

Fence Test

Florida, US

Testing Overview

For the three year period starting in Spring 2000, a major power utility in Florida, USA conducted the "Florida Fence Test" on a series of 29 anti-corrosion coatings, including Si-COAT®579 | Anti-Corrosion Protective Coating.

The 29 coating systems tested included two-coat systems and three-coat systems. The only one-coat system in the field was the Si-COAT 579.

Two-coat systems included, from various manufacturers:

- zinc-rich epoxy/polyurethane,
- moisture-cured polyurethane/polyurethane,
- epoxy/polyurethane,
- moisture-cured polyurethane/acrylic,
- epoxy-polysiloxane copolymer/ epoxy-polysiloxane copolymer, and
- zinc-rich epoxy/epoxy-polysiloxane copolymer.

Three-coat systems included, from various manufacturers:

- zinc-rich epoxy/epoxy/polyurethane,
- zinc-rich epoxy/epoxy-polysiloxane copolymer/epoxy-polysiloxane copolymer, and
- zinc-rich epoxy/epoxy/epoxy-polysiloxane copolymer.

The parameters followed in this test were identical to those employed by NASA in their exceptionally harsh corrosion testing carried out in Cape Canaveral, Florida.

The test station owned by the utility that conducted the test is located on Melbourne Beach, 45 miles south of the test station used by NASA. This is the same beach on which the NASA test station is situated. As a result, both test stations experience identical UV radiation, wave break (salt spray) and weathering conditions. NASA and the utility both ran the test for the same three year duration with panels facing due south at a 45° angle.

Rusted panels:

3 inch x 6 inch (7.6 cm x 15.2 cm) carbon steel panels were pre-rusted in a salt fog chamber for each of the 29 coating systems tested.



SSPC-SP2 panel:

Panels coated with Si-COAT were prepared to SSPC-SP2 standards.

(Panels coated with conventional systems were sandblasted and in some cases profiled as per manufacturers' specifications [panel not shown here])



Coating:

Si-COAT One-coat system

PP

Details: self-priming, proprietary, 100% polysiloxane

DFT:

7 mils (178 microns) total

Observations:

Discoloration = medium[†]

Loss of gloss = 80.77%[†]

Rust creep = none

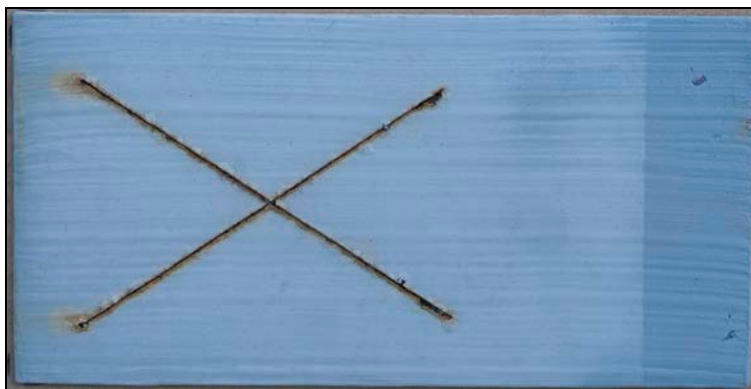
Bleed-through rusting = none

Pinhole rusting = none

Adhesion loss = none

Exposure:

36 months



[†] Loss of gloss and discoloration seen in photograph are due to unknown contaminants deposited on coating surface during testing and are not indicative of Si-COAT polymer degradation as is common with epoxy coatings that exhibit chalking. Such surface deposits are unobserved on Si-COAT in real applications extending beyond ten years service.

Coating:
Two-coat acrylic system

AA

Primer: waterborne acrylic emulsion
Finish coat: water-reducible acrylic

DFT:
8 mils (203 microns) total

Observations:
Discoloration = medium
Loss of gloss = 94.79%
Rust creep = heavy
Bleed-through rust = slight
Pinhole rust = slight
Adhesion loss = medium

Exposure:
36 months



Coating:
Two-coat polyurethane system

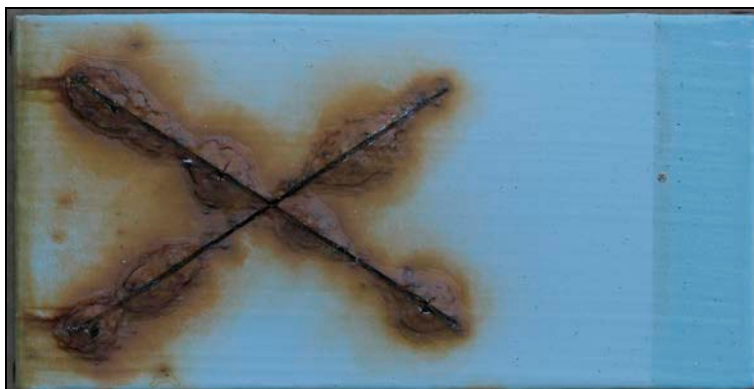
BB

Primer: one-component, moisture-cure aromatic polyurethane
Finish coat: one-component, aliphatic, moisture cure polyurethane

DFT:
8 mils (203 microns) total

Observations:
Discoloration = medium
Loss of gloss = 91.35%
Rust creep = heavy
Bleed-through rust = slight
Pinhole rust = slight
Adhesion loss = medium

Exposure:
36 months



Coating:
Two-coat polyurethane system^{CC}

Primer: micaceous iron oxide,
one-component, moisture
cure polyurethane
Finish coat: one-component,
aliphatic, moisture cure
polyurethane

DFT:
8 mils (203 microns) total

Observations:
Discoloration = heavy
Loss of gloss = 81.75%
Rust creep = very heavy
Bleed-through rust = very
heavy
Pinhole rust = heavy
Adhesion loss = heavy

Exposure:
36 months

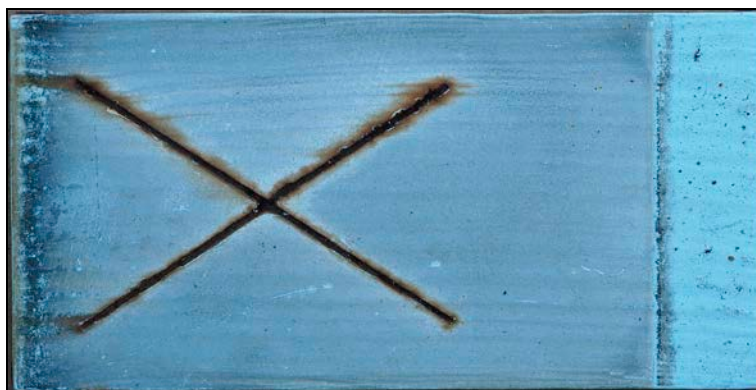


Coating:
Two-coat alkyd system^{DD}
Primer: alkyd
Finish coat: alkyd-bound
calcium sulfonate

DFT:
13 mils (330 microns) total

Observations:
Discoloration = extreme
Loss of gloss = 88.57%
Rust creep = none
Bleed-through rust = none
Pinhole rust = none
Adhesion loss = none

Exposure:
36 months



Coating:*Two-coat acrylic system**Primer: acrylic**Finish coat: acrylic*

EE

DFT:

9 mils (229 microns) total

Observations:*Discoloration* = medium*Loss of gloss* = 94.60%*Rust creep* = very heavy*Bleed-through rust* = heavy*Pinhole rust* = very slight*Adhesion loss* = very heavy**Exposure:**

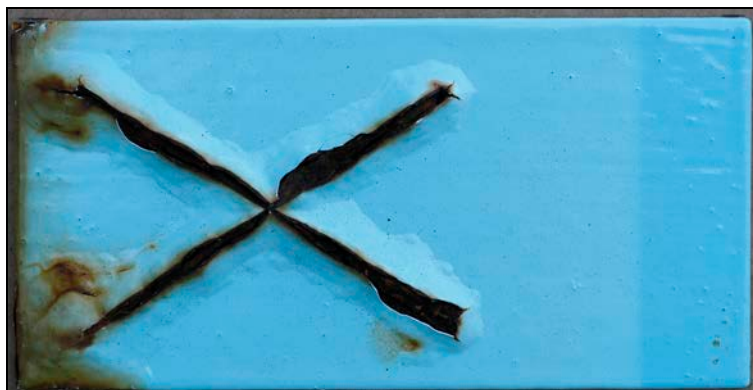
36 months

Coating:*Two-coat epoxy-polysiloxane copolymer system*

FF

*Primer: two-component, high solids epoxy**Finish coat: two-component epoxy-polysiloxane copolymer***DFT:**

12 mils (305 microns) total

Observations:*Discoloration* = slight*Loss of gloss* = 43.63%*Rust creep* = medium*Bleed-through rust* = medium*Pinhole rust* = none*Adhesion loss* = medium**Exposure:**

36 months

Coating:

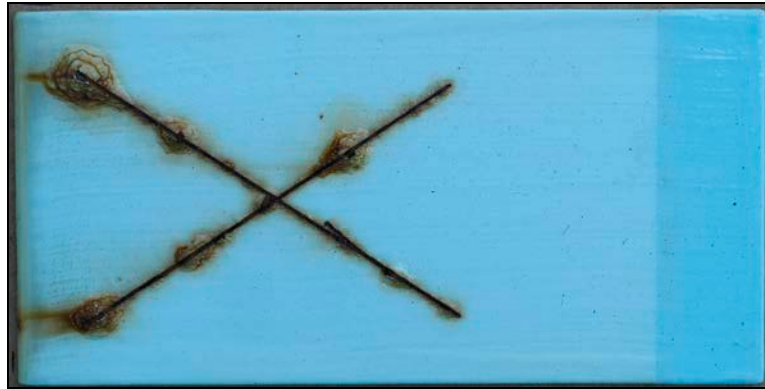
Three-coat zinc-rich epoxy/epoxy/polyurethane system

GG

Primer: one-component, zinc-rich epoxy

Intermediate coat: two-component epoxy

Finish coat: two-component, thin film acrylic-polyurethane

**DFT:**

8 mils (203 microns) total

Observations:

Discoloration = heavy

Loss of gloss = 51.05%

Rust creep = slight

Bleed-through rust = slight

Pinhole rust = none

Adhesion loss = slight

Exposure:

36 months

Coating:

*Two-coat zinc
polyurethane/polyurethane
system*

HH

*Primer: micaceous iron oxide,
zinc-pigmented, one-
component, moisture cure
polyurethane
Finish coat: two-component,
high solids polyurethane
mastic*

**DFT:**

10 mils (254 microns) total

Observations:

Discoloration = heavy

Loss of gloss = 63.60%

Rust creep = medium

Bleed-through rust = heavy

Pinhole rust = medium

Adhesion loss = medium

Exposure:

36 months

Coating:

Two-coat zinc/acrylic system

Primer: micaceous iron oxide, zinc-pigmented, one-component moisture cure polyurethane

Finish coat: water-based acrylic enamel

DFT:

10 mils (254 microns) total

Observations:

Discoloration = medium

Loss of gloss = 96.40%

Rust creep = medium

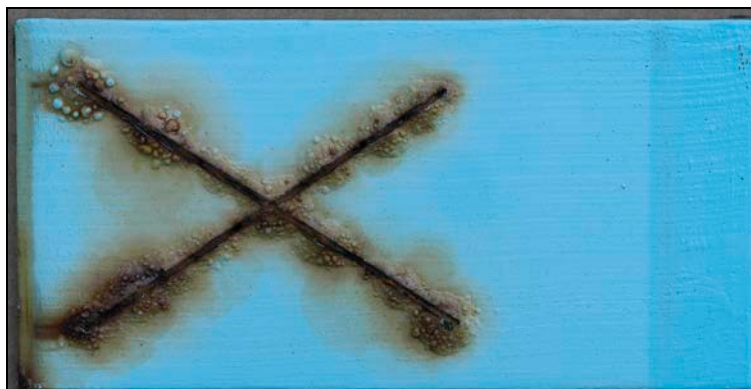
Bleed-through rust = heavy

Pinhole rust = none

Adhesion loss = medium

Exposure:

36 months

**Coating:**

Two-coat epoxy/polyurethane system

Primer: micaceous iron oxide epoxy

Finish coat: two-component, high solids polyurethane mastic

DFT:

10 mils (254 microns) total

Observations:

Discoloration = heavy

Loss of gloss = 24.60%

Rust creep = heavy

Bleed-through rust = very heavy

Pinhole rust = very slight

Adhesion loss = very heavy

Exposure:

36 months



Coating:

One-coat alkyd system

Details: micaceous iron oxide, zinc-pigmented oil-alkyd

KK

DFT:

8 mils (203 microns) total

Observations:

Discoloration = extreme

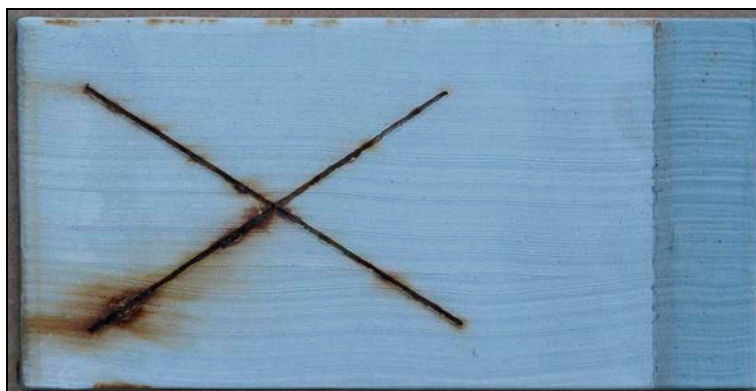
Loss of gloss = 89.86%

Rust creep = very slight

Bleed-through rust = slight

Pinhole rust = none

Adhesion loss = very slight

**Exposure:**

36 months

Coating:

Two-coat acrylic system

Primer: one-component, water-based latex acrylic emulsion

Finish coat: one-component, waterborne acrylic

LL

DFT:

7 mils (178 microns) total

Observations:

Discoloration = medium

Loss of gloss = 80.65%

Rust creep = very heavy

Bleed-through rust = very heavy

Pinhole rust = slight

Adhesion loss = very heavy

**Exposure:**

36 months

Coating:

Two-coat epoxy/polyurethane system

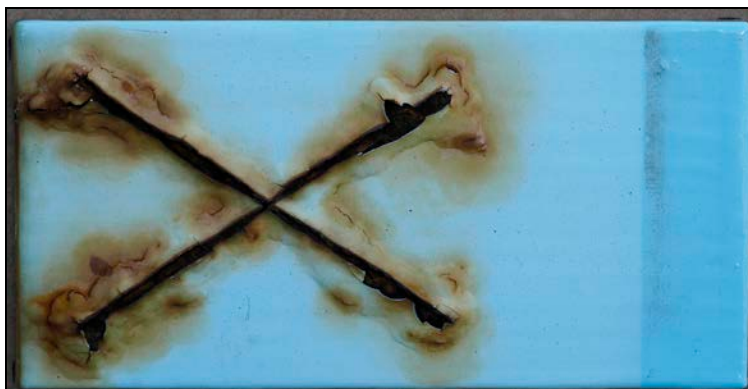
MM

Primer: two-component, high solids, aluminum-pigmented polyamine epoxy

Finish coat: two-component, high solids acrylic polyurethane

DFT:

13 mils (330 microns) total

**Observations:**

Discoloration = heavy

Loss of gloss = 27.26%

Rust creep = heavy

Bleed-through rust = heavy

Pinhole rust = none

Adhesion loss = heavy

Exposure:

36 months

Coating:

Two-coat alkyd/acrylic system

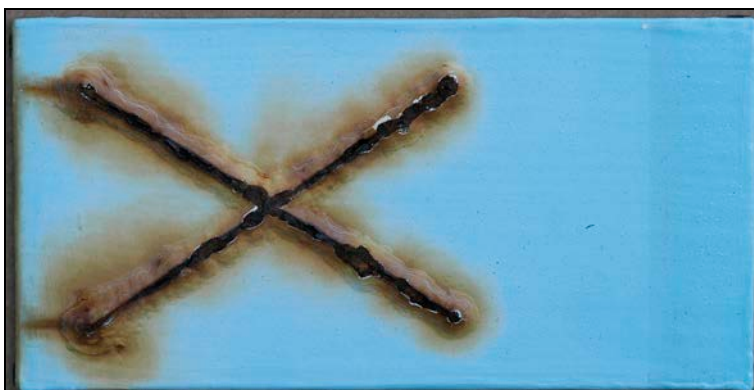
NN

Primer: modified alkyd

Finish coat: 100% acrylic enamel

DFT:

8 mils (203 microns) total

**Observations:**

Discoloration = medium

Loss of gloss = 96.81%

Rust creep = medium

Bleed-through rust = heavy

Pinhole rust = none

Adhesion loss = medium

Exposure:

36 months

Coating:

Two-coat epoxy/polyurethane system

00

Primer: two-component epoxy

Finish coat: two-component acrylic aliphatic polyurethane

DFT:

8 mils (203 microns) total

Observations:

Discoloration = very heavy

Loss of gloss = 72.99%

Rust creep = extreme

Bleed-through rust = extreme

Pinhole rust = medium

Adhesion loss = extreme

Exposure:

36 months

**Coating:**

One-coat zinc-rich epoxy system

RR

Details: one-component, zinc-rich epoxy

DFT:

8 mils (203 microns) total

Observations:

Discoloration = very heavy

Loss of gloss = 21.43%

Rust creep = medium

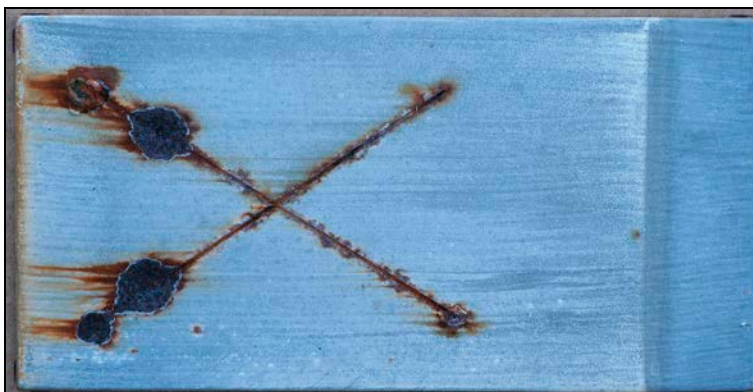
Bleed-through rust = none

Pinhole rust = very slight

Adhesion loss = medium

Exposure:

36 months



Coating:

Two-coat alkyd system

SA

Primer: phenolic-modified alkyd

Finish coat: silicone-modified alkyd

DFT:

10 mils (254 microns) total

Observations:

Discoloration = very heavy

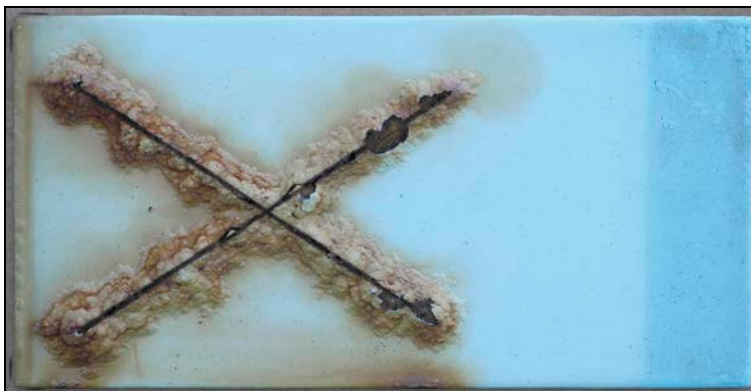
Loss of gloss = 82.37%

Rust creep = heavy

Bleed-through rust = heavy

Pinhole rust = none

Adhesion loss = heavy

**Exposure:**

36 months

Coating:

Two-coat silicon-modified epoxy system

SS

Primer: two-component, silicon dioxide-modified aromatic epoxy

Finish coat: two-component, silicon dioxide-modified aromatic epoxy

DFT:

14 mils (356 microns) total

Observations:

Discoloration = extreme

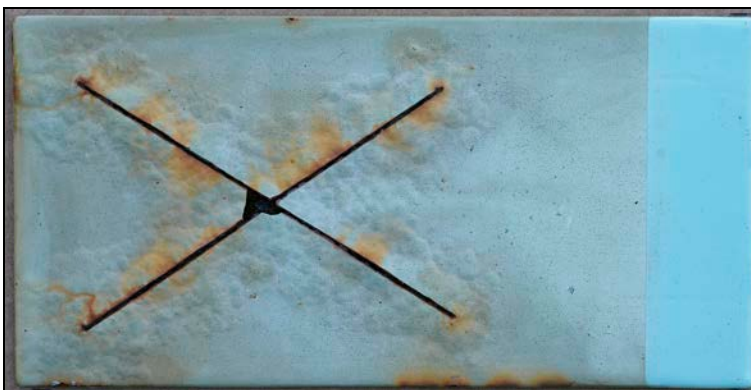
Loss of gloss = 99.44%

Rust creep = extreme

Bleed-through rust = slight

Pinhole rust = none

Adhesion loss = very heavy

**Exposure:**

36 months

Coating:

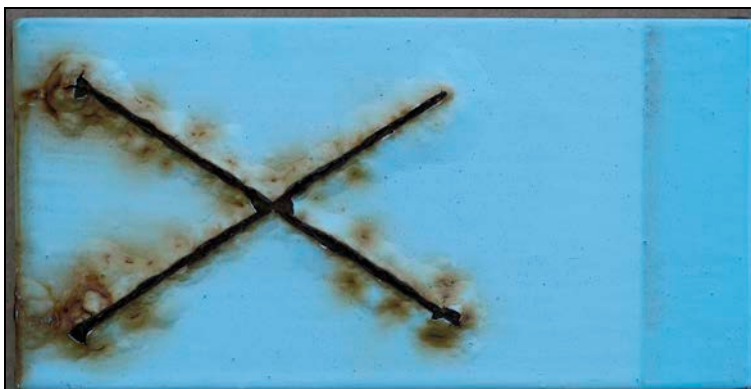
Three-coat epoxy/polyurethane system

TT

Primer: two-component, high solids, polyamine converted epoxy

Intermediate coat: two-component, high solids, polyamine converted epoxy

Finish coat: two-component, high solids polyurethane mastic

**DFT:**

12 mils (305 microns) total

Observations:

Discoloration = medium

Loss of gloss = 79.85%

Rust creep = heavy

Bleed-through rust = medium

Pinhole rust = very slight

Adhesion loss = medium

Exposure:

36 months

Coating:

Two-coat epoxy/polyurethane system

UU

Primer: two-component, high solids epoxy

Finish coat: two-component, high solids polyurethane

**DFT:**

13 mils (330 microns) total

Observations:

Discoloration = very heavy

Loss of gloss = 98.66%

Rust creep = very heavy

Bleed-through rust = extreme

Pinhole rust = very slight

Adhesion loss = very heavy

Exposure:

36 months

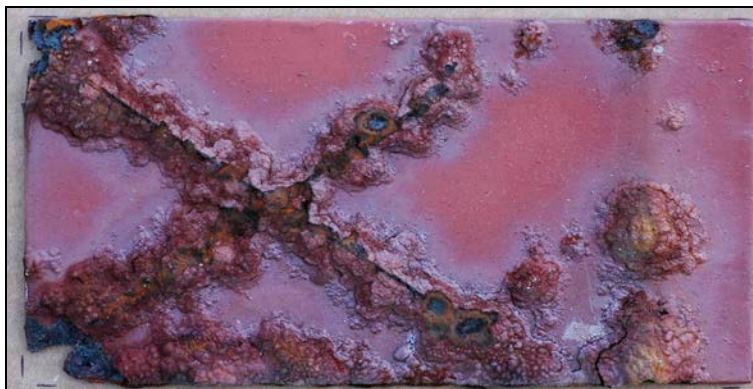
Coating:

Two-coat alkyd system

W

Primer: non-pigmented, inhibitor-, surfactant- and siccative-enriched alkyd

Finish coat: non-pigmented, inhibitor-, surfactant- and siccative-enriched alkyd

**DFT:**

10 mils (254 microns) total

Observations:

Discoloration = extreme

Loss of gloss = 97.32%

Rust creep = extreme

Bleed-through rust = extreme

Pinhole rust = extreme

Adhesion loss = extreme

Exposure:

36 months