

CERAM-A-STAR[®]

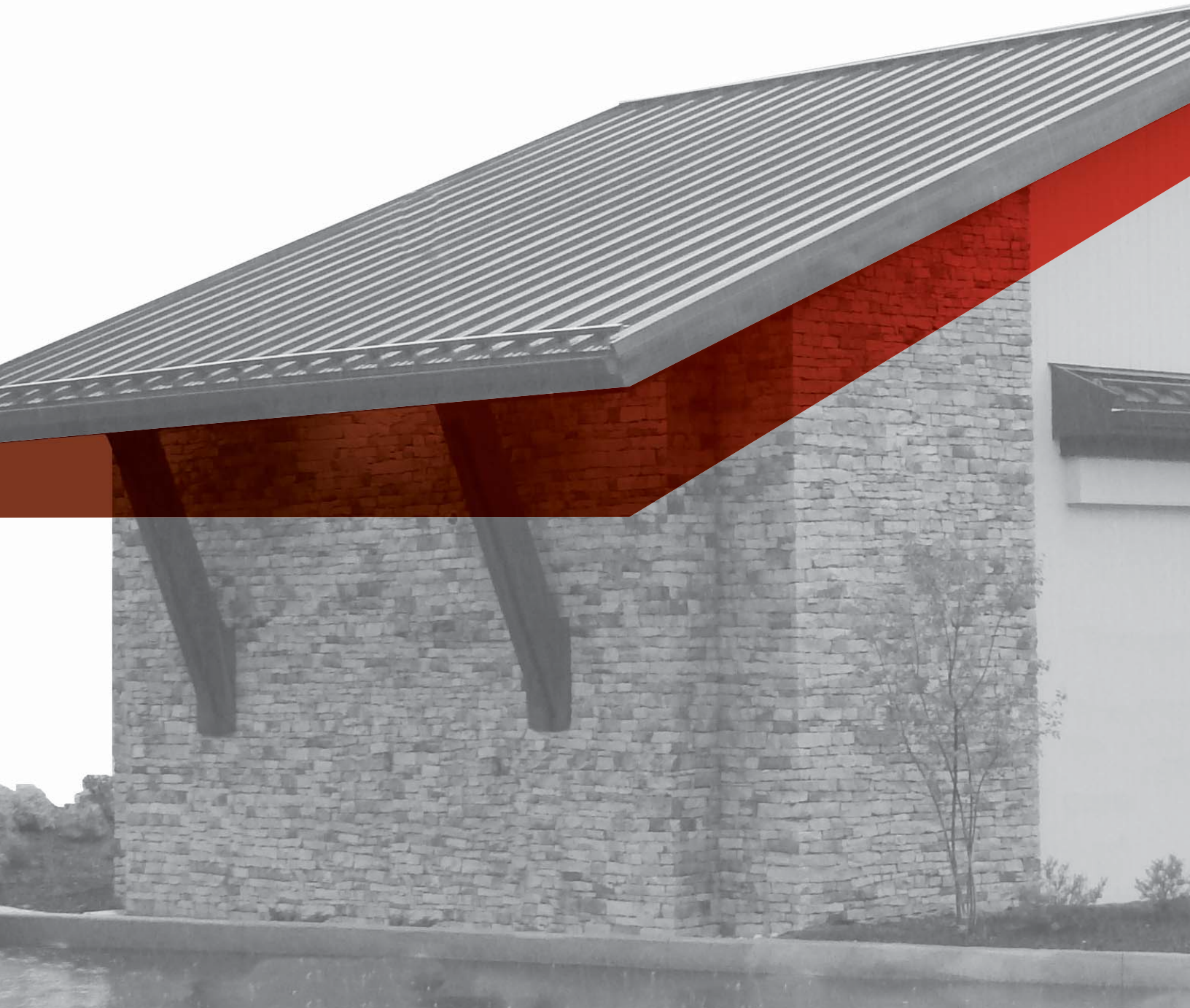
950

An economical silicone-modified polyester coil coating system



AkzoNobel

Tomorrow's Answers Today



The right chemistry

In a world where individual customer satisfaction is critical to success, we are focused on quality and service through close technical cooperation with our customers.

The know-how and experience of our technical experts around the world are there to help you select the right chemistry for your coil coating system needs. Our coil coatings meet your commercial goals by drawing on research and development from laboratories across the world; in the U.S., Europe, Australia and Asia to offer well proven products that combine innovative formulations manufactured to the highest quality standards.

We are committed to focusing on your needs while utilizing all the resources available to the world's largest coatings company to provide the best products available.

AkzoNobel is the largest coatings manufacturer in the world and one of North America's leading manufacturers of industrial finishes. Headquartered in Columbus, Ohio, the Coil and Extrusion Coatings division manufactures and markets coatings in North and South America and Asia/Pacific.

AkzoNobel is a market leader in the development and supply of coil coatings, the most effective method in use to ensure the consistent, high-quality protection and decoration of metal substrates.

Why do some metal finishes last longer?



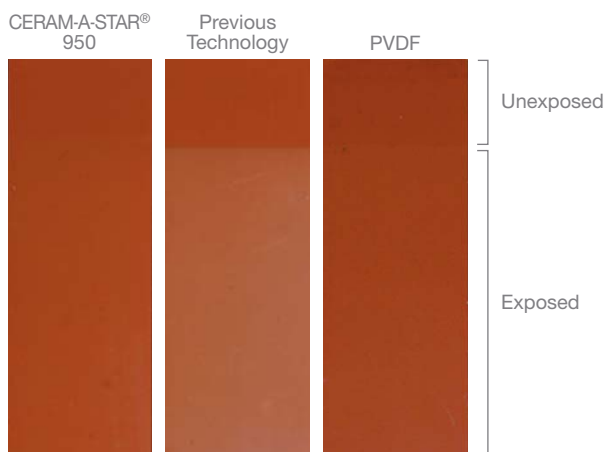
No comparison
Close-up of original paint chip of competitive SMP coating on faded metal roofing, after ten years in Ohio weather.

The resin system is the key

The exterior weathering performance of a resin is established by its chemical make-up. Because of its performance characteristics, there is little dispute at this time that polyvinylidene fluoride (PVDF) resin finishes set the standard in the metal construction industry.

Traditionally next in performance is silicone-protected polyester resin technology. Continuing research strives to maximize the performance capabilities of the polyester portion of this formula while further enhancing its durability with silicone.

AkzoNobel's CERAM-A-STAR® 950 represents a level of performance surpassing that of all previous silicone-protected finishes. CERAM-A-STAR® 950 closes the performance gap with PVDF as it approaches the long-term results of the higher priced coating — while combining the best technological balance of flexibility and toughness.



Exposure to 45° S. South Florida weathering for 48 months demonstrates that CERAM-A-STAR® 950 closes the gap with 70% PVDF and surpasses Previous Technology.

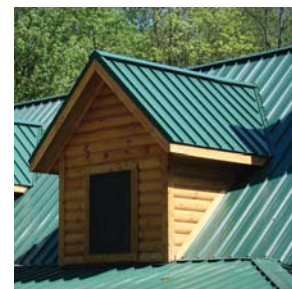
Superior performance through superior chemistry

To assure the very best results from our highly-durable CERAM-A-STAR® 950 resin system, it is imperative to use the same high performance ceramic and select inorganic pigments that are found in more expensive PVDF finishes. This combination gives unbeatable performance when compared to Previous Technology systems.

This raises a very important question...

Why would any paint manufacturer use ceramic pigments in their polyvinylidene fluoride (PVDF) resin finishes — but something less in their highly-durable, silicone polyester finishes?

The long-term performance of exterior coatings is dictated by resin strength and the correct choice of pigmentation. You simply cannot have one without the other. The right combination will insure a superdurable coating.



What difference does the pigment type make?

Differences in pigment types

Pigments used in exterior metal coatings fall into three classifications:

organic pigments: comprising a class of pigments that may have good — but usually not ultimate — durability. Just as the curtains in your living room can be expected to fade with time, so can the organic pigments used in coatings. It generally costs less to use organic pigments.

inorganic pigments: pigments that are synthetic or naturally occurring which do not contain carbon compounds. The majority of these colorants provide excellent long-term performance. The exception is carbon black, which can sometimes be considered an inorganic pigment. Their higher performance usually comes at a higher cost than organic colorants.

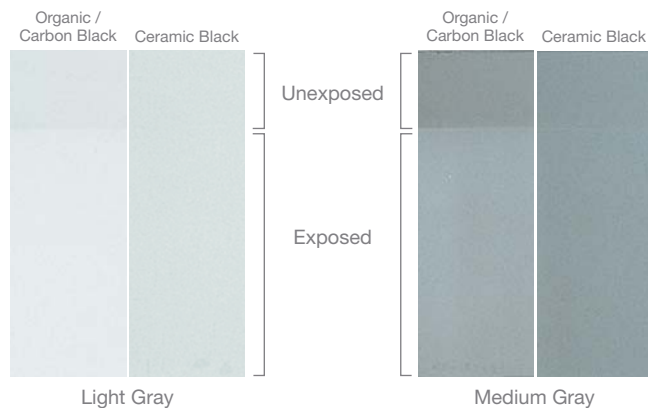
ceramic pigments: named after their original use in ceramic products, these complex inorganic pigments are made from mixed metal oxides synthesized at molten metal temperatures. The most color stable pigments available today, they offer unparalleled resistance to heat, light and chemical attack. These attributes make them ideal for use in the highest quality exterior coatings to assure long-term color retention even after decades of weathering. Higher cost is usually associated with their higher performance.

Only the best pigments are used

It is well known throughout the coatings industry that use of the right pigment combination is critical in formulating a finish that will resist color fade. Only ceramic and select inorganic pigments are used in CERAM-A-STAR 950® finishes to ensure years of durability.

Ceramic and select inorganic pigments are recognized as the most durable, having proven their performance in hundreds of years of use in porcelain and ceramic products.

Other types of pigments may be portrayed as being durable, but none can offer the same long term performance as ceramic and select inorganic pigmentation. They deliver many years of superior weatherability and resistance to color change. Their chemical structure and bonding makes them resistant to acids and alkalis, as well as oxidizing and reducing agents found in some harsh environments.

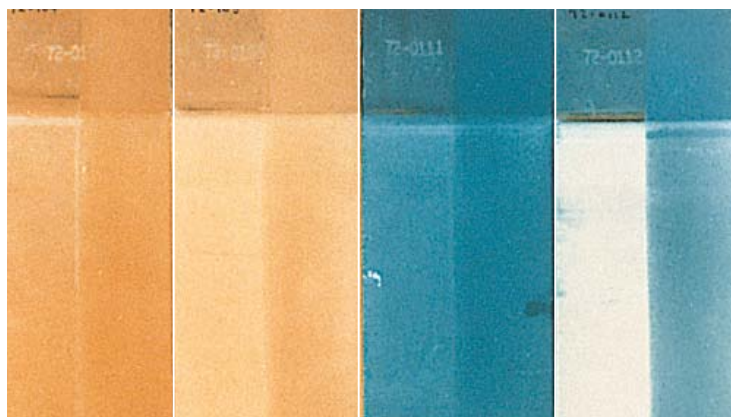


↑ Above

Comparison of ceramic black pigment versus organic/carbon black pigment after 6 years 45° S. South Florida weathering.

↓ Below

These two colors are a Previous SMP Technology pigmented in each case with ceramic pigments in left panel and organic pigments in right panel, after 8 years 45° S. South Florida weathering.



NOTE: LEFT SIDE OF EACH PANEL IS UNWASHED, RIGHT SIDE IS WASHED

Real world exposure testing results



It does make a difference

To ensure the highest level of performance, CERAM-A-STAR® 950 finishes have been thoroughly tested under a variety of real life conditions in a comprehensive South Florida exposure program. Here are photos of a competitor's coating system currently being represented as an "equal" to CERAM-A-STAR® 950. If you want your building to stand out from the crowd, choose CERAM-A-STAR® 950. It outperforms the competition.

	CERAM-A-STAR® 950	Competitor	CERAM-A-STAR® 950	Competitor	CERAM-A-STAR® 950	Competitor
Exposed Area						

Outperforming the competition
CERAM-A-STAR® 950 panels are on the left in each color and current SMP competitive system on right in each color after only 48 months roof exposure 45° S. South Florida.

Real world exposure testing

Real world exposure vs. accelerated testing

Compared to real world natural exposure, using only accelerated testing offers questionable results. All research programs can use accelerated testing as a tool, but only as a tool, because it can lead to false conclusions.

To ensure the highest level of performance, CERAM-A-STAR® 950 finishes have been thoroughly tested under a variety of real life conditions in a comprehensive South Florida exposure program. Accelerated testing methods alone simply do not yield the same accurate and reliable results as real world testing.



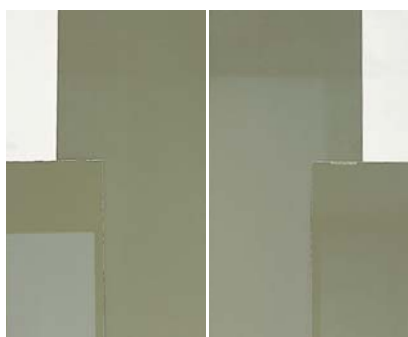
One year of testing in South Florida at 45° S. is equivalent to two years on a roof and three years on a wall north of Jacksonville, FL.



QUV accelerated weathering testing device.

Accelerated vs. southern Florida testing

Large panel on left is CERAM-A-STAR® 950 and the large panel on right is a competitor's current SMP after only one year roof angle exposure in South Florida. Corresponding small panels represent totally misleading results using accelerated testing method (QUVB).



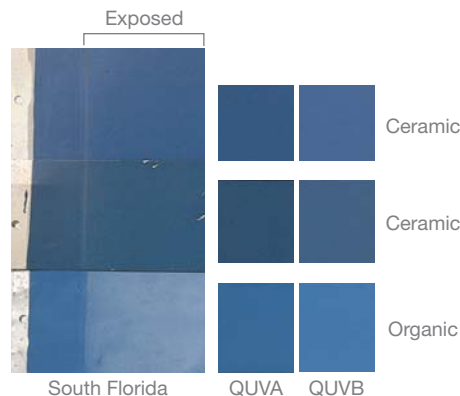
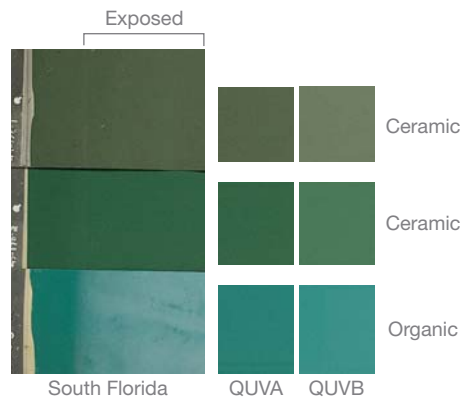
CERAM-A-STAR® 950

Competitor

Accelerated vs. southern Florida testing and organic pigmentation

CERAM-A-STAR® 950 uses only ceramic and select inorganic pigmentation due to their superior long term performance. Organic pigmentation will fade much quicker in real world exposure. However, this performance difference is not readily apparent when subjected to accelerated testing.

The following panels help illustrate the different results that can be observed between accelerated testing and real world southern Florida exposure. All panels are coated with PVDF resin system. Outer large panels were exposed at roof angle for 6 years in South Florida. Smaller panels were tested in QUVA and QUVB accelerated testing. Accelerated testing using either QUVA or QUVB does NOT detect the poor performance of lower cost organic pigments!



What others say about accelerated testing...

"Thus, none of the conventional accelerated tests [carbon arc with Corex D filters, FS40 UV-B, xenon arc] based on artificial light sources are acceptable for this coating [i.e., the coating in Ford's study] since the degradation chemistry that occurs in these tests is unnatural. Although acceleration factors can be calculated... they can not be used reliably to predict service life."

— **D. R. Bauer, et al., (Ford Motor Company), Journal of Coatings Technology, 1987.**

"Commonly used cycles in carbon arc and fluorescent UV-condensation equipment exhibited generally unacceptable correlation levels for these materials [i.e., the materials evaluated in 3M's study]."

— **R. M. Fischer (3M), SAE Technical Paper Series, #841022, 1984**

"One user reports that his company is now employing both UV-A and UV-B lamps. 'When we want the real world, we use UV-A...' Several European laboratories reported that devices using UV-B lamps occasionally failed materials that passed outdoor tests. Some U.S. labs subsequently reported similar findings..."

— **P. J. Brennan, (Q-Panel Lab Products) Plastics Compounding, 1987**

"The QUV (313B) consistently exhibited poor gloss and overall color change (delta E) correlation with the Florida set."

— **L.S. Crump, Atlas Sun Spots, 1996**

"The use of QUV B-313 is not suggested as a screening tool because the low-wavelength portion of the exposure spectrum can lead to anomalous results."

— **Eastman Chemical Company, Publication N-335A, 1996**

"All UV-B lamps emit UV below normal sunlight cut-on. This short wavelength UV can produce rapid polymer degradation and often causes degradation by mechanisms that do not occur when materials we exposed to sunlight. This may lead to anomalous results."

— **ASTM Standard Practice G53, 1995**

"It is now established fact that they [ASTM B 117 salt spray and QUV-B] do not correlate well to natural exposures, and in some specific cases can lead to totally wrong conclusions being made."

— **Dr. G. C. Simmons, European Coil Coating Meeting, Spring 1996**

Other issues to consider



Problems with dirt pickup

Both parts of the building in the photo below started out the same white color. AkzoNobel's original white is on the right; stained competitor's white is on the left.



The competition

The picture to the left illustrates the effects of dirt and soiling as shown on competitors' metal finish. Compare that with the three pictures below of CERAM-A-STAR® 950 panels. There is a difference!



← Left

CERAM-A-STAR® 950's superior resistance to dirt and soiling.

↙ Lower Left

Example of CERAM-A-STAR® 950 superior whiteness.

↓ Below

Example of CERAM-A-STAR® 950 gloss retention.



Do other factors come into play?

Chalk and fade aren't the only issues. Do you want your building to remain looking fresh and clean? Gloss retention and resistance to stain, smudge and dirt accumulation are also important factors to consider. There are vast differences in coating performances for these properties.

The resins used in AkzoNobel's CERAM-A-STAR® 950 are formulated and tested to provide outstanding performance in surface appearance, gloss retention and film hardness. Their all around performance is once again verified by extensive exposure to South Florida and Midwestern testing over multi-year periods.

Problems with dirt and stain retention begin to show up very early after building erection, particularly in lighter colors (often within 6-18 months) and are usually very difficult to remove.

COOL CHEMISTRY® Series

Improvements in Total Solar Reflectance may be realized by using AkzoNobel's COOL CHEMISTRY® Series coatings containing ceramic infrared reflective pigments. These special pigments are designed to reflect infrared energy while still absorbing visible light energy, thus appearing as the same color yet staying much cooler. When COOL CHEMISTRY® Series paints are used on metal roofing, the result is a sustainable building material that can lower air conditioning costs, reduce peak energy demand, and help to mitigate urban heat island effects. COOL CHEMISTRY® Series versions are available of our high performance coatings for building products.

CERAM-A-STAR® 950 is the proven performer

In the long run, are you really getting value by paying a little less now for a metal coating that's going to deliver a lot less in years to come? CERAM-A-STAR® 950's advanced technology resin system is the performance standard of the industry. Insisting on the value-added performance of CERAM-A-STAR® 950, using ceramic and select inorganic pigments today will pay off later in a building that will look better for a longer period of time. Anyone can write a warranty for paint performance. Only AkzoNobel can back it up with ten plus years of proven performance of CERAM-A-STAR® 950 silicone-protected polyester finishes.

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AkzoNobel

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We're the largest global paints and coatings company and a major producer of speciality chemicals. We supply industries worldwide with quality ingredients for life's essentials. We think about the future, but act in the present. We're passionate about developing sustainable answers for our customers. Based in Amsterdam, the Netherlands, we have 60,000 employees working in more than 80 countries - all committed to excellence and delivering Tomorrow's Answers Today™.

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