



Fiberglass Reinforced Polymer Panels

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Technical Data

Corrosion & Weathering Guide

CORROSION RESISTANCE

Since the 1950's, fire retardant polyester resins have been used for building panels in corrosive atmospheres. There are many resin systems available having varying degrees of corrosion resistance. Based on required characteristics and the intended use as an exterior FRP siding or roofing panel, Resolite established guidelines to select the optimal resin system.

First, it had to be flame resistant and able to meet Class 1 flame spread ratings. Second, it had to perform in all types of severe weather conditions. And third, it had to be resistant to a host of various chemical and corrosive elements. These criteria must be satisfied while maintaining an inherent toughness and resiliency and an ability to meet the stringent load/span requirements of the major building codes. Resolite's high quality isophthalic halogenated polyester resin system is the ideal solution.

Isophthalic polyester resins have some major advantages when compared to orthophthalic polyester resins. While orthophthalics offer good corrosion resistance, isophthalics provide higher heat resistance, greater retention of physical properties, better chemical resistance, and greater composite strength when bonded to fiberglass reinforcement. In laboratory tests, a fiberglass reinforced isophthalic polyester resin panel showed 10% higher flexural and 20% higher tensile properties than a comparable panel using orthophthalic polyester resin.

Vinyl ester resins are another possible choice. They have good corrosion resistant qualities, in some environments better than polyester resins, and may perform satisfactory at slightly higher temperatures. Fire rated vinyl ester resin systems, however, have a major drawback; they have poor resistance to UV and will weather very quickly. Vinyl ester resin is not recommended for use as an exterior wall or roof panel since severe color change and UV degradation will occur.

WEATHERABILITY

The first fire retardant panels had good corrosion resistance in a host of harsh environments. However, they had very poor weather resistance and soon yellowed from ultraviolet attack. Fibers were also becoming exposed in three to five years. Coatings and films were tried but none of these proved to be a long term solution.

Resolite soon realized that weathering, mainly UV degradation, was a major factor that impacted the quality and long term performance of its products. For decades, Resolite has been in the forefront of providing solutions to this difficult problem. We were one of the first FRP producers to utilize SFTS (South Florida Testing Service), an internationally recognized environmental testing company, to evaluate long term outdoor performance. In addition, Resolite has had its own outdoor weather testing program for over 45 years.

Resolite's Research and Development Staff utilizes a Xenon-Arc Weatherometer. This device provides comparable natural outdoor weathering correlation at an accelerated rate. Resolite is able to evaluate the latest resins, pigments, reinforcements and additives in as little as 6 months instead of the standard 3 years required by traditional outdoor test methods.

THE SUPERIOR SOLUTION

Over 45 years of FRP evaluation and testing has led Resolite to the fire retardant isophthalic polyester resin system currently utilized. This system with neopentyl glycol, acrylic modification and UV stabilizers provides the best combination of performance characteristics. All Resolite fire-rated products, including FS25A, CRFS25A, Tred-Safe and RFM, utilize this superior polyester resin system. Coupled with a standard embossed resin rich surface, Resolite FRP panels provide the utmost in long term corrosion resistance and weatherability.

C/W BARRIER

To further enhance panel corrosion and weathering performance, a C/W Barrier is incorporated by Resolite. C/W Barrier is a protective layer that is fused into the resin/fiberglass matrix to give the panel even greater protection against degradation. C/W Barrier is available as a standard on many Resolite FRP panels and as an option on others. Consult product descriptions or contact Resolite Customer Service for availability.

Corrosion & Weathering Guide (continued)

CHEMICAL & CORROSION RESISTANCE GUIDE

Chemical Environment	Concentration %	Temperature (°F)	Chemical Environment	Concentration %	Temperature (°F)
Acetic Acid	10	150	Hydrocyanic Acid	Sat'd	200
	25	125	Hydrofluoric Acid ¹	15	100
	50	90	Hydrofluosilicic Acid ¹	10	100
Alum	Sat'd	250	Hydrogen Chloride, Anhydrous	100	250
Alum, Potassium	100	160	Hydrogen Fluoride, Wet ¹	100	90
Aluminum Chloride	100	120	Hydrogen Sulfide	100	250
Aluminum Fluoride ¹	100	90	Hypochlorous Acid	Conc	90
Aluminum Potassium Sulfate	100	160	Kerosene Vapor & Condensate	100	120
Aluminum Sulfate	100	250	Lactic Acid	100	200
Ammonia, Dry & Wet	Gas	90	Lime Slurry	Sat'd	180
Ammonium Hydroxide	10	90	Magnesium Chloride	Sat'd	220
Ammonium Nitrate	Sat'd	200	Mercury	100	250
Ammonium Sulfate	Sat'd	200	Mineral Oils	100	180
Anaerobic Sewage	-	85	Naphtha	100	200
Arsenic Acid	19°Be	180	Nitric Acid	10	175
Benzene	100	90	Nitric Acid Vapor	60%	95
Benzene Sulfonic Acid	30	180	Nitrous Acid	10	90
Benzoic Acid	Sat'd	250	Oleic Acid	100	200
Boric Acid	Sat'd	180	Oxalic Acid	100	220
Bromine, Wet Gas	100	90	Palmitic Acid	Sat'd	160
Butyric Acid	70	120	Phosphoric Acid	85	220
Calcium Hydroxide	Sat'd	160	Picric Acid	10	100
Calcium Hypochlorite	Sat'd	100	Potassium Aluminum Sulfate	Sat'd	160
Carbon Dioxide, Wet, Acidic	100	250	Potassium Sulfate	100	200
Carbon Monoxide Gas	100	200	Sewage, Municipal, Treated & Untreated	-	90
Carbon Tetrachloride, Vapor	100	90	Sodium Bicarbonate	Sat'd	140
Carbonic Acid	Sat'd	160	Sodium Bisulfate	100	200
Chlorine Gas, Dry	100	200	Sodium Carbonate	Sat'd	90
Chlorine, Wet Gas	100	90	Sodium Chloride	Sat'd	200
Citric Acid	Sat'd	200	Sodium Hydroxide	5	180
Copper Sulfate	Sat'd	250	Sodium Nitrate	Sat'd	220
Diesel Fuel	100	100	Sodium Sulfate	100	180
Ethylene Glycol	100	250	Stearic Acid	100	200
Fatty Acids	Sat'd	250	Sulfamic Acid	Sat'd	160
Fertilizer Fumes	-	100	Sulfite Liquors	-	160
Flue Gas @ 340°F	-	180	Sulfur	-	200
Fluoboric Acid ¹	10	180	Sulfuric Acid	50	200
	Sat'd	90		70	150
Fluosilicic Acid ¹	25	90	Sulfuric Acid Vapor	80	140
Formaldehyde @ 150°F	37-44	90	Sulfurous Acid	10	90
Formic Acid	50	90	Tannic Acid	Sat'd	200
Gluconic Acid	50	120	Toluene	100	90
Glycolic Acid	70	120	Turpentine, Pure Gum	100	90
Hydrobromic Acid	25	160	Urea	Sat'd	90
Hydrochloric Acid ¹	20	210	Waste Water Treatment	-	100
	32	100	Zinc Sulfate	100	200

¹These recommendations are for vapor, mist, condensate and splash conditions.

General Notes:

- Temperature data is not necessarily the maximum service temperature. It is the upper temperature at which the resin has been tested, used or evaluated. Actual panel performance at elevated temperature may be lower. Contact Resolite Customer Service.
- C/W Barrier is recommended for optimum performance. The use of C/W Barrier will enhance performance in all environments.
- This guide is applicable for all Resolite standard iso-polyester resin system products including Tred-Safe, CRFS25A and FS25A. Due to additives required to retard burning in Resolite RFM Factory Mutual Approved panels the chemical and corrosion resistance of RFM panels should not be considered equal to Resolite's standard iso-polyester panels. For information on the Vinyl Ester Resin used in Tred-Safe DECK, contact Resolite Customer Service.
- This information is offered as a corrosion resistance guide to design engineers, plant engineers and others who are responsible for selecting building panels. Since conditions vary from project to project, this data is offered as a guide and should not be construed as a guarantee.