Coatings Application Guide

2024

TCF

Twin City Fan

Liquid Coatings

INTRODUCING A VARIETY OF NEW LIQUID COATINGS TO MEET THE APPLICATION DEMANDS FOR YOUR FAN.

Twin City Fan & Blower offers liquid coatings and a wide array of color-matching tools to serve customers in all of our markets – from light OEM and commercial facilities to industrial customers. Our products include the latest waterborne and low VOC coatings, as well as high solids and traditional solvent borne coatings. All products meet emerging customer and regulatory requirements around the world. Our ongoing goal is to consistently develop formulations and application systems that will meet the changing needs of all of our customers.

Our new paint system makes liquid coatings highly durable.

Polyurethane Acrylic

Polyurethane Acrylic is direct-to-metal (DTM). The coating is designed to provide a highly durable, high gloss, high build, one-step system suitable for non-corrosive exposures and more harsh environments. Our Polyurethane Acrylic, which can be brushed, rolled or sprayed, is formulated to provide maximum topcoat appearance and industry-leading polyurethane performance. See Technical Info Sheet TILC-T-3 for more details.

Epoxy Mastic

Epoxy Mastic is a satin gloss, high build epoxy mastic, based on amido amine modified polyamide epoxy technology. The resulting coating is designed to be highly durable and to deliver outstanding corrosion and chemical resistance. It is well-suited for caustic environments. See Technical Info Sheet TILC-T-1 for more details.

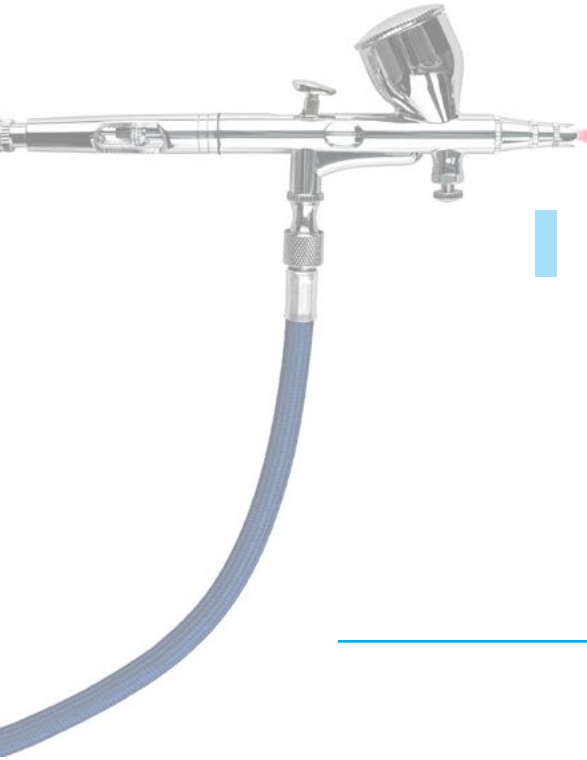
Zinc Rich Epoxy Primer

Zinc Rich Epoxy Primer is a moisture-cured organic zinc-rich coating based on polyurethane technology. The resulting coating is designed to be highly durable and to deliver outstanding corrosion resistance. Our Zinc Rich Epoxy Primer is intended to be used as a primer and should be topcoated. See Technical Info Sheet TILC-T-4 for more details.

High Temperature Liquid

High Temperature Liquid is a high quality, flat finish pure silicone alkyd, designed to resist temperatures up to 1,200°F (649°C). This coating is formulated to provide long-term protection. To achieve high temperature resistance, heat must be applied between 600°F – 800°F (316°C – 427°C) to the painted metal in order to fuse the coating to the surface. The maximum heat resistance of our High Temperature Liquid occurs only after the fusion process. Our High Temperature Liquid is designed for indoor and outdoor use with low UV exposure. See Technical Info Sheet TILC-T-2 for more details.

Powder Coatings



POWDER COATINGS ARE THE BEST CHOICE FOR THE MOST EXTREME APPLICATIONS.

Powder coating is a dry finishing process used for a high-quality, durable finish. A process called electrostatic spray deposition (ESD) is typically used to achieve the application of the powder coating to a metal substance. We offer epoxy and polyester powders designed for general purpose decorative and protective end service applications.

Powder coating helps stainless steel parts stand up to wear and tear caused by weather and other factors, as it is highly resistant to scratching, flaking and corrosion. It can help prevent corrosion of the steel part and extend the life of components used outdoors or in a working environment.

BENEFITS OF POWDER COATING

Powder coating is a very popular way to paint fans and there are a number of advantages over conventional painting methods.

1 **Efficiency**

Almost no waste due to the electromagnetic energy used to apply the powder.

2 **Durability**

Powder forms a chemical bond when it cures, creating a flexible, durable finish.

3 **Variety**

Large potential for customization by blending colors, texture and finish.

4 **Environmental Safety**

Powder produces less waste and is free of toxic chemicals and solvents.

5 **Maintenance**

Powder coating is easy to maintain – no special solvents or cleaners are required.

Powder coatings applied with our new paint system provide innovative features.

Polyester Powder

Polyester Powders are designed for decorative and protective end service applications where exterior durability is a requirement. Recent enhancements have provided premium durability Polyester Powders that withstand South Florida weathering exposures beyond five years. Polyester Powders provide very good chemical and solvent resistance, and scratch and mar resistance. See Technical Info Sheet TIPC-T-4 for more details.

Epoxy Powder

Epoxy Powders are designed for general purpose decorative and protective end applications where exterior UV durability is not a requirement. Epoxy chemistries will chalk and fade upon exposure to ultraviolet rays, resulting in aesthetic changes only. Epoxy Powder is formulated to provide superior chemical and solvent resistance, and scratch and mar resistance. Epoxy Powder has a variety of formal recognitions from Underwriters Laboratories, NSF, FDA and automotive companies. In addition, epoxy is the standard chemistry for fusion bonded epoxy (FBE) coatings for pipe and rebar. See Technical Info Sheet TIPC-T-1 for more details.

High Temperature Powder

High Temperature Powder is a thermosetting silicone powder designed as a coating for High Heat Resistance applications. Depending on the substrate type, this coating is capable of withstanding operating temperatures of up to 1,000°F (538°C) for four hours with minimal visual change, no loss of adhesion and providing very good corrosion resistance. This coating is good for outdoor applications requiring UV resistance. See Technical Info Sheet TIPC-T-2 for more details.

Zero Zinc Primer

Zero Zinc Primer is designed to provide excellent adhesion properties with the substrate and the topcoat. It is also formulated to deliver high anti-corrosion resistance to components subjected to severe environmental conditions. Zero Zinc Primer is designed for the architectural, transportation, industrial machinery and agricultural equipment markets. It is appropriate for applications requiring outstanding anti-corrosion protection with no heavy metals and all the benefits of a powder coating. See Technical Info Sheet TIPC-T-5 for more details.

Thermoplastic Powder

Thermoplastic Powder has been specifically designed to provide a long lasting, tough coating to mild steel, galvanized steel and aluminum used in exterior applications. It is based on an alloy of acid modified polyolefins. Thermoplastic Powder is resistant to stress cracking, adverse weather conditions, detergents, salt spray and typical airborne pollutants. The coating maintains excellent adhesion to the metal substrate without the need for a separate primer. The material also provides good abrasion and impact resistance. See Technical Info Sheet TIPC-T-3 for more details.

COATINGS DETAILS

Property	Polyurethane Acrylic+	Epoxy Mastic	Zinc Rich Epoxy Primer*	High Temperature Liquid	Polyester Powder+	Epoxy Powder	High Temperature Powder	Zero Zinc Primer*	Thermo-plastic Powder
Salt Spray	1,000 hrs.	4,000 hrs.	4,000 hrs.	N/A	1,000 hrs.	2,500 hrs.	N/A	4,000 hrs.	10,000 hrs.
Humidity Resistance	1,000 hrs.	3,000 hrs.	3,000 hrs.		1,000 hrs.	1,000 hrs.		1,000 hrs.	10,000 hrs.
Impact Resistance	80 in.-lbs.	3 in.-lbs.		80 in.-lb.	120 in.-lb.	160 in.-lb.	40 in.-lb.	60 in.-lb.	20 in.-lb.
Mandrel Flexibility	1/8" Mandrel	0% Elongation	5 – 10% Elongation	1/4" Mandrel	1/8" Mandrel	1/8" Mandrel	1/8" Mandrel	20% Elongation	800% Elongation
Pencil Hardness	4H		5H	2H	2H	2H to 6H	2H	H	Hardness Shore A = 95 Shore D = 44
Crosshatch Adhesion	100%		100%	5B	5B	5B	4B	5B	5B
Taber Abrasion	TBD	70 mg	140 mg		40 to 60 mg	24 to 45 mg		25 to 45 mg	60 mg
Min/Max Service Temp.	300° F	300° F	250° F	1,000° F	500° F	200° F	1,000° F	200° F	158° F
Coating Thickness (mils)	4 to 5	5 to 12	2.8	1.5 to 2	1.5 to 3	1 to 3	2.5 to 3.5	2.5 to 3.5	7 to 12
Weather Resistance	Excellent UV Resistance	Poor	Excellent w/ Topcoat	Poor UV Resistance	Excellent UV Resistance	Poor UV Resistance	Good UV Resistance	Excellent w/ Topcoat	Excellent
Chemical Resistances	See TCF's Protective Coatings Chemical Resistance Guide - ES-35								
Standard Colors	Gray / Blue	Gray	Gray	Silver	Gray / Blue	Gray	Black	Black	Black

** Requires a top coat. Using Zinc Rich Primer or Zero Zinc Primer as a primer in conjunction with Polyurethane Acrylic, Epoxy Mastic, Polyester Powder or Epoxy Powder will increase the salt spray to 4,000 hours.*

+ Color and gloss loss is expected over time with continued operation at or exceeding max temperature.

POWDER VS. LIQUID

Powder Coating

Powder coating is a superior coating system in most situations, based on environmental, performance and aesthetic reasons. Unlike liquid coatings, VOCs (Volatile Organic Compounds) are not needed as transfer agents for the coating. The excess overspray is not wasted, as it can be reclaimed and cycled back through the system. Therefore, the EPA recommends powder coating as a sustainable coating option. In addition, powder coating performance is typically harder and more scratch resistant. The powder coats can also achieve a thicker coating (see Thermoplastic Powder) without the "sagging" that can be characteristic of liquid coatings. Powder coats also tend to retain gloss and color better, and offer a more uniform look on the coated surface, than their liquid counterparts.

Liquid Coating

One of the advantages of liquid coatings is that they can be applied and allowed to air-dry without using a bake oven, which is needed to cure powder coatings. Many of the largest fans in TCF's product offerings are not able to fit in a common bake oven. Therefore, you'll see that many of our largest fans are offered only with liquid coatings. In addition, when it comes to color matching, TCF has the capability to mix small batch, custom colors in-house for liquid coatings without a significant change to the properties of the coating. For a powder-based coating, changing the color can also affect the chemical resistance, heat resistance and other coating properties. For a custom-colored powder coating, further analysis and details on the application are required. This increases time and cost as compared to a custom-colored liquid coating.

OUR COLOR SELECTION

Standard Gray

Standard Blue

New Color Match Ability

Twin City Fan has incorporated a new state-of-the-art color match system called a spectrophotometer. Also known as a color eye, the spectrophotometer allows for extremely accurate color measurement. This color eye then gives the operators a pigment formula to create an exact color match. We can also utilize this system to match any RAL code given. RAL colors are used for information defining standard colors for varnish, powder coating and plastics.

Note: Please contact your TCF sales representative for custom color options.

ASTM COATING TESTS

Impact Resistance (ASTM D2794)
ASTM D2794 is a standard test method for resistance of organic coatings to the effects of rapid deformation (impact). This test involves applying organic coatings to suitable 24 gauge metal panels and dropping a standard weight from a certain distance to induce an indenter deforming the coating as well as the substrate.

Mandrel Bend (ASTM D522)
ASTM D522 is a standard test method for mandrel bend test of attached organic coatings. It is used to qualify the coating resistance to cracking, upon bending, once they were applied and cured on sheet metal or other flexible materials.

Pencil Hardness (ASTM D3363-92a)
ASTM D3363 is a test method designed to evaluate the hardness of a coating through the use of pencil or drawing leads. The cure of the coating may also be assessed by this standard.

Relative Humidity (ASTM D2247)
ASTM D2247 is also known as Standard Practice For Testing Water Resistance of Coatings in 100% Relative Humidity. This practice evaluates the coating's water resistance by exposing coated test specimens in an atmosphere maintained at 100% relative humidity at 100°F. This condition will enable condensation to form on test specimens.

Adhesion (ASTM D3359)
ASTM D3359 is a standard test method for measuring adhesion by tape test. This test assesses the adhesion of film coatings to metallic substrates by applying and removing pressure-sensitive tape over cuts made in the film. This test method is also known as the Cross Hatch test. There are two distinct test methods in ASTM D3359: method A and B. ASTM D3359 is widely used in the coating industry as it allows to semi-quantify the adhesion of the coating undergoing testing to the specific substrate to which it is applied. Because of its macroscopic nature, this method allows to factor in the complete coating process from surface preparation to curing.

Taber Abrasion (ASTM D4060)
Taber abrasion is a test to determine a coating's resistance to abrasion. Resistance to abrasion is defined as the ability of a material to withstand mechanical action such as rubbing, scraping or erosion. Abrasion can be difficult to compare but weight loss is often evaluated. The test specimen is placed on the abrasion tester. A 1,000-gram load is placed on top of the abrader wheel and allowed to spin for a specified number of revolutions. Different abrading wheels are specified. A final weight measurement is taken.

Flame Spread (ASTM E84)
ASTM E84 (often referred to simply as "E84") is the standard test method for assessing the surface burning characteristics of building products. The purpose of this test is to observe the flame spread along a sample in order to determine the relative burning behavior of its material. Through the E84 test, both Flame Spread Index (FSI) and Smoke Developed Index (SDI) are reported for a given sample. FSI is the measurement for the speed at which flames progress across the interior surface of a building, while SDI measures the amount of smoke a sample emits as it burns.

ASTM Defined
The American Society for Testing and Materials' (ASTM) paint and related coating standards are instrumental in specifying and evaluating the physical and chemical properties of various paints and coatings that are applied to some bulk materials to improve their surface properties.

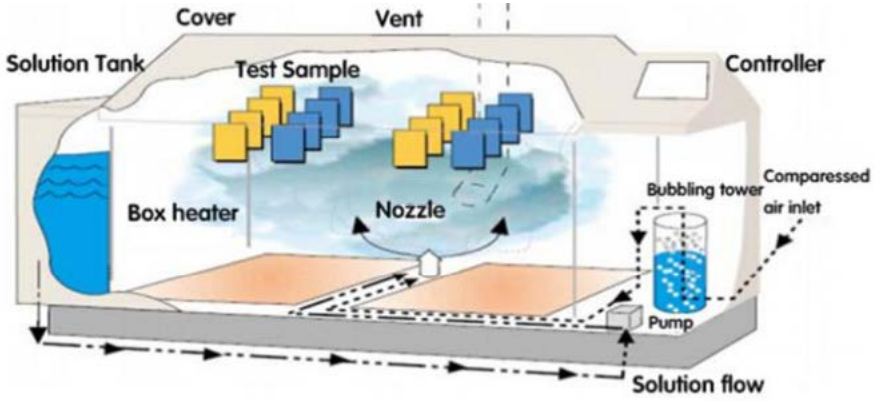
Abrasion Tester

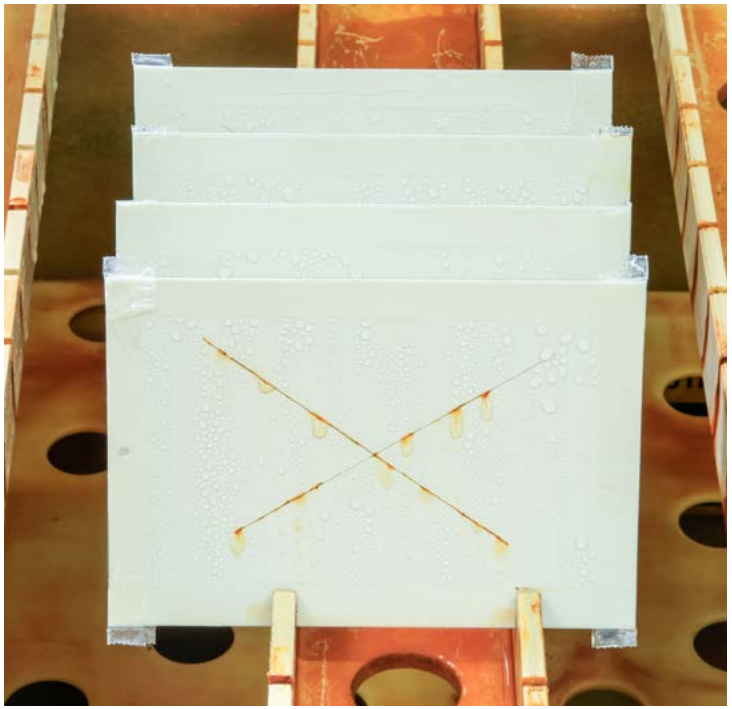
Impact Tester

SALT SPRAY TEST

ASTM B117

ASTM B117 is a salt spray test that defines the process for accelerated testing of the relative resistance of different coated materials in a standardized marine environment. It is important to consider that there is not a direct relation between the salt spray test and resistance to other corrosive agents that may be present in the environment where the fan is installed. Specifying a specific hour of salt spray test per ASTM B117 does not define the extent of corrosion present in the test, only the method the sampled was tested per. The amount of creep or actual corrosion in a scribed area is also important to consider in a marine or other saltwater-heavy environment.





Salt Spray Test Panels

Test panel shown with paint intact after 1,000 hours of salt spray testing.

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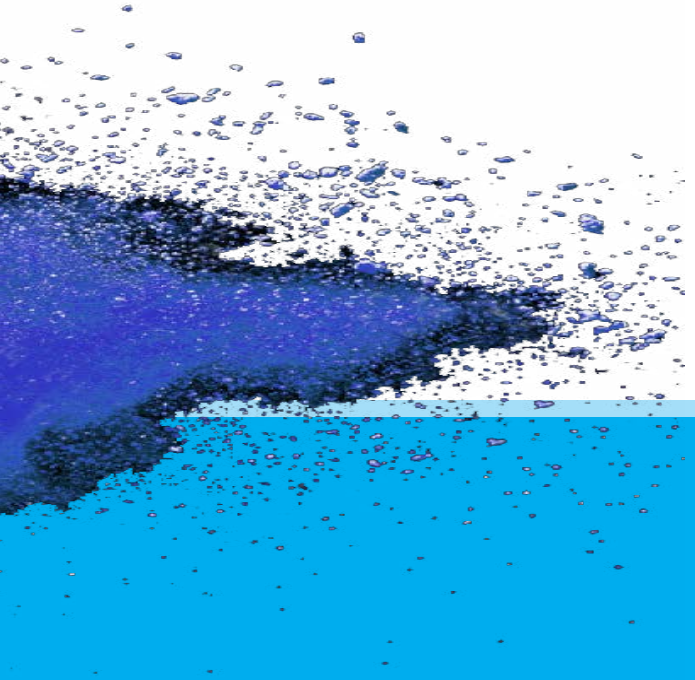

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