

# CERAM-A-STAR<sup>®</sup>

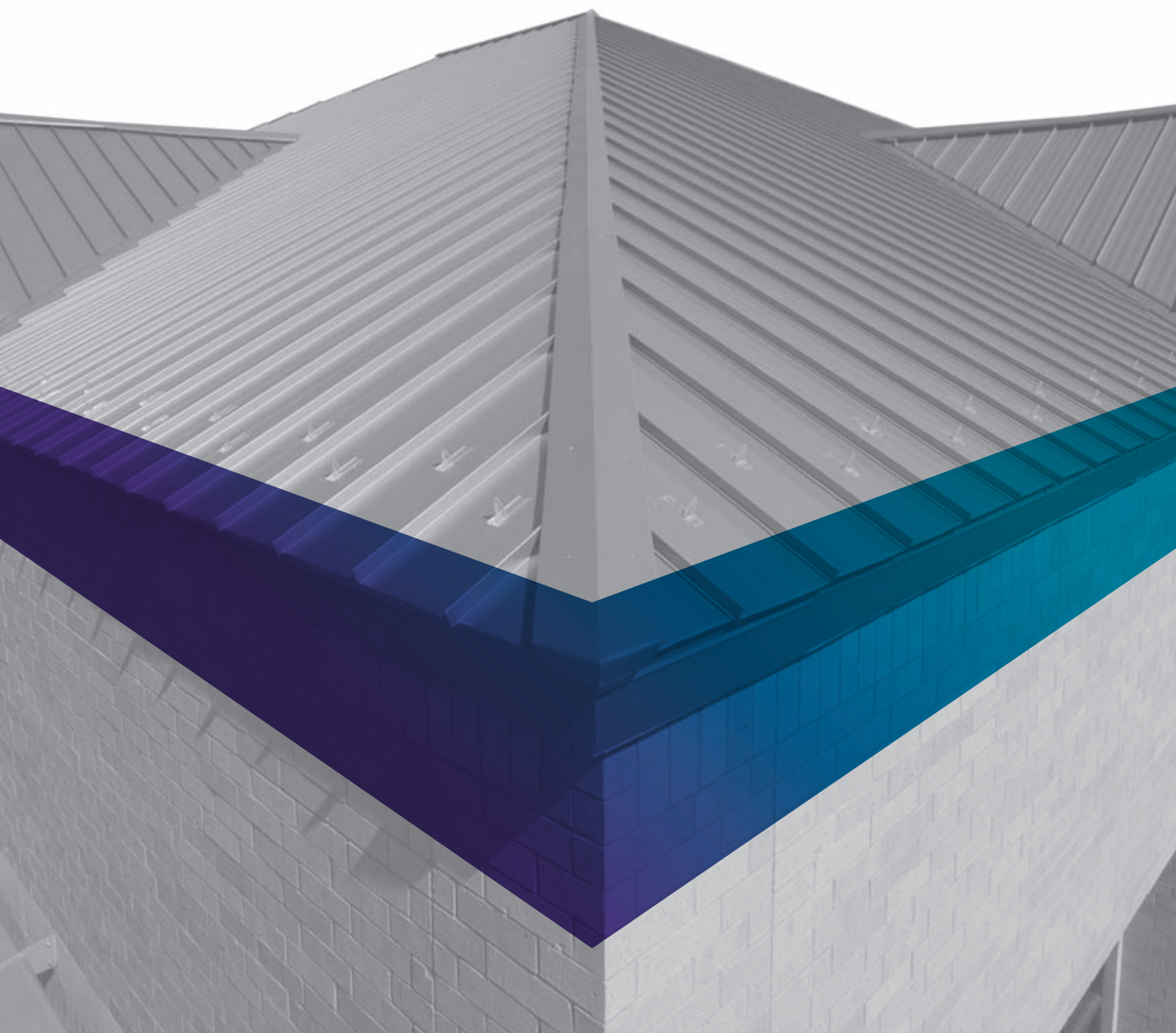
## 1050

The industry's best silicone-modified polyester coil coating system



**AkzoNobel**

Tomorrow's Answers Today



# The right chemistry

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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.

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.

# Setting the standard in performance.



#### No comparison

Close-up of original paint chip of competitive SMP coating on faded metal roofing, after ten years in Ohio weather.

#### The challenge

Achieving outstanding long-term performance in metal building components is a big challenge for coatings.

Maintaining their color and integrity over decades of harsh weather conditions and natural degradation is a tough task. While the industry was satisfied with the performance of silicone-modified polyesters, AkzoNobel was not. So we went to work.

We spent more than 10 years in the laboratory and in the field researching, developing and testing the next generation of silicone-modified polyester (SMP). It didn't happen overnight, but it did happen. And it was well worth the wait.

#### The new standard

CERAM-A-STAR® 1050 is a silicone-protected polyester coil coating system designed exclusively for the metal construction industry.

Built on the proven strength of CERAM-A-STAR® 950, AkzoNobel's CERAM-A-STAR® 1050 is the industry's best and strongest SMP coil coating system, offering superior color stability, chalk resistance, fade resistance and gloss retention. How did we do it? Two words: unique chemistry.



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# Setting the standard in pigment selection.

## 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 1050® finishes to ensure years of durability.

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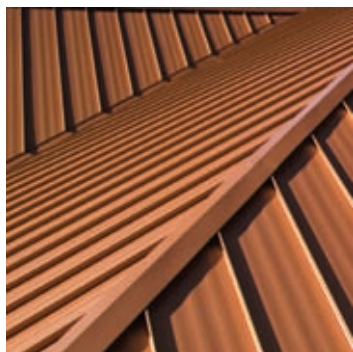
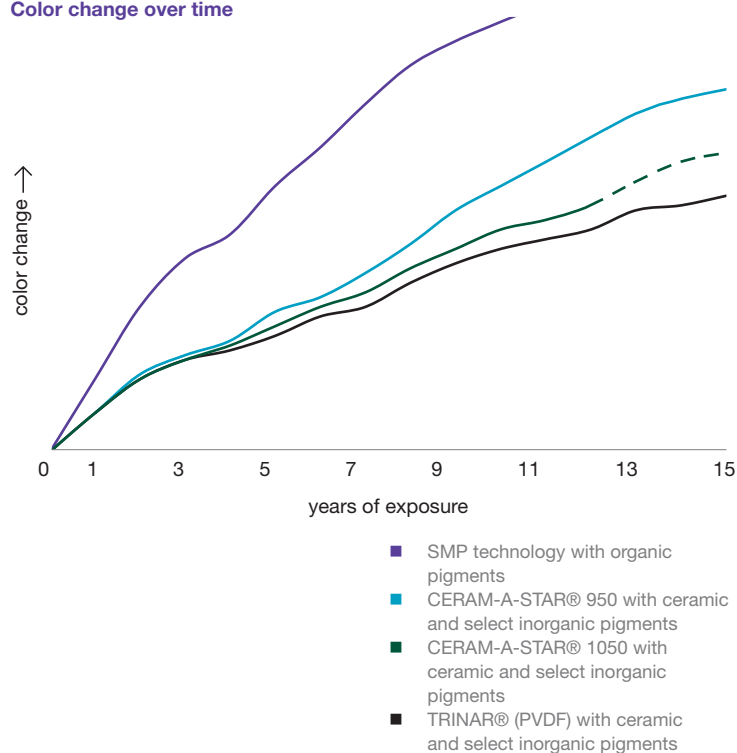
Ceramic and select inorganic pigments are recognized as the most durable, having proven their performance in hundreds of years of use in porcelain and ceramic products.

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.



# Setting the standard in resin chemistry.

Color change over time



## Unique chemistry

CERAM-A-STAR® 1050's proprietary resin formulation provides the backbone for this revolutionary SMP system. It's combined with ceramic and inorganic pigments and other enhancements to our award-winning CERAM-A-STAR® 950 system to create the most durable SMP finish available.

The two-coat system, using our high-performance primer, provides exceptional durability and offers superior resistance to moisture and UV exposure, with excellent flexibility and abrasion resistance. The unique and highly-durable topcoat provides the best color stability and gloss retention of any SMP product.

In fact, the color stability of CERAM-A-STAR® 1050 rivals that of Kynar® 500 and Hylar® 5000 coatings, while offering excellent resistance to dirt pickup and atmospheric stain. Its scratch-and-abrasion-resistance are big bonuses during transit, handling and installation as well – particularly in hot weather. These qualities in particular make CERAM-A-STAR® 1050 an excellent alternative to PVDF coatings in certain applications where hot hardness and handling issues are of concern.

CERAM-A-STAR® 1050 represents a level of performance surpassing that of all previous silicone-protected finishes. CERAM-A-STAR® 1050 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.

## The right combination

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 ensure excellent performance and long term durability.

# 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® 1050 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.



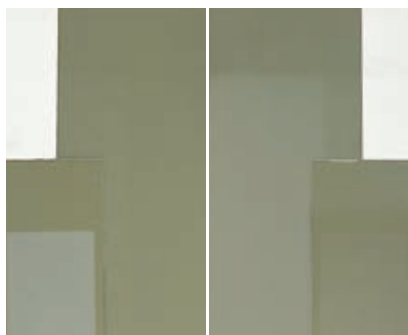
One year of testing in South Florida at 45° S. is equivalent to two years on a roof and three years on a wall north of Jacksonville, FL.



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).



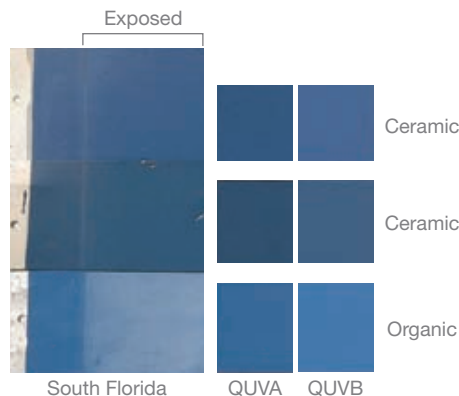
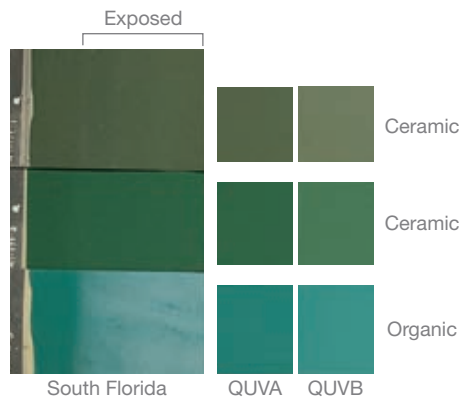
CERAM-A-STAR® 950

Competitor

## Accelerated vs. southern Florida testing and organic pigmentation

CERAM-A-STAR® 1050 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."

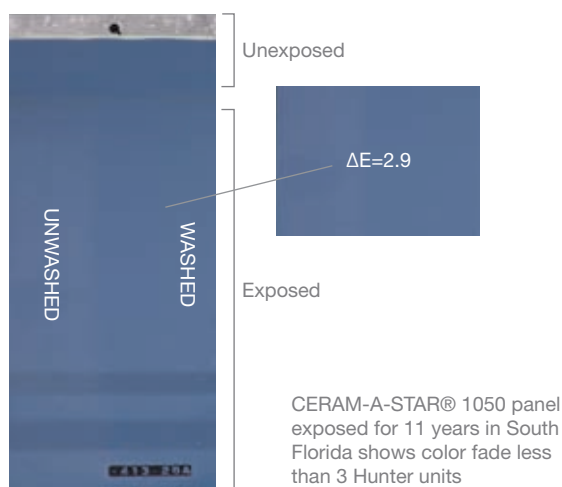
- Dr. G. C. Simmons, European Coil Coating Meeting, Spring 1996

# Standing the test of time.

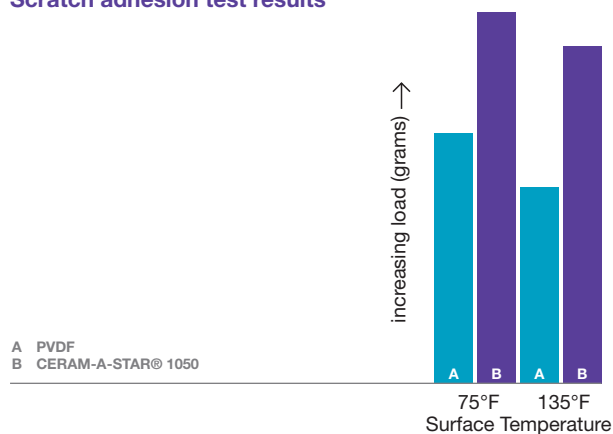
## Tested Tough

We don't believe in shortcuts. That's why we spent more than 10 years testing CERAM-A-STAR® 1050 in the laboratory and on the outdoor test fences to ensure its quality and durability before bringing it to the market. You just can't get real world results without real world testing.

In a decade of outdoor tests at our South Florida exposure site, CERAM-A-STAR® 1050 showed its mettle. Our proprietary new silicone polyester resin formulation withstood the harsh conditions of sweltering sun and high humidity. That's why we know it will stand the test of time on your project.



## Scratch adhesion test results



## Resistance to dirt and stain

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® 1050 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.

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.



## 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.



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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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