Architectural Finishes Guide

Architectural finishes undergo the harsh combination of intense heat, high humidity, unrelenting ultraviolet sun rays, dust and a variety of airborne pollutants throughout the country. A finish which may be perfect in one location may not stand up as well in another.

It is often confusing to understand the terms and processes involved in selecting a finish. This guide will help clarify the different types of architectural/commercial finishes available, as well as the basic differences between them.

Application Methods:

Coil Coating

The coil coating method of painting sheet metal before fabrication is efficient, cost-effective and provides consistent quality.

The process follows a number of automated steps in a continuous line beginning with the raw metal coil that is:

1. Unwound at one end of a process line
2. Cleaned
3. Treated
4. Primed
5. Top-coated
6. Rewound on the other end of the line

The painted coil may be slit or re-coiled for use in roll formers to produce panels or it may be cut to various sizes for other products.

Coil coating is also known as pre-coat and pre-finish because the metal is painted or finished before it is fabricated into end use products.

Gauge and color options are limited due to the speed and quantity of the material that this method produces.

Application Methods:

Post-Coated

Another application method is the post-coated process, also known as post-finished process.

This process is the most common method for custom color requirements.

Extruded products or products that have been fabricated from unfinished sheet stock is sent to the spray applicator to be finished.

Materials:

Aluminum & Steel

Mill Finish Aluminum
Mill Finish Aluminum is unfinished metal in its raw state, and is widely used as the base material for prefinished sheet metal products. Mill finish aluminum is specified for many exterior applications, however, staining or uneven weathering may result from long term exposure to the elements.

Galvanized Steel
G-90 galvanized steel is the most widely used acceptable exterior grade steel and is the predominant base material for prefinished Kynar coated steel products.

G-90 designates that the material has been coated with a minimum of .090 oz. of zinc per square foot, giving the product excellent corrosion resistance.

Paint Grip Steel
This sheet steel product is recommended where field painting is required on architectural sheet metal products. Sometimes referred to as bonderized or phosphatized, this material is chemically treated with phosphate film, providing for the good adhesion of most exterior grade paints.

Paint grip steel should be painted shortly after installation as weathering prior to paint application will cause materials to rust.

AAMA Specs:

Overview

In the architectural industry, performance standards are set by the American Architectural Manufacturers Association (AAMA). The two specifications for organic coatings are AAMA 2603 and AAMA 2605.

The AAMA 2603 is a lower performing specification typically used for interior architectural, residential or very light commercial applications. The AAMA 2605 specification is for high performance organic coatings for architectural and heavy commercial applications.

Metal-Era focuses on AAMA 2605 since all of our products are for exterior use only.

PVDF Coatings
PVDF coatings are the most weather resistant finishes known. These coatings are also called fluorocarbon, fluoropolymer and PVF_2 (trade names include Kynar 500 and Hylar 5000®). These finishes all exhibit outstanding resistance to humidity, color change, chalk, gloss loss and chemicals; and they have excellent flexibility. Their graffiti resistance is excellent and color change is incredibly slow. Kynar 500/Hylar 5000 paints meet or exceed the AAMA 2605 criteria.

Post-Coating:

The Process

Spray & Applied Kynar®
The general sequence of painting operation is:
1. Surface preparation & cleaning
2. Paint application
3. Curing

For aluminum, surface preparation usually involves removing dirt and contaminants, and then doing a chemical surface conversion. For AAMA 2605 compliance, chrome pre-treatment is specified. Metal-Era's applicator utilizes an electrostatic spray process.

Paint can be cured by a variety of methods. Those most commonly used in the architectural industry are heat cure or catalyst cure (some air dry cure is also available).

Paints:

The Components

The exact composition of a particular paint is often complex and proprietary. In general, most paints contain the following:
- Binder (resin)
- Pigment(s)
- Solvent(s)
- Additives

Binders
A paint binder, or resin, is the solid material which forms the bulk of the paint film. It is generally a tough material which gives the paint most of its thermal, mechanical and weathering properties.

Pigments
Paint pigments are small, hard particles present in paint to give the film color and sometimes certain other properties.

Solvents
Solvents are the liquids used to make the paint flowable prior to the application.

Additives
Additives are chemicals that are sometimes added to paint to achieve special effects.

Application Coatings:

Exotic vs. Non-Exotic

Required Application Coats:
Non-Exotic, Non-Metallic Kynar colors are generally a two-coat process (mica colors may also fall into this category).

Specialty exotic and metallic Kynar colors are generally a three or four coat process.

Exotic vs. Non-Exotic
Exotic colors are "non-earthtone" colors. They quite often require the clear top coat for pigment protection. Non-exotic color are earthtone type colors and are not deep or bright colors.

Application Coatings:

Color Variations

Paints containing metallic or mica pigment will show some variation in appearance cased by an extensive list of variables, some of which are uncontrollable. When selecting a metallic or mica finish, color variation can be expected.

Factors that affect color consistency include, but are not limited to, humidity, temperature, film thickness, bake time and temperature on the substrate, application equipment, angle of presentation to the spray equipment, type of spray equipment, air pressure, electrostatics, batch to batch variation, etc.

Sample chips will also vary from the actual production run. This is especially true when chips are being supplied by the paint vendor.

Application Coatings:

Minimizing Inconsistent Color

Critical color matches should be prepared by the paint line on actual parts, duplicating those to be used on the project in question. To keep color inconsistency to a minimum the following steps should be taken:

- Paint all adjacent parts at one time. Do not split releases if possible. The more releases, the more the opportunity for color inconsistencies. The ideal case is to paint the complete job on one production run.
- Advise all involved that some degree of variation is expected. A range or delta range should be agreed upon before the job begins painting. The Architectural Spray Coaters Association (ASCA) recommends that all color variation be held to 2-3 delta E when measured by a color meter.
- Advise all parties that color variation must be questioned before the material is installed on the building or the building is complete. Many states do not allow field repair so in many cases repair is not possible on the building. Please be aware that color may appear very consistent in interior light, but appears non-uniform in exterior light. Different lighting conditions and viewing angles on the job site will also change the overall appearance and consistency of a job.
- Be aware of your job site state or federal air regulations governing field touch ups or repairs.

Application Coatings:

Bright (Clean) Whites Colors

As market trends head toward brighter, cleaner colors, fluoropolymer technology is pushed to its limits. One of these limits is with clean bright whites.

To satisfy requests for clean bright whites, ASCA members feel compelled to disclose a few items to those desiring these colors:

- Whites have a lower "hide" quality (as tested with spray monitors by the LENETA CO) than most other colors. They are much more susceptible to color variation than colored pigments.
- Many clean whites require additional film thickness and/or additional coats to achieve the desired color or decrease the degree of color variation.
- Clean whites may increase the cost of paint finishing.
- Clean whites will increase the probability of color inconsistency. Whites can be sprayed to specific millimeter thickness and show see-through or color variation.
- Channels and inside corners are difficult to cover with whites.

Materials:

Colors

70% Kynar 500/Hylar 5000 Polyvinylidene Fluoride (PVC) & Solvent Based Finishes

Solvent-based finishes represent the most popular group of architectural exterior grade coatings used today. This would include Kynar 500, Siliconized polyester, and acrylics.

These finishes are termed solvent-based coatings because they are applied as compounds that include resins, solvents and color pigments. in addition, emerging technology is being developed on "powder coated" baked on Kynar 500 finishes. As these finishes are "baked-on" under high temperatures, the solvents evaporated leaving behind the paint solids.

Of all the solvent-based finishes available, Kynar 500 is recognized industry wide as offering the highest quality exterior finish for the price. Kynar 500 was originally developed by the Pennwalt co. in the early 60s for use as a metal coating in highly corrosive environments such as those found at electrical power and chemical plants. Furthermore, high performance 70% fluoropolymer Kynar 500 finishes are widely used for applications needing protection against high humidity, acid rain and other pollutants.

Kynar 500 finishes are molecularly similar to Teflon®, thus reducing scratching or damage caused during fabrication, transportation and installation.

Kynar's inherent qualities include excellent formability, high abrasion resistance, excellent weathering qualities and resistance to ultra-violet color degradation. Because it is a low friction coating, Kynar is considered a relatively self-cleaning coating with minimal maintenance costs; heavy rains can "wash" the paint surface.

At Metal-Era, Inc. we manufacture our Roof Edge Products utilizing a large selection of prefinished, coil-coated Kynar 500/Hylar5000 colors; with warranties available up to (20) twenty years. Post-coated (spray applied after product is manufactured) custom Kynar colors (on aluminum only) are available with warranties up to (20) twenty years.

PVDF Coatings:

There is a wide variety of terminology, product names and company names used in the industry.

A.K.A.

Common names or specifications for this coating include:

• Kynar 500	Elf Atochem, North America-Trade Name
• Hylar 5000	Ausimont USA, Inc.-Trade Name
• Polyvinylidene Fluoride	Proper Chemical Name
• PVDF	Preferred Abbreviation
• PVF_2	Old Abbreviation
• Fluoropolymer	Any Fluorine Bearing Polymer (preferred term)
• Fluorocarbon	

Licensees of this product include:

• PPG	Duranar
• Valspar (DeSoto)	Fluropon
• Akzo Nobel (Reliance)	Trinar

Metal-Era's custom paint supplier is a licensed applicator of all Kynar 500 and Hylar 5000 paints. They have in-house blending capabilities for Duranar, Fluropon and Trinar systems.

Anodizing:

Overview

Anodized Finishes

Anodizing aluminum is the process of accelerating the natural formation of an aluminum oxide coating under controlled conditions. Anodizing cannot peel-off.

During this process, the aluminum is first etched to remove impurities, then immersed into a sulfuric acid bath. Next, the material passes through an electrically charged tank of cobalt mineral salts. The result is the formation of aluminum oxide on all exposed surfaces of the metal.

Once anodized, the metal is then immersed into a bath of water heated to near boiling point forming a hydrate over the oxide; in essence "sealing" the material. Aluminum oxide creates a finish which is highly abrasion resistant.

Choices

A full range of bronze shades can be added to the anodizing process utilizing what is called hardcoat and two-step anodizing.

Anodizing:

Hardcoat

Through the hardcoat anodizing method various shades of bronze are acquired by:

1. Varying the amount of electrical current
2. Changing the chemical composition of the bath
3. Controlling the amount of time spent immersed in the anodizing tanks.

One drawback to the hardcoat process is that color consistency will vary from batch to batch, even from piece to piece.

Anodizing:

Two-Step

Utilizing the two-step anodizing process the aluminum is essentially anodized twice. First, the standard anodizing finish is applies, then cobalt or tin salts are deposited into the pores created in the first anodizing step. Color is entirely dependent upon the amount of electrical current sent through the sheet. As long as the electrical current remains consistent, the color remains consistent.

Availability

Metal-Era offers "as standard" the two-step anodizing process on many of the products we offer. However, the hardcoat or batch anodized products are available upon request. No performance warranties are available on anodized materials.