARCHITECTURAL FINISHES



It would be nice if there was one best answer to finishing architectural metal surfaces, but there is not. There are a number of common finish types and most are available in multiple varieties with different cost and performance characteristics. Each finish sub-variety has its strengths and weaknesses, and will perform differently depending on the environment it will be used in. Any one of these systems is complex enough to require a book-length treatment to fully explore all the variables that affect its suitability for a particular application. And of course, each finish type is constantly being refined and improved, so such a book would be obsolete in just a few years. This article will offer a simplified outline of the four most common finish types encountered in architecture. We will present the trade-offs each entails to simplify finish selection, though final cost and warranty duration will still depend on project specific details.



This article compares four finish types. Three of these finishes are coatings that physically cover the metal substrate. The fourth is a chemical transformation of the metal surface itself.

#### FINISHES COVERED:

- Catalyst-Hardened Urethane (Automotive Paint)
- Liquid Applied PVDF (Kynar 500, among others)
- Powder Coating
- Anodizing

• **Automotive Paint, Catalyst-Hardened Urethane**, is a versatile, room temperature paint system. Once the paint is mixed with the catalyst, nothing is required but time, generally 24 to 72 hours, for the paint to reach its final hardness and durability. PVDF and powder coating must be oven baked, and anodizing requires submersion in a tank of solvent. Because catalyst-hardened urethane requires neither it can be applied to structures that wouldn't fit into tanks or ovens. It can also be used in assemblies that include industrial adhesives that cannot survive baking, and it is the only one of the four finishes that can be applied in the field.

• **Kynar, PVDF**, (polyvinylidene fluoride), is a fluorocarbon resin that is combined with other resins and pigments to make a finish with the desired color and performance characteristics. Although it is sometimes applied as a powder coating, more typically it is mixed with a liquid carrier and sprayed on much like catalyst-hardened urethane. Then the finish is heat cured at 450-500°F. The carbon-fluorene bonds in this resin are one of the strongest chemical bonds known and form a very durable coating. It is this strength that gives PVDF its outstanding color stability and weather resistance.

• **Powder Coating** is more a finishing process than it is a finish type. Like the PVDF finish above, powder coat finishes are baked-on resin-pigment mixes, but without the solvent carrier. The cost and performance of the final finish depend on the properties of the resins, and to some extent the pigments chosen. The coating is sprayed on dry and held in place by electrostatic charges until the baking process binds it to the metal surface. Typical powder coat finishes do not have the weatherability of PVDF, but they do have better wear and abrasion resistance. Because of the lack of VOC solvent carriers, they are also considered more environmentally friendly.

• **Anodizing** is not a coating process like the other finishes. It is a chemical reaction with the surface of the metal, and it only works with aluminum. The process involves soaking electrified aluminum in dilute sulfuric acid until the required finish thickness is reached. Subsequent reactions can then add colors ranging from champagne to very nearly black, or copper tones, or dyes can be added to achieve a somewhat limited variety of more vibrant colors. Because these processes are so sensitive to the constantly changing chemistry in the tanks, it is difficult to maintain consistent color on long runs. Color issues are among the weaknesses of anodized finishes. For weatherability, UV stability and hardness however, anodizing is unmatched.



Table of Rule-of-Thumb Guidelines (Will Not Apply to Every Application)

	Automotive Paint	PVDF (Kynar)	Powder Coat	Anodized
Range of Colors	★★★★★	★★★★★	★★★	★
Color Consistency	★★★★★	★★★★	★★★	★★
Large Assemblies	Yes	No†	No†	No†
Field Application	Yes	No	No	No
Touch-Up	★★★★★	★★★★	★★★	★
Abrasion Resistance	★★★★	★★★★	★★★★★	★★★★★
Non-Aluminum	Maybe*	Maybe*	Maybe*	No
Weathering	★★	★★★★★	★★★★	★★★★★
Coastal Environments	★★★	★★★★★	★★★★★	OK

\*Finishes applied to other metals are difficult, if not impossible, to warrantee.

†Parts can be finished and then assembled, but fasteners and or seams will be visible.