### WEATHER-ABLITY MATTERS

Developing Coatings for all Conditions



# THE IMPORTANCE OF WEATHERABILITY

### **DEVELOPING COATINGS FOR ALL CONDITIONS**

The Sherwin-Williams industry-leading test site in Florida provides conditions that are perfect for natural exposure "real world" testing. Currently, there are approximately 100,000 exposure panels at various angles, and the oldest panel is from 1968.

### WEATHER TESTING

For more than 150 years, Sherwin-Williams has shaped its reputation for coatings that are rugged enough to withstand the harshest of conditions. While coatings need to perform, they must also maintain their beauty over time.

There are many elements to developing a quality coating, but one critical component is testing and the testing methodology at Sherwin-Williams is rigorous.

The centerpiece of Sherwin-Williams Coil Coatings exposure sites is a 6.25-acre facility in Fort Myers, Florida. Based on its subtropical location of 26° 39'N and 81° 49'W, this weathering site provides conditions that are perfect for natural exposure testing. The site has 100,000 panels on exposure and a laboratory staffed with experts to review results and complete accelerated weather tests.



In addition to this site. Sherwin-Williams has three other company owned facilities: Rochester, PA to test acid rain; Marengo, IL to test freeze / thaw; and Rockhampton, Queensland Australia is a high-UV site. All of these facilities work together to make sure we are testing our coatings in every condition possible.

### MOST ACCREDITED TEST FACILITY

The Sherwin-Williams "Test Fence", as it is known by its employees, is the most accredited manufacturer's test facility in the coil coatings industry. We have equal accreditations to the facilities that our competitors use for exposure and cool roof testing.

### SITE ACCREDITATIONS

- ISO 17025 for Testing / Calibration Laboratories accredited by A2LA (American Association for Laboratory Accreditation)
- Accredited Manufacturing Testing Laboratory by CRRC (Cool Roof Rating Council)



### What does that mean for our customers? Peace of mind. When Sherwin-Williams puts a new product on the market, it has been tested by a technical staff that is evaluated, tested, and retested by accreditation bodies to ensure they meet all of the requirements for accreditation. During the process, factors relevant to a laboratory's ability to produce precise, accurate tests and calibration is assessed, including testing environment and handling of test items to meet industry standards. **BENEFITS TO OUR CUSTOMERS** Our commitment to quality is fueled by our end goal to do what is best for our customers. To help customers navigate the world of weatherability, Sherwin-Williams provides access to our test fence

facility and knowledgeable staff.

Pictured: Fort Myers, FL Site

### KNOW YOUR CHALLENGES

Exposure to the sun (ultraviolet light), moisture and humidity, high temperatures, and temperature fluctuations can lead to color changes, chalking, blistering, corrosion, and many other physical reactions for protective metal coatings. Knowing challenging weathering elements and understanding how it can affect our coatings helps Sherwin-Williams develop and deliver exceptional products to our customers.

Testing and evaluating how these elements interact is an important step in the coatings industry. UV light from the sun usually initiates the breakdown of the coating molecules, but it is a combination of the sun, heat, and moisture



### **TECHNOLOGY IS KEY**

Weather testing is a critical variable to Sherwin-Williams technical engineers when they are formulating new materials or improving upon old formulas. All new formulations are put through rigorous testing, because it is important to know if we are heading in the right direction or if we need to go back to the drawing board.



### **REASONS WHY SHERWIN-WILLIAMS CONDUCTS TESTING:**

- New product development
- Prevent field failure
- Improve quality and durability
- Expand product lines
- Improve current product lines
- Resin development
- Patch performance
- Application performance

- Pigment studies
- Product warranty requirements
- Meet new customer requirements
- Comply with government regulations
- Comply with environmental regulations
- Outlast the competition
- Help customers make educated decisions





## TEST, TEST, AND TEST AGAIN

Sherwin-Williams has two key approaches to weather testing: long-term natural exterior weat exposure and laboratory accelerated weathering Each of these testing approaches verifies performance, application, weathering, and appearance of our sample panels.

Tests and evaluations are performed to appropriate industry association standards by Sherwin-Williams technical experts.

#### NATURAL EXPOSURE

Exterior weather exposure (natural weathering) involves placing sample panels on inclined open racks orientated at the sun, usually at a 45-degree angle in a southerly direction. This angle ensures full UV exposure.

#### ACCELERATED TESTING

Special environmental cabinets and instruments are used to speed up the weathering process and measure its effects under extreme conditions.



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Corrosion Testing





	Cyclic Prohesion	ASTM G85 Annex5
	Cosmetic Corrosion Test	SAE J2334
	Cyclic UV Fog	ASTM D5894
	100% Humidity @ 100°F	ASTM D2247
	Cleveland Humidity	ASTM D4585
UV Testing	Dew Cycle Weatherometer	ASTM D3361
	QUV A - 340nm Bulb	ASTM D4587
	QUV B - 313nm Bulb	ASTM D4587
Physical Testing	Description	Standard
	Falling Sand Abrasion Test	ASTM D968
	Adhesion Testing	ASTM D3359
	Chalking	ASTM D4214
	Solar Reflectance	ASTM C1549
	Emittance	ASTM C1371
	Gloss	ASTM D523
	Instrumental Color	ASTM D2244
	Impact	ASTM D2794
	Pencil Hardness	ASTM D3363
	MEK Rubs	ASTM D5402
	Dry Film Thickness - Boring Device	ASTM D5796
	Detergent Resistance	ASTM D2248
	Water Resistance	ASTM D4585
	Measure of Thickness - Eddy-Current Method	ASTM B244
Exterior Exposure	Description	Standard
	Atmospheric Environmental Exposure Testing	ASTM G7
Wet Stack Testing	Description	Standard
	Wet Stack Test	ASTM D7376
	Degree of Rust	ASTM D610
	Degree of Blistering	ASTM D714
	Evaluation of Specimens in Corrosive Environment	ASTM D1654
Physical, Accelerated	Description	Standard

All Testing and Weathering

Neutral Salt Spray

ASTM B117

AAMA 2603, 2604,

2605, 623, 624 & 625



### **TESTING TO HELP PREVENT FAILURES**

Weather testing has become a crucial step to head off potential product failures. Innovation matters at Sherwin-Williams, where research and development is ongoing in order to improve the performance and durability of our coating systems. A well-planned weathering test program could identify coating failure risks in advance. With this, new formulations are created and need to be tested to failure. Below are a few of the many potential coating failures we are testing for.

### **GLOSS RETENTION**

Gloss refers to a coating's ability to reflect light Blistering represents a localized loss of adhesion without it scattering. Direct UV exposure can and the lifting of the coating film from the degrade the luster of the topcoat. While all types underlying surface. This is caused by heat, of coatings will lose some degree of gloss over moisture, or a combination of both. This condition time, lower quality paints will generally lose gloss eventually leads to peeling and corrosion. Surface much earlier than superior coatings. blistering can sometimes be caused by improper drying or curing of the coated material.

### CHALKING

Chalking is caused by degradation of the resin **CRACKING / FLAKING** system at the surface of the finish due to Hairline fractures occur in the coating that exposure to ultraviolet (UV) rays. As the resin then splits and eventually peels away from the system breaks down, resin particles take on a substrate to cause cracking and flaking. Improper white appearance and imbedded pigment particles application, spreading paint too thin, poor surface lose their adhesion to the film. Chalking is tested preparation, or improper paint selection for the by transferring the chalk to a fabric or adhesive environmental conditions can all cause cracking or tapes, then is compared to a photographic flaking in a coating system. reference standard (ASTM D4214). The range is from 10 to 1, with 10 showing the least amount of chalking and 1 showing the presence of extreme chalking.

#### FADING / DELTA E

Delta E (dE) is a single number that represents the distance between two colors. One color is always the standard - the starting point for the calculation. The second color is the weathered panel. The Delta E number will provide the color change that is expected due to fade and loss of gloss after exterior exposure. The lower the number, the lower the amount of color change. The higher the number, the higher the amount of fading.

### BLISTERING

### COMPLETE **SOLUTIONS THAT OUTLAST THE** COMPETITION

Sherwin-Williams is constantly evaluating our products to make sure they withstand the damaging exposure to the sun, heat, and moisture, even if it forces of nature and provide the excellent long-term durability and beauty our customers have come to expect. While accelerated weathering cabinets are a key resource when developing and reporting to industry associations, Sherwin-Williams does not rely on those tests alone.

Nothing provides better results than natural takes years. Sherwin-Williams is continually testing and collecting data on our products, as well as our competitor products. We focus on what matters to our customers - a coating system they can trust.



### WEATHERING GOVERNING **ASSOCIATIONS**

#### WHAT IS ASTM?

ASTM International, formerly known as the American Society for Testing and Materials (ASTM), is a globally recognized leader in the development and delivery of international voluntary consensus standards. ASTM standards help level the playing field so that businesses of all sizes can better compete in the global economy. For more information, visit www.astm.org.

#### WHAT IS AAMA?

American Architectural Manufacturers Association (AAMA) stands as a strong advocate for manufacturers and professionals in the fenestration industry and is dedicated to the promotion of quality window, door, curtain wall, storefront, and skylight products. They work to improve product, material, and component performance standards. For more information, visit www.aamanet.org.

#### **OTHER ASSOCIATIONS**

Sherwin-Williams prioritizes sustainable practices. We are a proud member of the following organizations: U.S. Green Building Council, LEED®, and Cool Roof Rating Council (CRRC).



### WEATHERABILITY MATTERS

SHERWIN-WILLIAMS. Coil Coatings

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