



Q-Lab Test Services

- ▶ Florida & Arizona Outdoor Exposures
- ▶ Accelerated Laboratory Testing
- ▶ Evaluations



Weathering & Outdoor Climatic Testing

If you're concerned about your product's appearance or functional performance in the outdoor environment, you're not alone. Sunlight, heat, and moisture cause billions of dollars in product damage every year. A proper weathering testing program can help you anticipate and prevent a variety of potential product failures, meet durability specifications, and preserve your reputation for quality.

Will your product last outdoors? Don't guess when you can test!



WHY TEST?

Reliable weathering and corrosion data can help you:

- > Avoid unexpected product failures
- > Make the best material selection decisions
- > Validate new or less-expensive materials or additives
- > Improve your competitive advantage
- > Warranty your product's lifetime with confidence

Natural outdoor weathering and corrosion testing give the most realistic prediction of product performance. Accelerated testing, available both outdoors and in the laboratory, gives faster results but with some uncertainty about its accuracy. Many companies combine both approaches to ensure reliable results in the shortest time possible.

WHY CHOOSE Q-LAB?

Experienced and Reliable

Q-Lab provides the highest-quality weathering testing services. Our first natural weathering site opened in 1959. Today, our scientists and engineers participate and offer leadership in ISO, ASTM, IEC, GB, and numerous other professional organizations in creating standardized test methods and procedures.

Instant Credibility

When Q-Lab does your testing, the results have instant credibility with your customers and colleagues. Q-Lab conducts all exposure tests and evaluations in accordance with appropriate test methods from ASTM, ISO, BSI, DIN, JIS, SAE, GB, and other recognized organizations and is accredited by AMECA and AAMA.

Cost-Effective

Q-Lab's state-of-the-art test services are available at a surprisingly affordable price. In many cases, it is less costly to test with Q-Lab than to set up and run tests yourself.

Best Test Sites, Best Technology

South Florida and Arizona, where Q-Lab does most of its outdoor testing, have been recognized for over a century as harsh climates for product testing. If your products perform well in these benchmark locations, they will perform well just about anywhere. Q-Lab uses the most trusted accelerated weathering and corrosion technologies, used by thousands of companies in dozens of industries.



Natural Outdoor Testing

Location is everything. About one hundred years ago, companies in the paint and automotive industries realized that environmental conditions in South Florida and the Arizona desert were the harshest on their products. Several companies operated their own test sites in these locations, and they used what they learned to make their products durable enough to ensure generations of satisfied customers. Today, much of this testing has been consolidated at Q-Lab's sites in Florida and Arizona. Companies around the globe trust Q-Lab to perform their outdoor product testing.

FLORIDA

The subtropical climate of the Miami area has the perfect year-round combination of abundant sunlight, warm temperatures, and plentiful water. Sunshine during the summer months in Miami is quite similar to that of northern temperate regions. However, in the winter the difference is dramatic. The key point is that it is the same sun—just more of it, and for a longer duration each year. The same holds true for temperature, rainfall, dew, and humidity.

The result of this perfect combination of environmental factors is that exposures at Q-Lab Florida are accelerated compared to temperate climates. One year of Florida sunshine can produce the same weathering effects on materials as several years of weathering in most major markets around the world. Specimens that can withstand the sunlight, heat, and water in south Florida can be expected to be durable in most locations around the world.

SOUTH FLORIDA IS PERFECT FOR TESTING:

- > Sunlight (UV) stability
- > Moisture sensitivity
- > Mildew/mold resistance
- > Surface erosion
- > High-temperature resistance
- > Thermal shock response
- > Corrosion behavior
- > Moisture ingress
- > Acid rain resistance

ARIZONA

Arizona's desert climate is characterized by intense sunlight, very high temperatures, minimal rainfall, and very low humidity. Arizona desert exposures provide a different – in some ways harsher – exposure environment than Florida subtropical tests. Compared with Florida, Arizona is much hotter and receives about 15-20% more annual total solar and UV energy. Arizona experiences large day to night temperature variations, about 17 °C (31 °F) on average. Arizona receives little annual rainfall and has low atmospheric moisture overall. Specimens tested in the Arizona desert can be expected to have superior resistance to sunshine and elevated temperatures.

OHIO

Northeast Ohio has a Northern Temperate climate, meaning it experiences four true seasons during the year. Outdoor specimens are subject to a range of exposures to UV light, temperature, and water, including regular freeze/thaw cycles during the winter.

Although Northeast Ohio testing will generally not attain the acceleration of natural outdoor testing in Florida or Arizona, it does deliver conditions experienced by much of the population of the United States and the rest of the world.

Some industries include a benchmark Northern Temperate climate in their certification programs, in addition to Florida and Arizona, to ensure a fully comprehensive program for natural weathering. Ohio is ideal for meeting these requirements.



DESERT TESTING

Arizona features even hotter temperatures and higher levels of sunlight than Florida.

ARIZONA DESERT IS PERFECT FOR TESTING:

- > Sunlight (UV) stability
- > Heat aging effects
- > Thermal expansion stress resistance
- > Heat deflection and distortion
- > Material durability in low humidity environments



THE GLOBAL BENCHMARK

Q-Lab Florida has more specimens on test than any other outdoor weathering facility in the world.

Accelerated Laboratory Testing

Q-Lab offers a full range of accelerated laboratory weathering and corrosion testing services at our fully-equipped facilities in Florida, Germany, and China. Q-Lab can perform most testing that utilizes xenon arc, fluorescent UV, salt spray, or cyclic corrosion chambers. Contract testing at Q-Lab is an ideal solution for companies that:

- > Have a short-term need for testing but aren't ready to invest in facilities and equipment
- > Need additional testing capacity that the in-house lab can't accommodate
- > Have a special project with a new test cycle that can't be performed in-house
- > Need third-party verification of test results

STANDARD & CUSTOM EXPOSURES

Tests and evaluations are performed to appropriate ASTM, ISO, EN, DIN, JIS, SAE, GB, AATCC, or other standard procedures.

Visit Q-Lab.com/standards or contact Q-Lab to discuss a particular standard.

We can also perform custom exposures to meet your individual testing needs. **More on page 13.**



Homestead, Florida USA



Saarbrücken, Germany

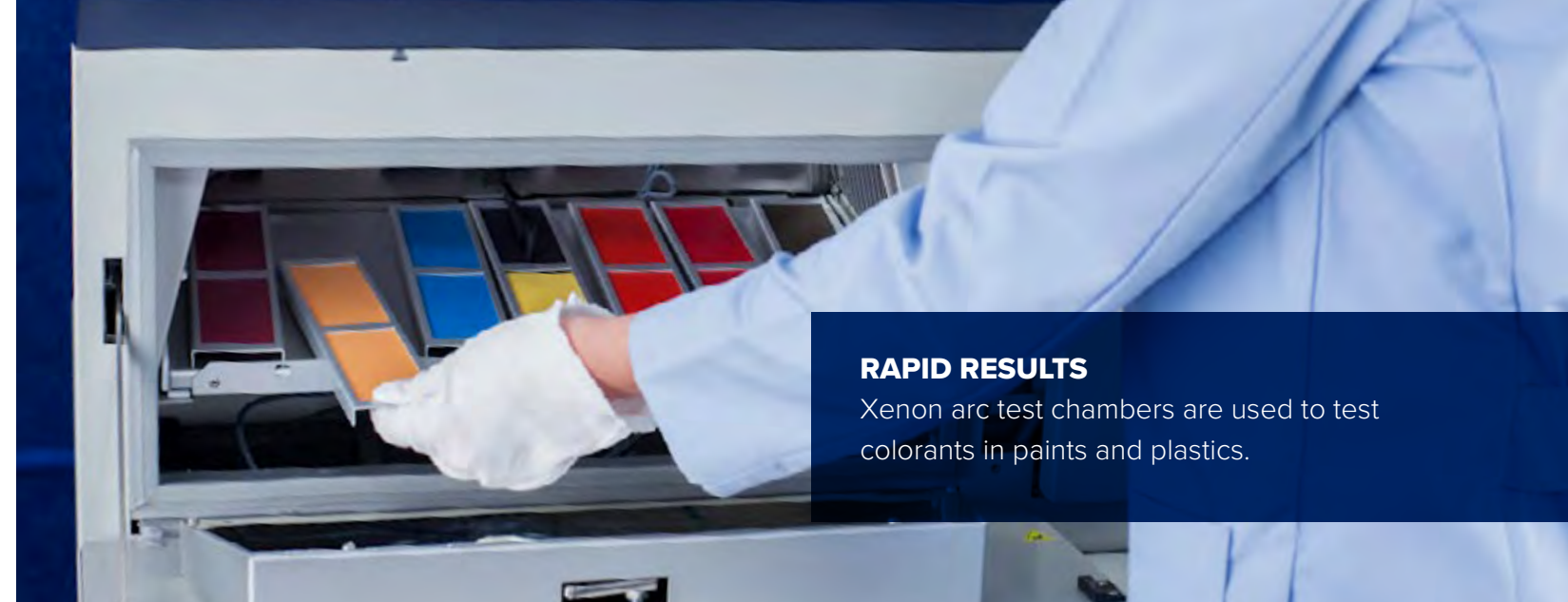


Shanghai, China

THREE LABS, ONE STANDARD OF QUALITY

- > Homestead, Florida USA
- > Saarbrücken, Germany
- > Shanghai, China

All locations follow the ISO 17025 accredited Quality System, ensuring the best care for your projects.



RAPID RESULTS

Xenon arc test chambers are used to test colorants in paints and plastics.

TYPES OF ACCELERATED TESTS



XENON ARC WEATHERING

For weathering tests that require full sunlight simulation, the **Q-SUN** xenon arc weathering chamber can perform a variety of methods from the automotive, textile, building material, paint, plastics, personal care, or other industries. Xenon arc instruments are usually the best choice for applications where color change is the primary failure mode of concern.



FLUORESCENT UV WEATHERING

When changes to physical properties or yellowing of polymeric materials are the concern, the **QUV** accelerated weathering tester is an effective and inexpensive tool for comparative testing. Fluorescent UV lamps match the most damaging portion of the sunlight spectrum.



SALT SPRAY/ CYCLIC CORROSION

Q-FOG cyclic corrosion chambers can perform any test from simple salt spray to tests with precise control of RH and moisture transitions, which is required by most OEM automotive standards. In addition, certain models can also perform demanding modern test protocols like CASS and JASO M609.

Q-TRAC Natural Sunlight Concentrator Testing

Faster test, natural environment. Accelerated outdoor materials testing using a Q-TRAC natural sunlight concentrator delivers the benefits of testing in a natural outdoor environment while at the same time amplifying the sunlight and heat delivered to specimens. This testing is especially useful for highly-durable materials with long expected lifetimes.

SUPER-FAST RESULTS FROM NATURAL SUNLIGHT

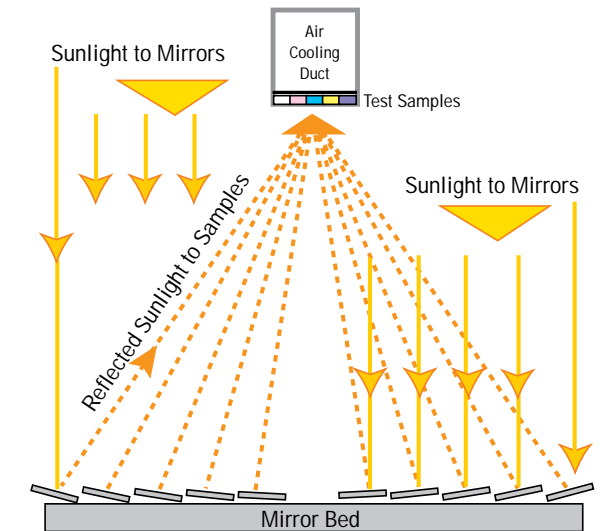
The Q-TRAC delivers the same amount of damaging ultraviolet energy in just one year as specimens would experience in five years of Florida sunlight. Like other accelerated tests, sunlight concentrator testing allows products to be brought to market faster, but the Q-TRAC uses natural sunlight to reduce further the risk of generating erroneous test results. In this way, the Q-TRAC delivers dual benefits – the realism of natural exposures and the speed of accelerated laboratory tests.

Q-TRAC IS PERFECT FOR TESTING:

- > Roofing
- > Coil coatings
- > Fluoropolymers
- > Geosynthetics
- > Powder coatings
- > Building materials
- > Industrial coatings
- > Hardboard coatings

ENHANCED SUNLIGHT WITH CONCENTRATING MIRRORS

The Q-TRAC system uses an array of 10 flat mirrors to reflect and concentrate natural sunlight onto the test specimens. It further maximizes the exposure by automatically tracking the sun throughout the day in both azimuth (horizontal) and elevation (vertical).



Q-TRAC WATER SPRAY & SPECIAL APPLICATIONS

Water spray during the night time can simulate the time of wetness experienced in Florida, and during the day it can simulate thermal shock associated with rain bursts. During night-time wetting, specimens are oriented facing upward to give increased wetness and realism compared to original natural sunlight concentrator testing. Q-Lab also offers temperature-controlled Q-TRAC testing for more heat-sensitive specimens.

Several standardized cycles—including desert, freeze/thaw, and spray are available to test different materials and end-use application. Standards include:

- > ASTM G90
- > ASTM D4141
- > ASTM D4364
- > ASTM D5105
- > ASTM D5722
- > SAE J1961
- > SAE J576
- > ISO 877-3
- > AAMA 623, 624 and 625



ONLY IN ARIZONA

Q-TRAC testing requires a high proportion of direct beam sunlight and low cloud cover that exists only in very dry environments.



Automotive Interior Testing

Accelerated testing to simulate behind-glass environments. Interior components in automobiles and other behind-glass environments can experience higher temperatures than materials in service outdoors. AIM box testing delivers high temperatures in combination with natural sunlight behind window glass for fast, realistic testing.

AIM BOX

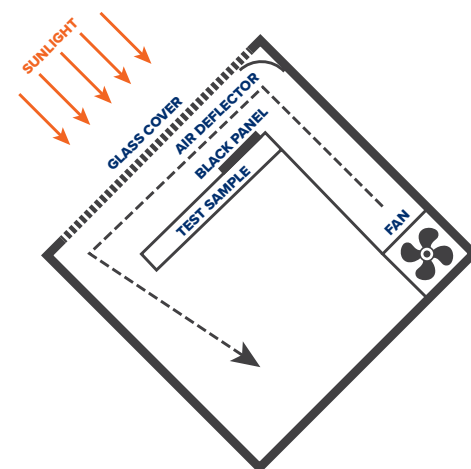
An Automotive Interior Materials (AIM) box is an under-glass enclosure that simulates the sunlight and heat found inside an automobile. Although this technology was developed for the automotive industry, it can be very effective for many applications where glass-filtered sunlight and heat are important stressors, such as building window assemblies and electrical enclosures.

Key test standards for AIM box testing include GMW 14873, GMW 16717, GMW 3417, GM 2617M, GM 3619M, GM 7454M, GM 7455M, GM 9538P, Ford DVM 0020, and ASTM G201.

REALISTIC SIMULATION

Testing automotive interiors can be different from testing other materials because air temperatures inside a vehicle can far exceed the temperature outside it. Materials can reach 100 °C or more in warmer climates. Furthermore, the light that reaches internal components is filtered by automotive glass, making it different from natural outdoor sunlight.

The AIM box uses tempered glass - clear or laminated - to simulate the sunlight spectrum experienced inside a car. In addition, a black panel thermometer continuously monitors the environment inside the box. A cooling fan and curtain are used to ensure that specimens are maintained at precise and realistic temperatures.



DEGRADATION MODES PRODUCED IN AIM BOX TESTING:

- > Color change
- > Cracking
- > Peeling
- > Oxidation
- > Heat deflection
- > Tackiness



HIGH TEMPERATURE TESTING

Automotive instrument and dashboard panels are commonly tested in AIM boxes.

ACCELERATION

The AIM box in Arizona can perform precision azimuth tracking of the sun throughout the day. This boosts the total amount of solar radiation reaching the specimens for faster results without sacrificing accuracy.

TRUE AIM BOX

To increase the total amount of solar radiation exposure, Q-Lab's proprietary new TRUE (Tracking Reflecting Ultra Exposure) AIM box uses highly reflective mirrors and dual-axis tracking (azimuth and elevation) to focus more sunlight into the box interior. This technique approximately doubles the total sunlight received every day.



Standard Outdoor Exposures

True benchmarking via standardized testing. Natural outdoor testing according to international test standards gives improved consistency of results from test to test. Having a library of outdoor test data according to recognized test standards gives the best estimate for a product's service life and serves as an excellent basis for comparison to accelerated laboratory testing.

DIRECT EXPOSURE (ASTM G7, ASTM D1435)

Specimens can be securely mounted at a variety of angles for direct exposure to the sun. Various backing techniques are available to simulate the thermal environment of the specimen's intended service application. Plywood backing raises temperatures, while open- or mesh-backed specimens receive maximum natural air flow for cooler temperatures.



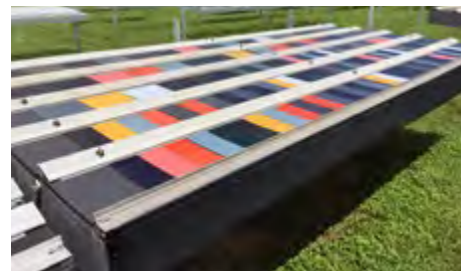
UNDER GLASS (ASTM G24, ISO 877-2)

These exposures are used to test interior-use materials, such as textiles and printing inks. Specimens are behind 3 mm window glass which will filter out short-wavelength (UVB) light. Exposures are typically at a 45° or 5° angle from horizontal.



BLACK BOX (ASTM D4141, GMW 14873)

These tests reproduce conditions found on the horizontal surfaces of a vehicle, including higher temperatures and longer wet times. Under glass black box exposures are used to test automotive interior materials or other applications that experience similar conditions.



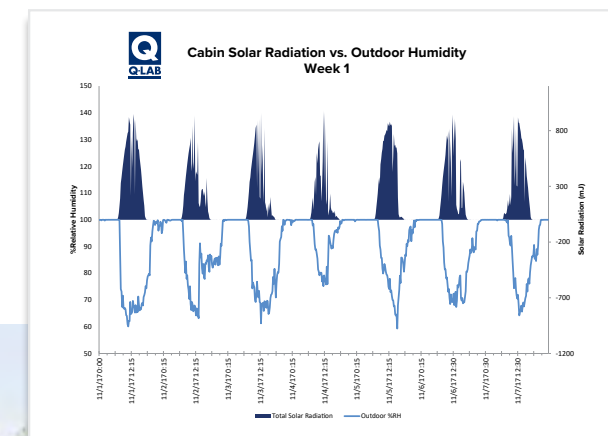
Other standard outdoor exposure test methods are available, including salt-accelerated, outdoor acid etch, and mildew-enhanced weathering.

Custom Tests & Special Projects

If you need a specialized test for a component, assembly, or complete product, Q-Lab can customize a test program to identify any problem areas quickly. Do you need to measure the temperature profile of multiple areas of your product throughout the day? Or design a test that accurately simulates your product's end use? Whatever your need, our experts can design a customized test solution to fit your budget.



Outdoor weathering testing in a replicated end use environment, like the shed shown above, can demonstrate interactions between components and give a more realistic representation of outdoor product durability.



DETAILED DATA ACQUISITION

Q-Lab can instrument your product to capture the data most important to you, and we always take care to protect confidentiality.

Evaluations & Physical Testing

Exposing your products or materials is only half of the equation. Measuring how they degrade over time is the other half. Q-Lab's engineers and technicians are worldwide experts at identifying and quantifying how your materials change when exposed to weathering or corrosion tests. We have many tools at our disposal to tell you nearly everything you need to know about your product's performance.

VISUAL EVALUATIONS

Visual evaluations detail all defects observed, such as cracking/checking, blistering, chalking, dirt retention, flaking, mildew growth, surface rust, or color change, according to standardized rating scales.

Q-Lab technicians are highly trained and experienced experts in the field of evaluation techniques and reporting scales. Many are actively involved in the organizations that create and maintain the standards relied upon by labs around the world.

COLOR & GLOSS MEASUREMENTS

Instrumental measurements of appearance and surface characteristics include gloss, distinctness of image, and color. These are used in place of or in addition to visual ratings, and are required by many standards. The science of color and appearance measurement can be very complex, and Q-Lab's experts can guide you through your options to ensure you get the correct data for your needs.



VISUAL EVALUATIONS

All visual ratings are made under standard lighting conditions to provide accurate, repeatable results.

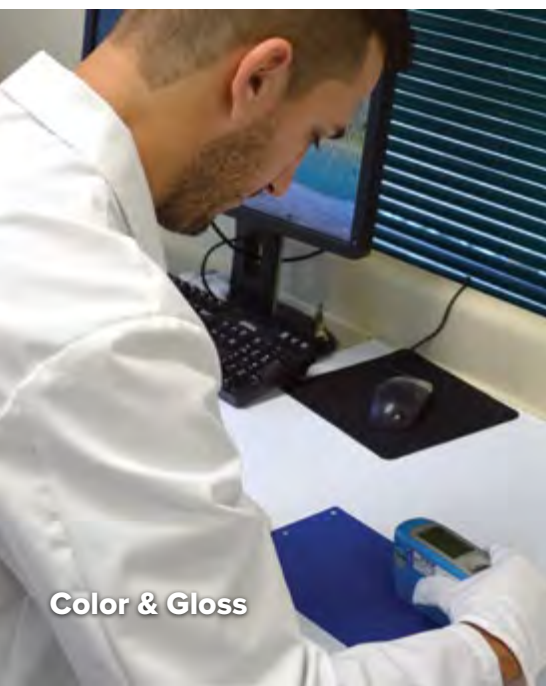
MECHANICAL TESTS

Mechanical tests on physical properties are necessary for many products and materials. They include:

- > Drop impact
- > Pencil hardness
- > Tape adhesion
- > Mandrel bend & elongation
- > Tensile strength & elongation
- > Shear & peel adhesion
- > Gravelometer stone chip impact
- > Taber abrasion

PHOTOGRAPHY & SPECIAL HANDLING

A complete test program often includes other special services or handling. Common services include washing, polishing, scribing, and specimen weighing. Q-Lab can also photograph weathering and corrosion changes, which requires special lighting skills and equipment.



Color & Gloss



Mechanical



Photography



OUR GLOBAL NETWORK

We are committed to provide world-class technical, sales, and repair support in each of the over 60 countries in which we operate. Visit [Q-Lab.com/support](https://www.q-lab.com/support) for contact information specific to your location and inquiry type.

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