THE ARCHITECT'S GUIDE TO POWDER COATINGS

EVERYTHING YOU NEED TO KNOW



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ARE ALL POWDER COATINGS CREATED EQUAL?

The simple answer is no.

Powder coatings are used on so many different products, from facades to furniture, cookers to computers, wheels to windows, bikes to buildings and refrigerators to railings.

Even though it's all called 'powder coating', that's really quite a generic term, as there are many different types of powder coating, hence it can be used on so many different things. The formulation chemistry behind each different type of powder is designed to deliver very different types of performance, so within the term "powder coating" there are many different product types.

It's like comparing a kids first bike with training wheels to a world class Tour de France winning bicycle. They're both bikes but...

Both refrigerators and curtain wall are 'powder coated'. But we're not going to put the same type of powder coating on a fridge, as we are on the exterior of a building and give it a 20 year color and gloss warranty. Both products use powder coatings, but they're powders that are designed to do very different things.

In terms of the powder itself, regardless of chemistry or product type, it pretty much looks the same in its raw form.







The application process is basically the same – at least the theory behind it is – and in architectural applications it delivers a tough, thermosetting finish that is way better for the environment than any form of liquid paint.

There are many different powder product types, based on different chemistries – polyesters, fluoropolymers, hybrids, acrylics, epoxies, urethanes and more – and performance is where they differ. Powder coatings for architectural applications are usually created in 3 different product types:

High performance, Fluoropolymer Powders

Fluoropolymer powders are exterior grade powders that are used on curtain wall, building façade, fenestration, etc. Fluoropolymer powder coatings will meet and exceed the performance requirements of AAMA 2605, usually come with a 20 year color and gloss warranty on aluminum when applied by a registered applicator, and deliver the same or better performance as a 70% PVDF liquid paint. The IFS 100% FEVE Fluoropolymer is called IFS 500FP.

111 57th, NYC. This beautiful skyscraper's façade is coated with IFS 500FP, the high performance Fluoropolymer powder from IFS.

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IFS 400SD, the high quality super durable powder from IFS is used on commercial storefront.

Super Durable Powders

These powders are used as the exterior coating on commercial storefront, low-rise buildings, windows, doors, etc. and often on monumental or high value buildings as a very high quality interior coating. Super Durable powder coatings will meet and exceed the performance requirements of AAMA 2604, usually come with a 10 year color and gloss warranty on aluminum when applied by a registered applicator and come in an enormous range of colors and effects. The IFS Super Durable powder is called IFS 400SD.

Standard Polyester Powders

Standard polyesters are generally used on interior applications that do not require extensive weathering capability or low value exterior applications like railing. Polyester powder coatings will meet and exceed the performance requirements of AAMA 2603 and are perfect for interiors especially where unusual colors and effects may be required. They are great value for money and can also have additional functionality, like improved scratch resistance, added. The IFS Standard Polyester is called IFS 300SP.

As you can see, all of these architectural grade powders meet and exceed the AAMA coating specifications that liquid paints, including 70% PVDF liquid paints, have also designed to meet. There are examples of these beautiful, high quality finishes all over the world in the Americas, Europe (in fact 80% www.ifscoatings.com of all high performance coatings in Europe are powder coatings due to strict environmental regulations), Asia and the Middle East.

Powder coatings always deliver an excellent environmental punch and when you choose the right product type for your architectural application, they also deliver the highest levels of exterior performance, color consistency and protection available.

> For more information on high performance architectural powder coatings, please contact flevin@ifscoatings.com

POWDERS AND AAMA – MEETING THE AAMA COATING SPECIFICATIONS

Talk to anyone in the North American high performance coatings industry and they will probably start talking about the AAMA coating specifications, pretty quickly!

So what are the AAMA specs and why do coatings experts talk about them so much?

AAMA is an acronym for the American Architectural Manufacturers Association, and they have put together a whole variety of voluntary specifications – testing and performance requirements - for many different aspects of architectural manufacturing.

In January 2020 the name of the association changed to Fenestration and Glazing Industry Alliance (FGIA) but the Coating Specs retain their name e.g. AAMA 2605, AAMA 2604 etc.

It's probably important to point out here that these three coatings specs are for all coatings! For many years liquid coatings have talked about the AAMA coating specs and so people often incorrectly associate them with liquid coatings only. In fact the specs are for all high performance coatings, and so they apply to both liquid (including 70% PVDF liquid paints) and high performance architectural grade powders (think 100% FEVE Fluoropolymers). Anodized is not included in these particular specifications, as anodizing actually changes the substrate itself, so it is referred to as a 'finish' and there are separate AAMA specifications for anodizing (e.g. AAMA 611).

So what are the AAMA specifications all about and why are they important to specifiers, architects and designers?

Simply put, they will give you a very good idea of the performance capability of the coating. Each spec requires chemical, mechanical and weathering testing to be done, and lays out minimum performance requirements for each test.

As you move up through the coating specifications, the tests become longer and stricter.

So what type of tests are we talking about?

Some of the most important tests AAMA requires are in the below table. There are actually more than 20 tests in total, but these are some of the most telling. Check out the test and how it varies between the various AAMA specifications.

| | AAMA 2603 | AAMA 2604 | AAMA 2605 |
|-----------------------|-----------------|-----------------|------------------------------|
| Chemical resistance | Same | | |
| Humidity resistance | 1500 hrs | 3000 hrs | 4000hrs |
| | Few blisters | Blisters size 8 | Blisters size 8 |
| Salt spray resistance | 1500 hrs | 3000 hrs | 2000 hrs aggressive cyclical |
| | 1-2mm creepage | 1-2mm creepage | 1-2mm creepage |
| | Blisters size 8 | Blisters size 8 | Blisters size 8 |
| Florida exposure | 1 year | 5 years | 10 years |
| Color retention | "Slight change" | Delta E <5 | Delta E <5 |
| Gloss retention | "Slight change" | Minimum 30% | Minimum 50% |

As you can see, as you move up through the specifications, tests like corrosion and weathering require more and more from the coating.

One important thing to note is the salt spray testing. At first glance it may seem that the AAMA 2604 test is longer than the AAMA 2605 test. This is not the case – the 2605 test is actually a different, much more aggressive test, so the time frame is shorter. Initially, the 2605 test was for 4000 hours of salt spray testing, however this changed in 2013 to the more aggressive 2000hr cyclical test. Many companies, IFS Coatings included, often run both tests.

So which powder products will meet these coating specifications?

Making sure you get the right product performance for your application is important. Here's what you should expect

AAMA 2603

IFS 300SP is the IFS Standard Polyester that will meet

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and exceed the performance requirements of AAMA 2603. As the weathering requirements of AAMA 2603 allow a "slight change" in the color and gloss (not very specific!), we normally recommend these powders for interior uses where weathering or exterior conditions are not really a factor. They do sometimes get used on the exteriors of low value residential projects – items like windows, fixtures, fittings etc. – but for general purposes, regard them as a good all round interior grade powder!

AAMA 2604

IFS 400SD is the IFS Super Durable Polyester that will meet and exceed the performance requirements of AAMA 2604. The testing requirements, including weathering, are much stricter than the 2603 requirements, with exact performance parameters (as you can see, the weathering requirement is five times that of the standard polyester). For this reason, super durables are regarded as good exterior grade powders, that are often used on windows, doors, and especially on applications like commercial storefront. Super durables come with a 10 year warranty when applied by a registered applicator to aluminum – great for storefront where the chance of the same store being in place in 20 years is unsure, but a robust 10 year performance is ideal.

AAMA 2605

IFS 500FP is the IFS 100% FEVE based Fluoropolymer that will meet and exceed the performance requirements of AAMA 2605. The testing requirements are stricter than the 2604 performance requirements, with weathering testing being double that of the 2604 spec. For this reason, Fluoropolymers are regarded as an excellent high performance exterior grade powder. They are almost always used solely on exterior applications and are used on curtain wall and façade, windows, doors etc., on monumental buildings, high value residential, stadiums, malls, hospitals, government buildings and more. Fluoropolymers come with a 20 year color and gloss warranty when applied by a registered applicator to aluminum. If you want a liquid comparison – think 70% PVDF liquid paint!

In actual fact, the AAMA specifications are a great way to specify any high performance coating – no matter whether it's powder or liquid, stating the AAMA spec level gives you an absolute minimum that must be met, and stops a contractor from simply getting any "powder coating" or "paint" in the right color, regardless of performance.

Some more of the AAMA tests are outlined below, and for more information, talk to your IFS architectural coatings rep.

Mechanical and Corrosion testing

| Test | AAMA 2603 | AAMA 2604 | AAMA 2605 |
|--------------------------|---|--|---|
| Adhesion | No film removal under the tape within or outside the cross hatched area or blistering anywhere on the test specimen | No film removal under the tape within or outside of the cross hatched area or blistering anywhere on the test specimen | No film removal under the tape within or outside of the cross hatched area or blistering anywhere on the test specimen |
| Impact resistance | No removal of film from substrate | No removal of film from substrate | No removal of film from substrate |
| Abrasion | Test not required for standard polyesters | The abrasion coefficient value of the coating shall be minimum 20 | The abrasion coefficient value of the coating shall be minimum 40 |
| Humidity | 1500hrs test | 3000hrs test | 4000hrs test |
| | Blisters size 8 | Blisters size 8 | Blisters size 8 |
| Salt spray resistance | 1500hrs test Blisters size 8 | 3000 hrs 1-2mm creepage Blisters size 8 | 2000 hrs aggressive cyclical 1-2mm creepage Blisters size 8 |

Chemical Testing

| Test | AAMA 2603 | AAMA 2604 | AAMA 2605 |
|-----------------------------|---|--|---|
| Muriatic Acid resistance | No blistering and visual change in appearance with the unaided eye | No blistering and visual change in appearance with the unaided eye | No blistering and visual change in appearance with the unaided eye |
| Mortar resistance | Mortar shall dislodge easily from painted surface and any residue removed with a damp cloth | Mortar shall dislodge easily from painted surface and any residue removed with a damp cloth | Mortar shall dislodge easily from painted surface and any residue removed with a damp cloth |
| Nitric acid resistance | N/A | Not more than 5DE units color change between exposed and unexposed areas | Not more than 5DE units color change between exposed and unexposed areas |
| Detergent resistance | No loss of adhesion, blistering or significant visual change | No loss of adhesion, blis- tering or significant visual change | No loss of adhesion, blistering or significant visual change |
| Window cleaner resistance | No blistering or visual change | No blistering or visual change | No blistering or visual change |

Weathering testing

| Test | AAMA 2603 | AAMA 2604 | AAMA 2605 |
|-----------------------|--------------------|--|---|
| Florida exposure | 1 year | 5 years | 10 years |
| Color retention | Slight change | Color change Delta E <5 | Color change Delta E <5 |
| Chalking | Slight chalking | No more than 8 rating | No more than 8 rating and 6 rating for whites |
| Gloss retention | Slight fade | Minimum 30% | Minimum 50% |
| Erosion resistance | No loss of erosion | Less than 10% film loss after exposure | Less than 10% film loss after exposure |

FLUOROPOLYMER COATINGS – UNDERSTANDING HIGH PERFORMANCE, EXTERIOR FLUOROPOLYMER COATINGS.

Fluoropolymer coatings are the gold standard for high performance, exterior coating protection in North America. A quick look at the levels of weatherability, durability and aesthetic appeal offered by Fluoropolymers make it easy to see why.

Fluoropolymer protection is actually available in both liquid and powder formulas. Ever heard of 70% liquid PVDF paint? That's a Fluoropolymer paint that uses 70% PVDF Fluoropolymer resin. There are also high performance Fluoropolymer powder coatings that also use a Fluoropolymer resin. The only difference is it's a FEVE Fluoropolymer, rather than PVDF Fluoropolymer. FEVE Fluoropolymer powder coatings use 100% FEVE resin in the formulation. 100% FEVE Fluoropolymer powder coatings – IFS 500FP is just one high performance FEVE based Fluoropolymer powder used on curtain wall, window wall, façade, windows and doors – achieve the same or better performance than 70% PVDF but in a single coat! Turn to our chapter on the differences between PVDF and FEVE for more info.

The DSNY, in NYC features IFS 500FP, a high performance fluoropolymer powder system on the external louvers by Construction Specialties that cover the building façade. In North America, for a long time, high performance coatings were known as two, three or sometimes even four coat liquid PVDF Fluoropolymer systems for aluminum. This liquid Fluoropolymer system meets and exceeds AAMA 2605, comes with great warranties on aluminum when applied by a registered applicator and is available in solid colors and metallic/mica effects.

Equivalent (or better) high performance powder Fluoropolymer systems for aluminum meet and exceed AAMA 2605, come with great warranties on aluminum when applied by a registered applicator and are available in solid colors, metallic/mica effects and even some textures. What's more they also come with significantly improved environmental credentials.

Understanding AAMA 2605 Performance

We all want high performance protection, durability and beautiful aesthetics from our exterior coatings. The building has to look great – it's an integral part of the design and what the eye sees almost immediately after shape and form. The building also needs to retain those good looks for many years, and this is what high performance organic coatings are designed to do. AAMA 2605 has long been held as the gold standard for high performance coatings applied to exterior applications

It's important to note AAMA 2605 is a "coatings" standard. This means whether the coating is liquid or powder, if the coating can meet or exceed the performance requirements laid out in the specification, then the coating is an AAMA 2605 coating.

Corrosion resistance, humidity resistance, chemical resistance and impact resistance are just some of the ASTM tests that AAMA 2605 coatings are put through. As well as strict chemical and mechanical testing – and the thermosetting properties of FEVE based Fluoropolymer high performance powders mean far superior scratch resistance and a significant reduction in susceptibility to dirt and

Folsom Street, in San Francisco, features IFS 500FP coated windows by Thermal Windows

mildew – weathering is a significant part of the AAMA 2605 performance requirements. The ability to retain color and gloss to within specific parameters over time is incredibly important for high performance Fluoropolymer coatings (see the chapter on AAMA for details).

Everyone knows and expects liquid coatings to meet this standard and with those expectations come assumptions regarding warranty, number of coats and color options. What many people do not realized is that high performance 100% FEVE based Fluoropolymer powder coatings will actually meet and exceed the performance requirements outlined in the AAMA

Both towers at 33 Park feature IFS 500FP on the facade

2605 spec, and in many tests will outperform traditional liquid PVDF finishes. And they come with those same warranties, color options and require fewer coats.

High performance powder coatings go way beyond the performance requirements outlined in AAMA 2605, which is why they come with great warranties when applied to aluminum by a registered applicator. So far so good – world class protection and performance in the bag. It's easy to see

why architects like SHoP, Handel and SOM are specifying high performance powder on curtain wall projects. But what else? Let's look at the environmental advantages high performance powders can bring to a project.

Can high performance coatings REALLY be sustainable?

High performance, 100% FEVE based Fluoropolymer powder coatings will meet and exceed the performance requirements of AAMA 2605, and boasts environmental credentials that will make you confident you are living up to

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sustainable design commitment your practice purports to have made.

The list of environmental grievances that these solvent born, liquid PVDF paints bring to your project is worrying.

Chrome pretreatment and chrome based primer? Check. We all know the effect chrome has on the environment and people (remember Erin Brockovitch?), and in the US, liquid PVDF paints generally go over chrome based primer and use a chrome based primer as the first coat.

Toxic sludge/waste, which becomes toxic landfill that has to be specially disposed of? Check. When applying liquid paints, toxic waste that has to be specially disposed of, is created.

Solvents and VOCs escaping into the environment? Check. Liquid PVDF paints need a thermal oxidizer to manage solvent emissions.

Two, three or four coat options requiring significant energy usage and a disappointing carbon footprint? Check again.

So can high performance powder coatings really deliver incredible world class protection, colors and warrantied AND be a more environmentally responsible choice? See for yourself. Let's look at those environmental problems again from a high performance FEVE Fluoropolymer powder perspective...

Chrome pretreatment and chrome based primer? Nope, not necessary with high performance powder. So let's remove

chrome from the environment and from around the people who have to work with it.

Toxic sludge, which becomes toxic landfill that has to be specially disposed of? Nope, not produced in either manufacture or application, so let's reduce the toxic landfill we create as a by product of building beautiful structures.

Solvents and VOCs escaping into the environment? Nope, high performance powders have zero/negligible solvents and VOCs. Perfect. Especially for LEED projects.

Two, three or four coat options requiring significant energy usage and a disappointing carbon footprint? Nope, FEVE based Fluoropolymers are a single coat application, with higher film thickness in one coat to offer protection, and a superior chemical structure and manufacturing process that removes the need for primer coats or clear coats.

This is all pretty impressive, so is there anything to certify it? Absolutely. LEED v4 requires all vendors to LEED projects to have an Environmental Product Declaration (EPD). The environmental footprint of high performance powder is pretty impressive, and all IFS Architectural products come with an EPD.

It's easy to see why high performance FEVE Fluoropolymer powders are fast becoming the sustainable architects high performance coating of choice. World class color and gloss retention, superior mechanical and chemical performance, excellent warranties and unbeatable environmental credentials. High performance powder coatings are sustainable. Definitely worth adding to the spec.

PVDF AND FEVE RESIN BASED POWDER COATINGS. WHAT'S THE DIFFERENCE?

Powder coatings are not as familiar to us here in the US as in the rest of the world, so sometimes there can be some confusion. This seems to be especially so when it comes to the different resin bases used in the two types of architectural grade powder available and the number of coats required. Read on for a basic guide to AAMA 2605 Fluoropolymer powder coatings.

Architectural coatings that meet and exceed the performance requirements of AAMA 2605 can be based around two different types of resin.

FEVE resin (fluoroethylene vinyl ether)

PVDF (polyvinylidene difluoride) resin.

Most of us have heard about the PVDF resins in traditional liquid paints. These 70% PVDF liquid systems are usually 2+ coats on aluminum. This might be a primer plus top coat, or primer, plus top coat, plus clear coat etc. PVDF resin based powder coatings are also available, and these powders are also minimum 2 coat systems. FEVE resins are used in many architectural grade powder coatings and due to their unique resin make-up and the way powder is made, the 100% FEVE Fluoropolymer systems are usually 1 coat systems on aluminum.

Ultra-weatherability, durability, and chemical resistance are derived from the distinctive alternating fluorinated units. The FEVE resins are usually reacted with aliphatic isocyanates to form crosslinked FEVE coatings. 100% FEVE based fluoropolymer coatings take advantage of the carbon/fluorine bond, which is extremely difficult to break. Carbon-fluorine bonds can absorb much greater amounts of UV energy and will keep this energy from affecting the weaker bonds/linkages in the FEVE resin polymer structure.

So what are the differences and similarities between FEVE and PVDF resins?

Both FEVE and PVDF resin based coatings are factory applied finishes, requiring a spray and bake application process. Both will meet and exceed the performance requirements of AAMA 2605. For this reason the same type of warranty is also available when applied to architectural aluminum by a registered applicator and both are available in solid and metallic or mica finishes.

However there are some differences and this can be where confusion sets in.

Thermoset vs. thermoplastic

PVDF systems are thermoplastic. FEVE systems are thermoset. The thermoplastic PVDF resin will "remelt" under high temperatures and pressures while the FEVE resin is a thermoset system that will not "remelt" once it is correctly cured. These thermosetting properties also give the FEVE coatings superior toughness and scratch and mar resistance.

Number of coats

PVDF based powders, just like their liquid PVDF counterparts, must be a minimum of 2 coats. A powder primer coat is required to add protection and work with the top coat to give the desired levels of adhesion and UV protection.

FEVE based powders are single coat applications when applied to aluminum. The unique Fluorine-Carbon bond and thermosetting properties of the FEVE resin means the same (or better) levels of durability and protection are executed in a single coat. No primer coat is required.

Color and gloss

Both PVDF based systems and FEVE resin based powders retain their color and gloss extremely well and will meet and exceed the weathering performance requirements of AAMA 2605. However with FEVE based powder coatings a wider range of finishes are available. The PVDF resins are much more limited in the range of gloss they can achieve as the PVDF resin acts like a matting agent. Because the Carbon-

Fluorine bond is part of the resin system in FEVE based systems there is no matting effect.

Manufacturers of PVDF based powders will tell you that this is the superior coating and will have data to prove it. Manufacturers of FEVE resin based powders will tell you that *this* is the superior coating and will also have data to prove it. The truth, as always, is somewhere in between. The fact is, both products work well, offer great protection and warranties and are an excellent coating choice. At IFS Coatings we use FEVE based resins, along with many of our competitors. We believe there are many, many more examples of FEVE resin based powder coatings out there than PVDF powder projects, and they have been shown to be successful time after time after time. From a sustainability perspective, we know that FEVE resin based powders are a better choice. For architectural practices that claim to practice sustainable design, making the switch to powder should be a no brainer. Not only is solvent removed from the process as well as toxic compounds, less product and less energy is used in the application process and chrome (yes, the nasty hexavalent, trivalent "Erin Brockovich -we don't want it in our water" stuff) can be completely removed from the process. Unlike PVDF based products which in the US, generally have chrome based pretreatment. FEVE resin based powders will perform on top of both chrome and non-chrome pretreatments.

Navigating the world of architectural coatings and the various options out there can be tricky. We are here to help you, provide data you need, answer your questions and give you advice whenever you need it. Don't hesitate to ask.

Talk to your IFS architectural specification expert E: flevin@ifscoatings.com.

T: 520.345.7513.

SUPER HERO, SUPERMAN, SUPERGIRL, SUPER DURABLE?

The Sooner Center features IFS 400SD a hard working Super Durable

Super Size – When to use a Super Durable Powder Coating

Tough, durable, strong and steadfast are common traits associated with all manner of super heroes, but they're also commonly associated with super durable powder coatings too.

High performance, Super Durable Polyester powder coatings are actually designed to have super hero qualities – well at least when you compare them with a standard polyester powder coating!

Used regularly on exterior applications like commercial store front, windows, doors and low rise curtain wall, super durables are also often the choice for interior applications where conditions are extreme or stressful, or it's a high profile project where the added weathering, on the inside of a window frame for example, is a definite bonus. Check out 111 57th in Manhattan, NY and 9th and Lenora in Seattle, WA as prime examples of where a high performance Fluoropolymer was used on the exterior and a super durable polyester was used on the interior.

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111 57th, NYC features IFS 400SD on the interior curtain wall

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Marvelous performance

Super Durable Polyesters will meet and exceed the performance requirements of the popular AAMA 2604 coating specification. This includes holding color to within 5DE over 5 years of continuous Florida weathering testing, 3000 hours of salt spray and humidity testing and performing to very high levels in ASTM chemical tests - Super Durable Powders are certainly "Super". Though the AAMA weathering test – which is really looking at color and gloss retention – is a FIVE year test, when applied by a registered applicator to architectural aluminum, IFS 400SD, the IFS superior super durable architectural option actually comes with a TEN year warranty on exterior aluminum applications to hold color and gloss to within the same AAMA 2604 parameters.

With this in mind, it's easy to see why Super Durables are the obvious choice for many applications in commercial, residential, retail, mixed use and more.

Where else can Super Durables pack a punch worthy of a super hero?

When it comes to their environmental credentials, super durable powders take home the cape, the shield and the batmobile. Especially when you compare them with their more dastardly high performance liquid paint competitors. IFS 400SD will deliver all the incredible environmental benefits that powder coatings are known for, including no VOCs, no toxic compounds, no chrome primer required, no toxic waste/landfill created during manufacture or application, and an Environmental Product Declaration required by LEED v4. That's green to hulk-like proportions. In a good way!

Talking of green, Super Durables are available in a vast array of colors and special effects, including solid colors, metallic/ mica shades, textures and many special effects such as veins and even clear coats. In fact, the color, gloss and special effect range is significantly better than a Fluoropolymer powder (or liquid!), as some of these special effects can affect weathering capability in a Fluoropolymer. The icing on the cake? They are also extremely competitively priced and offer excellent value for money.

Though they don't have the extended weathering of a high performance Fluoropolymer powder coating, which meet and exceed AAMA 2605, offer incredible color and gloss retention and come with a 20 year warranty, Super Durables certainly pack a protective punch. Applied at 2-3 mils they also offer excellent film thickness and protection from the elements.

Super Durables certainly have their place in the high performance architectural coating world – no cape needed.

For more information contact flevin@ifscoatings.com

POWDER FOR INTERIORS

There's an awful lot of talk about high performance powders for exterior architectural applications, but what about interiors?

Powder coatings are used in many different interior applications and deliver an awesome performance punch!

Which product type should I use?

First things first. As always, the most important thing to decide on is product type. So often designers and architects choose color without specifying the product type/chemistry, and this can lead to performance and budget issues – neither good! So, what powders are good for interior applications? For most interior applications, a standard polyester powder coating is a great option. Many interior applications don't require the same levels of performance in terms of weathering (retaining color and gloss) or corrosion prevention, as the harsh exterior elements like UV resistance and salt or humidity don't come into play. IFS 300SP standard polyesters will meet and exceed the performance requirements of AAMA 2603, making them an excellent interior option for most applications.

For some interior applications, like interior façade, the interior side of a thermally broken window or commercial storefront in a mall, a more robust product in terms of weathering performance is desired. This is where a super durable polyester makes an excellent choice. IFS 400SD, the IFS super durable product range, will meet and exceed the performance requirements of AAMA 2604, thus delivering improved color and gloss retention and corrosion protection when compared with a standard polyester.

Where are powders used in interior applications?

The answer to this question could be an extensive list, however the easiest way to describe it is anywhere there's metal!

Common uses range from structural applications likes interior façade or inside of thermal break on windows, practical applications like trim, lighting, display units, racking and shelving and to decorate applications like furniture, accessories and point of sale stands. The options are endless!

Can powders deliver protection for all those different applications?

As well as looking great, these thermosetting powder coatings deliver a tough, hard and scratch resistance protective film – especially when compared with a liquid paint. Read on to discover what else is possible...

Anti-microbial powders

Perfect for hospitals, pharmacies, schools, gyms and more, anti-microbial additives can be added to interior powder coatings. The great thing about these is they remain anti-microbial for the life of the powder coating – as

long as the powder is present, it retains its anti-microbial properties.

Additional scratch and mar

Powder coatings have superior scratch and mar

resistance, especially when compared with liquid paints. However some applications need all the help they can get – protection from people, bags, keys, phones...the list goes on. Artco Bell makes quality furniture for schools and as such takes the protection of that furniture seriously – it needs to last as long as possible and stand up to the heavy demands placed on it. Check out this video that shows just what the powder coated legs of their chairs can stand up to. They're protected with an extra thick film of tough powder coating with additional scratch resistance built in, and the results are impressive.

Anti-graffiti

Unwanted graffiti can be a pain in the proverbial to deal with. Powder coatings can be made with an anti-graffiti additive included to make it easier to remove unwanted graffiti when it happens.

Electrostatic Dissipative coatings

Protecting extensive IT investment is important so even items like server cabinets can benefit from interior powder coating with electrostatic dissipative qualities built in.

So many special performance qualities can be added to powders – from fingerprint resistance to additional rub protection perfect for racking and shelving. For more information on the protective qualities you need, contact your IFS rep.

Color and clears – decorating with interior powder coatings

No exterior exposure means a significantly reduced

weathering requirement, and that's great news for the sheer number of colors and effects available in interior quality powders! Certain special effects require techniques to achieve the specific look, which can reduce the weatherability of the powder. For interiors, weatherability is not really a big consideration, so the freedom you have in choosing colors and special effects is endless!

Choose from color collections like RALs, Pantones, ANSI and Federal Standards as well as special effects like sparkles with mica and metallic, textures, river textures, veins, wrinkles, translucents, wood effect and more. The challenge with color in this blog is that it's so hard to effectively show color on screen. Just think how different a color can look when you tilt your laptop screen or your mobile one way or the other - and that's before we realize that no one's screen is color calibrated. Add into that the problems of accurately showing beautiful metallic or mica effects on screen, and we always recommend you ask for a free color sample or color cards to make your choice. With over 76,000 colors in our database you have so much to choose from so don't hesitate to reach out and let us know what we need and we'll get those samples out to you!

Choosing powder coatings for interior applications has never been easier! If you have questions, need help or assistance or want a color sample or free color match started for you – just let us know!

CAN I GET THE COLORS I NEED IN POWDER COATING?

The simple answer is yes! Powder coatings are available in a huge array of colors and special effects – at IFS we have over 76,000 colors in our database – so there is plenty to choose from. However there are some important things to consider - check out our tips on choosing colors in powder coating...

First things first – the most important thing to know in any color decision - choose your powder product first! Powder coatings are often referred to quite generically, but as we know, there are different grades of architectural powder, some suited to exterior and some to interior. We don't want to put an interior grade on the exterior as it will fade quickly – it's not designed to go outside. So make sure you know the product type you want first and then check if your color is available in that product.

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Solid colors

You may hear the term 'solid color' tossed around in the coatings industry. Don't worry, it's not referring to their actual state, it simply refers to the fact that it is a simple shade – no special effect added.

As well as standard architectural colors such as white. black, grey, silver, bronze etc. (the IFS architectural color card features actual powder coated chips, so you can see exactly what the powder will look like. Ask for your free copy), there are many color standards out there - RAL, Pantone, BSI – to name but a few. Most of these colors are available in powder coating technology. There are hundreds of RAL colors (check out the IFS RAL series) as well as Federal Standards, ANSI and even Pantones. A note to mention when considering Pantone colors; not all Pantone colors are possible in powder technology. Pantone is ink on gloss paper, and we are producing powder for metal. So with certain Pantone shades we can achieve the color but not the intensity, or the intensity is there but the color is slightly off. Fortunately it's not true of all Pantone colors, so simply ask your powder rep and they will let you know.

The full spectrum is available in most powder technologies, including elegant blacks and whites, inviting browns, greys, silvers and bronzes, eye popping neons, warm earthy tones, soft pastels, candy colors and striking translucents.

It's worth mentioning here that not all colors are available in high performance Fluoropolymers. Certain bright shades, like bright oranges, reds, pinks and purples are difficult to make in this technology. That said, we are testing some of those shades in Fluoropolymer technology right now, so always check with your IFS rep for the most up to date information. The reason some shades don't weather as well is some of the pigments used in these brighter shades don't weather as well. Where they may pass the 10 year color retention test required by AAMA 2605, most companies warranty their Fluoropolymer products for 20 years, and the challenge is these brighter shades won't retain their color, to within the required performance specification, for that period of time. The good news is we don't see these super bright shades requested that often on exterior projects!

Gloss

You can also choose what level of gloss you want for your color. Gloss is measured in Gloss Units with an instrument called a gloss meter.

Matte powders as low as a 5 gloss all the way up to a super shiny 90 gloss – and everything in between – are available in Super Durable and Standard Polyester powder products. Just like with the bright colors, Fluoropolymers are not available in the extremes of gloss. A very matte or very high gloss is difficult to achieve as these extremes can affect the weathering capability of the powder. Anything between a 30 – 75 gloss is available, so there's still plenty to choose from!

Special Effects

Metallics/micas

A few years ago an architect confidently told me that sparkle or mica effects weren't available in powder coating. Not sure where this info came from (perhaps back in the 70s?) but thankfully it's simply not true. Soft shimmers, brighter sparkles and even multi-colored metallic are all possible. Shades like anodized silver, platinum, bronze, champagne and pewter are incredibly popular. Remember, metallic or mica effects look different at different angles – even though most people looking at a building see them straight on! There are some limitations. With a powder coating the metallic loading (the amount of mica or metallic) can not be as high as with some liquid paints. Super sparkly is not really on trend right now, but always check with your IFS rep for the latest info.

Textures

Whether it's super fine (think confectioner's sugar) or super heavy (think anti-skid) we can give the powder coating texture, which adds that tactile dimension to the surface. It will come as no surprise that super heavy textures aren't available in Fluoropolymer technology (yep, you guessed it, the texture affects weathering capability) but if you are looking for a specific feel, it's amazing what can be done. We created a "terra cotta" texture in a Fluoropolymer for the curtain wall on the project shown in this picture and it looks great!

> 15 E 30th, designed by Handel Architects, features a "Terra Cotta Texture" Fluoropolymer powder on the curtain wall/façade.

Interior special effects

There are certain special effects that are best used for interior applications. What's also important to note is that it's really difficult to show these effects accurately on a screen, and to be honest, sometimes the name of the effect may not be what you're thinking (I personally don't think 'wrinkles' look particularly wrinkly. They are beautiful and one of my favorite special effects, just not wrinkly to me), so always ask for a free color chip to see exactly what it looks like.

Translucent powders

Translucent powders are pretty well described – when the powder cures it becomes slightly translucent, so you actually see the metal, or a printed logo, or whatever is under the powder showing through the powder coat. These have been very popular in the last few years due to the trend for a hint of natural metal showing through the color. Translucents are used in a wide range of industries, always for interior applications, and so have been created in natural metal tones and neutrals all the way through bright raspberry and teal.

Wrinkles, hammertones, multi-component effects and more

Wrinkles, despite the name hated by most of us, are a beautiful, sophisticated powder effect used on interior applications. Difficult to describe they are best seen in the

flesh – order a free sample chip. Likewise, hammertones, multi-components and speckles can come in a range of colors and are simply best seen first hand! What's clear is that they are also add depth and interest to a piece and can help achieve a more unique effect.

Woodgrain

Imagine if you could make aluminum look like wood, or marble or...

Powder sublimation means you can. Quite simply, the powder gives the piece the base color, and then the application

process does the rest of the work! So whether it's a light maple finish, a super oak or even a rusted metal effect, believe it or not it's possible. This really does have to be seen to be believed and is available in standard polyester (AAMA 2603) and super durable (AAMA 2604) powder coatings. Check this out!

Color matching

Despite the many thousands of colors and effects available, sometimes you want a very specific shade, need to match a brand or maybe want to take a liquid paint and get it in a more environmentally responsible powder coating. Not a problem. Color matching and color creation is what we do. You don't get to 76,000 colors by sticking to the basics! Whether it's matching interior paint colors from companies like Benjamin Moore or Sherwin Williams, creating powder that matches a fabric swatch or even matching to an item that you like (Nike once sent us a sneaker to match to, and we've matched to pennies, purses and more!), we can create a custom color for you. It's actually easier to match to something tangible - so sending in what you're looking for gives the color matching team an advantage.

There are so many colors to choose from in powder coating technology, with world class performance built in. Talk to your IFS rep about getting color samples or a free color match started today.

IFS POWDER LEEDS THE WAY FOR SMART ENVIRONMENTAL DESIGN

Many of us in the design world have a vague idea that powder coatings are a more sustainable coating, but what about high performance powders for architectural applications. Do they walk with the same environmental footprint?

Are high performance powders also a more sustainable coating choice?

By high performance powders, we are referring to hard working, high quality, architectural grade powders that meet and exceed the AAMA performance requirements.

The simple answer is yes. High performance architectural powders pack the same (or better) performance punch in terms of color and gloss retention and corrosion resistance, but without

the sucker punch to the environment that a liquid high performance coating delivers.

So what exactly are the environmental advantages of high performance powders?

Environmental Product Declaration (EPD) required by LEED v4

Not every powder coating company's powders have an EPD, but IFS 500FP, IFS 400SD and IFS 300SP all come with an EPD. See below for more details.

Lack of VOCs

There are no solvents and therefore no or extremely low Volatile Organic Coatings (VOCs) in powder coatings. This is a huge advantage for any LEED project, especially when used over large areas such as building envelope.

- There are no toxic compounds in powder coatings
- for example no lead or chromium (VI).
- Single coat

Powder coatings achieve the same or better levels of chemical, mechanical and weathering

performance than liquid coatings, but in a single coat. This means there is a significant energy saving. With liquid 2, 3 or 4 coat systems, each coat must be sprayed and baked – with significant energy requirements each time.

Reclaim and reuse

Any over spray can reclaimed and reused or recycled. This gives

up to a 97% utilization rate from a box of powder.

• No chrome required

IFS powder coatings can be used over non chrome pretreatment on aluminum and still meet and exceed the AAMA performance requirements. In the US, liquid PVDF paints always seem to require chrome pretreatment especially to achieve a warranty. Let's remove chrome, which is really bad for the environment, from the process.

• IFS powder coatings never require a chrome based primer when used on aluminum. In fact most of the time no primer – chrome or otherwise – is required on aluminum. Even when a primer is used, an epoxy based or zinc rich primer (not chrome) is great for delivering improved corrosion protection to substrates like steel.

• Lower carbon dioxide emissions

In a life cycle analysis (DSM study), powder coatings were shown to have both lower VOC and lower carbon dioxide emissions than liquid coatings.

• No Hazardous Waste

There is no toxic hazardous waste generated during the manufacturing or application process. This means there is also no toxic waste creating toxic landfill, unlike with the liquid paint application process.

• EPA

The Environmental Protection Agency (EPA) recommends powder coatings as a sustainable coating option.

If these great reasons aren't enough, add to the fact that powder is also tough, chemical and corrosion resistant (in line with AAMA tests), it weathers extremely well, which reduces the need for replacement products, and it is also much more scratch resistance meaning fewer replacements or touch up during construction. There's a reason GCs like working with powder!

But what about official Environmental credentials?

IFS Architectural powders each come with an Environmental Product Declaration (EPD) that is required by LEED v4 and contributes to LEED points. IFS Architectural powder will also pass all Red list and Living Building product requirements.

Check out this LEED Environmental Product Declaration (EPD) chart that covers the finishing process of an aluminum extruder and compares traditional liquid paints, powder coatings and anodizing.

To get an Environmental Product Declaration each IFS powder product type went through a full Life Cycle Analysis that included ingredients, production, energy usage, packaging, application requirements and more. The products are then tested in all of the LEED EPD categories, which are acidification potential, eutrophication potential, global warming potential, smog potential and primary energy demand.

A third party completed this testing on every IFS architectural grade powder coating and the results, unsurprisingly, were excellent!

The below chart showcases the results from Merit Aluminum's own EPD. They extrude aluminum and then offer all three finishes – high performance liquid, high performance powder and anodizing. The chart demonstrates the result of the three finishes in each category that LEED requires – the result speaks for itself!

Clearly powder outperforms the other finishing options in every category across the board.

From a high performance coating point of view, sustainable design has never been easier. So many architects are switching to high performance powder (check out just a few projects here). For so many years we've talked about sustainable design – now let's walk the walk. Choose high performance powder coatings.

Overall LCA Results – Gate-to-Gate

Comparison of finishing techniques

STEEL YOURSELF – POWDER COATINGS ARE A HIGH PERFORMANCE COATING FOR STEEL TOO!

Powder Coating Steel – the do's and don'ts.

Powder coating aluminum is pretty straightforward. There are the AAMA coating specifications that outline what you can expect from any organic coating applied to aluminum, and warranties up to 20 years are supplied when applied to properly pretreated aluminum by a registered applicator. Easy.

But what about steel?

Navigating coatings for steel is simply not as clear cut, and there are often many questions. Can you use environmentally responsible powder coatings on steel? Are there limitations? Will you get a warranty? Should you spec a primer? Are their limitations on colors and effects?

Check out our ten most frequently asked questions about powder coating steel and the answers you need to ensure your coated steel performs to the highest standards and looks great!

Lafayette House in NYC features powder coated steel windows.

1. Can you powder coat steel?

You've probably already guessed the answer to this one (otherwise a top "ten" would be pointless!) but yes, you can absolutely powder coat steel. Powder coatings are used on steel used in a wide variety of applications from high quality windows and doors to structural pieces and rebar. Outside of the architectural industry all sorts of steel applications are powder coated, many of them exterior, including aerial work platforms, cranes and trailers. Architectural grade powders for steel include high performance Fluoropolymers, high performance Super Durables and interior grade Standard Polyesters.

2. What types of steel can be powder coated?

Most types of steel can be powder coated! Some types are easier than others, and the pretreatment might vary depending on the type of steel and whether it is an exterior or interior application, but steel can be powder coated and is actually applied in the same way. It's a factory applied finish; the steel is prepped, the powder is electrostatically applied and then cured in an oven. Simple.

3. What type of preparation should be performed on the steel before powder coating?

For any exterior use, the preparation or pretreatment, of steel is incredibly important. The most common concern when using certain types of steel is corrosion. Proper preparation and pretreatment is the first step in trying to prevent corrosion. To be honest, it's not as simple as the awesome pretreatment options that exist for aluminum, but good substrate prep on steel is essential. Depending on the type of steel you are using zinc, iron phosphate or zirconium pretreatment or if sandblasting is the method of prep, a white metal blast. After pretreat or blast, a zinc rich powder primer should be applied.

4. Should I use a primer on steel?

For exterior applications, absolutely. For interior applications, it's not as essential in terms of weathering, but does help add a layer of protection and provides a good, smooth surface to powder coat. The good news is it's not a chrome based primer. High performance liquid coatings MUST use chrome based primer – they simply don't perform without it (and yes, it's the nasty variety – bad for people and the environment). Powder coatings never require chrome based primers. For steel substrates used in exterior applications we recommend a zinc rich IFS powder primer to add another level of corrosion protection before the IFS powder top coat is applied.

1. Does the system require a certified steel prep or applicator?

Applying powder to steel is not a proprietary application system, however to ensure good pretreatment and application for exterior pieces a registered applicator is recommended. It's slightly different to coating aluminum due to the warranty issues involved (see below), however as good substrate prep and application is so important in preventing corrosion and maintaining color and gloss over time, having a coater who knows what they are doing and has a good quality preparation and application system and oven is a no brainer.

2. Are there limitations on colors and effects?

The great news here is the answer is not really! The same rules as coating aluminum apply! So for exterior applications where high performance Fluoropolymers are required, some of the brighter pinks/purples, oranges and reds are more difficult to achieve. This is simply because the pigments that will meet the 20 year color retention requirements in these brighter shades are not available. Other than that there is a lot of choice and mica/metallics and some textures are also available.

With Super Durables or interior grade Standard Polyester powders, the world is your oyster! There's a huge range of colors and effects available – at IFS we have over 76,000 colors in our database so there's plenty to choose from!

3. Are the environmental benefits of powder the same if applied to steel?

For the most part, yes! The benefits of the actual coating – no VOCs, no toxic compounds, no toxic waste created in manufacture or application, no chrome required, etc. are exactly the same. Where it may differ slightly to powder coating aluminum is in the number of coats. Adding a zinc rich powder primer obviously adds another layer of coating – and this may add another cure cycle which means more energy used. However IFS has developed IFS Co-cure, which uses clever formulation technology so that 2 coats of high quality IFS powder can be applied with only one cure cycle. Talk to your IFS representative to see if this is available for your application!

4. What are the steel section size limitations?

Really the only limitation is the size of the powder coaters' oven. Many coaters working with steel parts have extremely large ovens for this reason.

5. Will I get a warranty for coating performance on steel?

The simple answer in this case, unfortunately, is no. At least not from the coating manufacturer, though the applicator may provide a warranty. The reason for this is to do with the substrate and the corrosion problems that can occur with steel, more than the coating. On aluminum, the coating is designed to deliver specified levels of salt spray and humidity resistance and will do so as long as proper pretreatment is in place. However the main factor there is actually the pretreatment, not the coating. With certain types of steel, the issue of corrosion is much bigger, and so while the powder coating is exactly the same product as is applied to aluminum, the pretreatment options are not the same.

6. Can I touch up powder coatings on steel?

Yes! Just like on aluminum touch up solutions are available, with various methods of application. They are liquid solutions – imagine how difficult it would be to cure powder on site – and they work great!

Las Vegas, NV City Hall features powder coated steel structure

www.ifscoatings.com

WHAT DOES IT TAKE TO APPLY HIGH PERFORMANCE POWDER?

Two words.

Registered Applicators.

Actually, that's not entirely true – registered applicators are required for Fluoropolymers and for products where a warranty is required, but we'll come to that later.

Firstly, powder has to be applied by a powder coater with the right equipment, and powders are a factory applied finish. Because they are electrostatically applied and then cured in an oven, they can't be applied on site. Of course they can be touched up if they do scratch (and the great news is they don't scratch as much as liquid due to their thermosetting properties), they just get touched up with a matched liquid paint. It's just like touching up competing liquid products and there are companies making touch up solutions all over the US.

Interior grade powders, like IFS 300SP for interior applications, can be applied by any professional coater – whether that's a custom coater, local job shop, or whichever

powder professional your contractor uses for their work. These coaters can also apply a Super Durable powder, as long as a warranty is not required.

Fluoropolymer powders like IFS 500FP (a 70% PVDF liquid equivalent) and also Super Durable powders where a warranty is required, must be applied by a registered applicator.

To achieve a warrantable finish, a certain level of pretreatment, application, curing and process control is required from the coater. That's why all good powder coating companies have a Registered Applicator program or similar.

To become a Registered Applicator, the coaters are visited by a technical team to assess their line for suitability. If it looks good, then we ask them to self audit and then we audit the pretreatment, application, oven, process control and quality control/testing to ensure it is up to scratch. Powder is then provided to the coater, and they are asked to

pretreat and coat panels and parts. Those panels and parts are then sent to our labs and they are put through rigorous AAMA required ASTM tests. If every part passes every test, then they become a registered applicator, and then we redo the whole process every 18 months to two years to ensure they are maintaining standards.

Clearly this is a very expensive and time consuming process, but it's essential to ensure that the pretreatment and powders are being applied in a way that will ensure the coating will perform at its best and is worthy of the color and gloss warranty that is offered.

The good news is there are registered applicators all over the USA, and more and more coming on line every year as the popularity of powder, loved for it's high performance and environmental benefits that liquids simply can't deliver, increases at a rapid rate.

What's more, many companies that you already know and love are registered applicators, including window companies like Sierra Pacific, Starline and Jeld Wen, louver companies like Construction Specialties, and metal fabricators like Merit Aluminum, Sapa, Kawneer and Exmet. So when you're looking for exterior, high performance Fluoropolymers, like IFS 500FP, with or without a warranty they must be applied by a registered applicator. Likewise if you're looking for a super durable finish with a warranty (like IFS 400SD) popular on commercial storefront – again a registered applicator should be used.

Non registered applicators can apply super durables where no warranty is required and also interior grade standard polyester powders.

Contact us to find a registered applicator near you or your project site!

POWDER COATING AND SPECIFICATION WORDING

April 2016

09 93 00 Staining and Transparent Finishing

- 09 93 13 Exterior Staining and Finishing
- 09 93 13.13 Exterior Staining 09 93 13.53 Exterior Finishing
- 09 93 23 Interior Staining and Finishing
- 09 93 23.13 Interior Staining
- 09 93 23.53 Interior Finishing

09 94 00 Decorative Finishing

- 09 94 13 **Textured Finishing**
- 09 94 16 Faux Finishing
- 09 94 19 Multicolor Interior Finishing

09 94 23 Gilding **High-Performance Coatings**

- 09 96 00 09 96 13
 - Abrasion-Resistant Coatings 09 96 23 Graffiti-Resistant Coatings
 - 09 96 26 Marine Coatings
 - 09 96 33 High-Temperature-Resistant Coatings
 - 09 96 35 Chemical-Resistant Coatings
 - 09 96 43 Fire-Retardant Coatings
 - 09 96 46 Intumescent Painting
 - 09 96 53 Elastomeric Coatings
 - 09 96 56 **Epoxy Coatings**
 - 09 96 59 High-Build Glazed Coatings
 - 09 96 63 **Textured Plastic Coatings**
 - 09 96 66 Aggregate Wall Coatings **Special Coatings**

09 97 00

- 09 97 13 Steel Coatings
- 09 97 13.13 Interior Steel Coatings
- 09 97 13.23 Exterior Steel Coatings
- 09 97 13.24 Steel Water Storage Tank Painting
- 09 97 23 Concrete and Masonry Coatings
- 09 97 23.24 Concrete Water Storage Tank Painting 09 97 26
- Cementitious Coatings 09 97 26.13 Interior Cementitious Coatings
- 09 97 26.23 Exterior Cementitious Coatings 09 97 35
- Dry Erase Coatings

10 00 00 **Specialties**

- 10 01 00 **Operation and Maintenance of Specialties**
 - 10 01 10 Operation and Maintenance of Information Specialties 10 01 20
 - Operation and Maintenance of Interior Specialties 10 01 30 Operation and Maintenance of Fireplaces and Stoves
 - 10 01 40 Operation and Maintenance of Safety Specialties
 - 10 01 50 Operation and Maintenance of Storage Specialties
 - 10 01 70 Operation and Maintenance of Exterior Specialties
 - 10 01 80 Operation and Maintenance of Other Specialties
- 10 05 00 **Common Work Results for Specialties**
 - 10 05 05 Selective Demolition for Specialties
- 10 06 00 Schedules for Specialties
 - Schedules for Information Specialties 10 06 10

It wouldn't be right to finish without including some pertinent information on specifying powder. So often the finishing spec is simply left as it has always been – with a 70% PVDF liquid finish, and the relevant liquid wording – in place. It's a great product, there's no doubt about that, but in the era of sustainable design, if you can get the same or better performance, the same warranties and the same colors and effects without the harsh environmental impact, surely it's a simple decision to switch from liquid to powder.

With that switch come a few simple changes to the finishing spec wording, e.g. masterspec division 09 section 9600.

We often get calls from General Contractors asking for 3 coat powder systems (they don't exist) or asking for an incorrect product because the spec wording is liquid vocabulary rather than powder wording.

So what are the two simple things to watch out for?

Number of coats. On aluminum, high performance powder is usually a single coat application. That includes high performance Fluoropolymers like IFS 500FP. And yes, that includes metallic or mica finishes, the same or better performance and the same warranties - the way we make it is different to liquid so the way the protection is delivered differs. So no clear coat, and on aluminum, unless it's right on the ocean front, a primer is not (check out the required chapters on Fluoropolymers to learn why). Please make sure you revisit the numbers of coats required in the finishing section and ensure it is correct for the product you choose. So, when you see phrases like "3-coat system" you should hear an alarm in your head - that is antiguated Define the AAMA and warranty language. requirements, and let the best system win.

An example of good powder coating spec language would be "High Performance Organic FEVE Fluoropolymer Finish: Single-coat fluoropolymer finish complying with AAMA 2605 and containing 100 percent Fluoro Ethylene Vinyl Ether

(FEVE) resin. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions."

2. 100% Fluoropolymer versus only 70% Fluoropolymer. Most good specs citing liquid PVDF exterior finishes call out for a minimum of 70% PVDF Fluoropolymer resin in the liquid coating. That should change when specifying high performance powder coating. Instead of only 70% Fluoropolymer resin, the spec needs to require a minimum of 100% FEVE Fluoropolymer resin. The resin is what coating its gives the durability and 100% FEVE performance. having SO Fluoropolymer resin in the coating is always a good thing!

We are here to help you! We can help with spec wording regardless of the coating system you choose. Make sure your spec wording is correct, make sure that your coatings manufacturer is available to any GC to help with product order and delivery, and make sure that what you took the time to specify is actually applied to the substrate. There are simple specification wordings available to download at IFS.com, however we know that everyone has their own style of specification, so contact us for help with tweaking your spec to make sure it's correct no matter what coating type you choose.

METALLIC POWDERS

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Sparkle, shimmer, glitter...the trend for coatings with that extra something isn't going anywhere.

So what do you know about Metallic/Mica effect powders? Joey Roush, IFS bonding manager, explains all...

To make the powder sparkle either mica, aluminum flake, or a combination of both is used. What's the difference?

Mica vs Aluminum

There are two main types of effect pigments used to make metallic or 'sparkle' type coatings: aluminum and mica. Mica is a type of mineral that is very thin and flaky. This mineral is then coated with various types of pigments to achieve colors ranging from pearlescent whites to rich coppers, bronzes and golds. Most of the mica pigments are transparent, which allows the base color to show through – this has a great influence on the overall color. Aluminum flakes on the other hand are fully opaque. The higher the loading of aluminum; the greater the silver appearance and the less visible the base color.

So do you only use mica or aluminum in powder coatings?

Liquid vs Powder

These effect pigments can be added to either liquid or powder coatings, and they look fantastic in both. We use the pigments to create everything from a fine shimmer through to a heavier sparkle in a high performance coating. However there are some differences in what can be achieved. All our cards on the table - there are some limitations to what can be achieved in powder. The most significant difference between liquid and powder lies in the lower viscosity of the liquid. The lower viscosity allows for a much higher loading of effect pigment to be used while still maintaining favorable application properties. A liquid coating can have up to 25% metallic pigment loading, while most powders can only have around 5-6% loading. The left photo below shows a liquid coating under 20X magnification, while the right is of a similar shade powder. The loading and depth of the liquid is much greater than that which can be achieved in powder.

However, with trends moving away from "super sparkle" effect coatings and towards more elegant, subtle effects, high performance powders can deliver the metallic effect you're looking for and without the harsh environmental impact of a liquid coating.

Ok, got it.

So how to you make a "sparkle effect" powder?

There are two ways. First up, dry blending:

Dry blending is a quick and simple process where a powder coating and an effect pigment are mixed. This process is very cost effective and can be successfully utilized under certain circumstances. Some of the main benefits include smaller minimum order guantities and guick turn around times. However, a dry blended product is more susceptible to application issues, depending on the color and loading of the effect pigments. Powder particles and effect pigment particles react differently to the corona field during application and can give a splotchy appearance if unbonded. In fact, some colors cannot be achieved in a dry blend. For example, colors with high effect pigment loading will likely experience 'spitting' during application, which is a collection of effect pigment on the spray gun electrode that is transferred to the part. The end result is like it sounds - it will appear as a blemish on the coating.

The second, and more common process in architectural powders, is bonding.

Bonding

Bonding is a more complex process compared to dry blending. During the bonding process, a powder coating is heated using friction in a mixing vessel, to the point where the out-side of the powder becomes sticky. The effect pigment then adheres to the powder particle. A properly bonded powder will yield a much more consistent finish as compared to a dry blend. Another benefit is that the powder can also be successfully reclaimed with minimal color shift. Bonding also allows for colors with higher effect pigment loading to be successfully applied. For the architectural market, where both high levels of performance and aesthetics are required, bonded metallics are the sensible option.

What about a clear coat? With liquid paints clear coats are always used with metallic/mica coatings?

Well, simply put, with a liquid coating the clear coat is needed to help protect it from scratch and mar, and meet the AAMA performance requirements. Plus the clear coat helps protect the flakes from degradation - especially at the low films liquid have to be applied at.

With powder coatings, that's not the case. The scratch and mar resistance of powder is much better due to its thermosetting properties, and the effect pigments used to conform to the AAMA specification have a specialized coating that protect them from degradation. This coating, or protection, of the effect pigment allows the system to meet the AAMA performance specifications without the use of a topcoat.

For more information on sparkle effect powders, or any of the topics in our book, please contact:

flevin@ifscoatings.com

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www.ifscoatings.com