How to Get the Most from Your Weathering Test

Understanding the process to improve your satisfaction!

Michael Crewdson

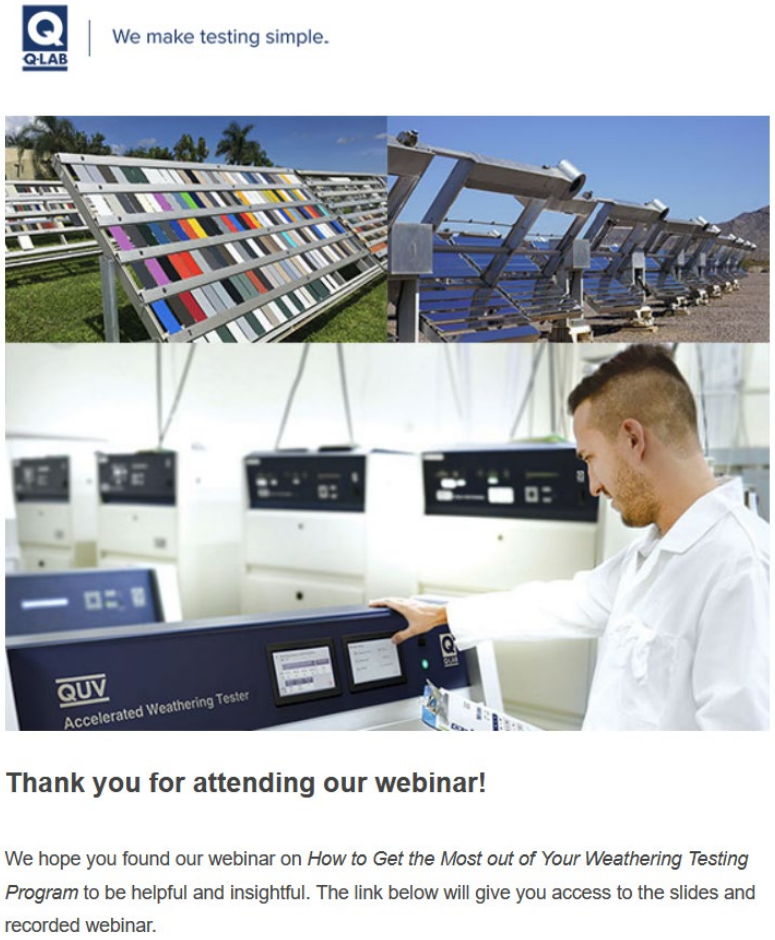
Q-Lab Test Services

View Recorded Presentation

Administrative Notes

You'll receive a follow-up email from info@email.q-lab.com with links to a survey, registration for future webinars, and to download the slides

Use the **Q&A feature in Zoom** to ask us questions today!



What we will cover

- Users new to weathering
  - What to expect
  - What to have ready
  - What questions to ask
  - What the process flow is
  - What are the deliverables
  - What is the timeframe
- Experienced Users
  - How to get more value, or “bang for your buck”
  - Review of where efficiencies are found

This presentation is mostly about Outdoor Weathering

What is the Best Test?

- These items are generally regarded as being necessary:
  - Useful
  - Meaningful
  - Reliable
  - Worthwhile (value for your time, effort, and expense)
- Many different options are available for testing
  - Depending on what your objectives are
  - Even if *you* are “sure” *we* need to be “certain”

General Questions for a New Test

We don't want to *assume* any requirements or parameters

- What test method?
  - Angle, direction, and backing for outdoors
  - Cycle, temperature, irradiance for laboratory
- How many specimens?
  - Total quantity including replicates
- What size are the specimens?
- What duration is the test?

Too late to fix a mistake after 12 months exposure

Detailed Questions

- Are the specimens flat or 3D?
- Are the specimens rigid or flexible?
- Do you need the entire specimen exposed?
- Is the non-exposure side indicated with markings?
- Do you want evaluations?
  - Need to specify type and frequency
- Do you want photographs?
  - Frequency, area, specimens per frame
- How do you want the specimens returned?
- How will you pay?
  - Credit Card, Purchase Order, Wire Transfer

Order Complexity

- Even simple tests have many variables
- Every exposure type has possible **differences**
  - Angle, Orientation, Backing, Duration, Cycle, Solution
- Each service has **options**
  - Schedule, Washed or Unwashed area
- Every service has **variations**
  - Color: Scale, Observer, Illuminant
  - Gloss: 20, 60, 85 degrees
- Many services have **pre-requisites**
  - Wash before color, clip after exposure

Cost Estimates

- They are “Estimates” … not “Quotes”
  - Quotes are rigid but test programs are flexible
  - Subject to change if the program changes
  - Different quantity, different size, different duration, added services
- Best practice to ask for “budget numbers” first, approximate cost of options
- Most estimates can be completed in a day, but complex programs require more time
  - Some tests include multiple methods
  - Some standards have different options and choices
  - Not all standard test methods are “standard”
- Even after you receive the estimate, you can still change your request
- We only bill actual charges: we notify the customer if price is higher than estimate
- Please make sure your Purchase Order allows partial billing (multi-year?)

Understanding the Process

Test labs share more than 80% of the workflow process. This is ours:

- Specimens arrive
- Specimens checked in*
- Initial evaluations performed
- Exposure rack or hardware prepared
- Schedule finalized
- Specimens exposed
- Ongoing exposure
- Periodic interval evaluations
- Exposure ends
- Specimens returned

** More on this part next*

Timeline

Time	Action	Who
0 Day	Accept Proposal from the Test lab	Customer
1 Day	Send Payment Information	Customer
2 Days	Send Specimens	Customer
7 Days	Receive Specimens, check for damage	Test Lab
8 Days	Begin Test Setup (Checking In)	Test Lab
9 Days	Questions	Test Lab
12 Days	Answers	Customer
13 Days	Mount specimens	Test Lab
14 Days	Begin Exposures	Test Lab
16 Days	Prepare, Check, and Finalize documents	Test Lab
18 Days	Initial Documents delivered to Customer	Test Lab

Specimens do not go straight from the delivery van to exposure

Shipping Test Specimens to Us

- Send through a regular mail service if possible, or use a courier service
- Do not send collect (unless confirmed with us prior)
- International: Try not to use an Air Freight company
  - Additional customs expense and delay in USA entry
  - Describe the contents as "Test Specimens"
  - Give the Total Value as $10, or $1 per specimen
- Send Directly to each test site location
  - For foreign customers: OK to send through the local Q-Lab representative
- Make sure the box is new and not damaged
- Take care in packing, do not send loose pieces
- Please email us back our Test Submission Form

Do Not Ship Via Ship
Stern rules for incoming shipments

Specimen ID List

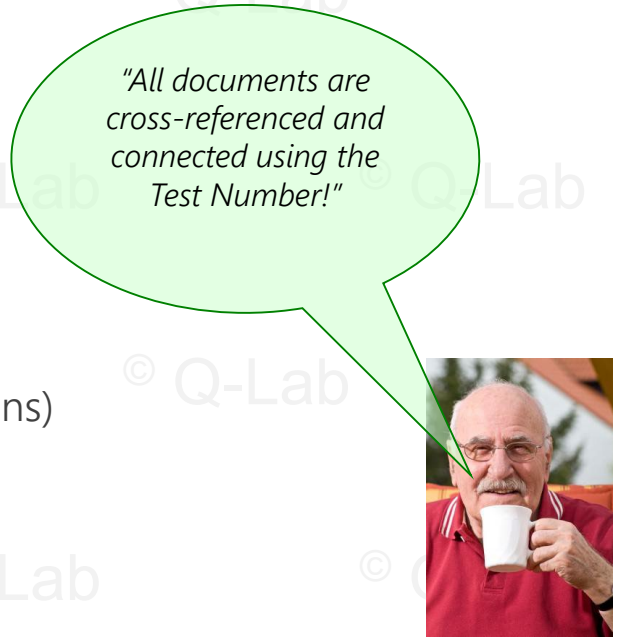
- Needed to correctly inventory each specimen received
  - Please don't just send the specimens with a handwritten number on the back
- Electronic format is best for speed and accuracy
  - **Preferred:** Use the Approved Spreadsheet from each lab
    - Standard Format
    - Imports directly into the database
    - Available from the test labs
  - **Okay:**
    - Any Spreadsheet is better than none, or a text document
- Last Resort
  - Paper copy

Setting up a Test (“Checking In”)

- One test per exposure type (e.g. direct, under glass, or black box)
- Once a test is checked-in, cannot add specimens
  - Minimum charge billed if test is cancelled after this stage
- We prefer to follow a published standard
  - Customer should tell us of any standard test, practice, or specification
- Default instructions are “Per Client Instructions”
- Cannot change the ID of a specimen after exposure
  - Make sure you use the name you want to see on a report
  - Name must be short enough to fit in the space allowed
  - ID chosen here is what is used on the all reports

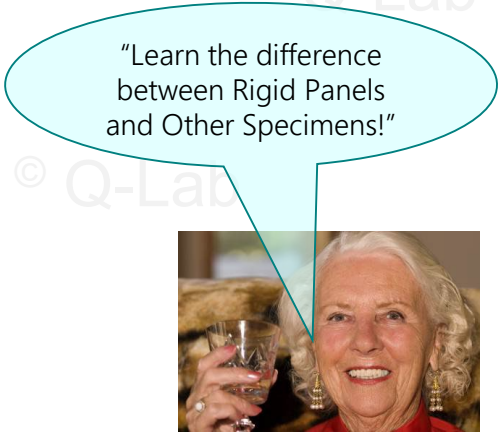
What the Customer Gets (Deliverables)

- Test Confirmation or Order (what we are going to do)
  - Please read this when you get it, let us know if any errors
- Outdoor tests only:
  - Test Schedule (when and what is going to happen)
- By request only
  - Interim and final evaluation reports
- Test Certificate (what we did, used for product submissions)
- Specimens returned after exposure
- Invoices



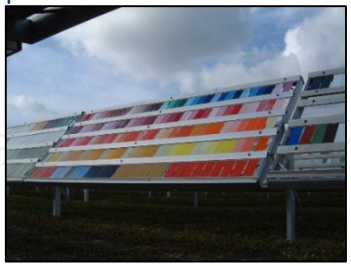
Understanding the Pricing

- For every exposure and service there is a **minimum** and a **unit** price.
  - The minimum is needed to cover fixed costs per exposure or service
  - The minimum charge is per test
  - Price using unit rates depend on quantity of specimens
  - Different unit to minimum specimen ratio for services and exposures
- There is no setup charge for outdoor tests, but …
  - Mounting fees may apply (Hourly labor rates) for odd shapes or flexible materials
- Test sites do not bundle services into packages
  - Fees are related directly to the amount of labor involved



Exposure Methods

- Most economical
  - Open Backed, uses mask area



  - Specimens must be flat, rigid
  - Between 8” and 18” length
- Least labor required

- Pay more
  - Special frames
  - Small panels and specimens
  - Larger panels
  - Flexible panels
  - Fabrics
- Requires more labor

Expense saved on exposures can be put towards **more replicates** or **more evaluations**

Specimen Considerations

- Size
  - Smaller is not always **better** (sometimes viewed as **cheaper**)
  - Larger is easier to handle and evaluate
  - Medium size is best compromise
- Quantity
  - Expose *at least* the minimum for that exposure type
- Replicates
  - 3 of each "recipe" is the best compromise
- Composition
  - Aluminum for color, steel for corrosion
- Make sure your specimens are correctly prepared; for example, film thickness

Specimens or Parts?

- Lab Specimens
  - Produced in the R&D Lab
  - Typically a panel, plaque, coupon, swatch, bar, board ….
  - Easier to handle
  - Easier to expose
  - Easier to evaluate
  - Generally does not require a file specimen
  - *How similar is it to the real part?*
- Real Parts
  - Taken off the production line
  - End products, any shape, typically 3 dimensional
  - Usually requires additional mounting charges
  - Can be challenging to find a flat area to measure color or gloss
  - Usually requires a file specimen or a specialized mask
  - *Test results more accurate?*

Best Specimens

For Exposure

- Rigid Panels (metal, wood, plastic)
  - 4-6" width (100-150 mm)
  - 8-18" length (250-450 mm)
  - Less than 1" thick (25 mm)

For Evaluations

- Flat, even, plane, plain
  - Instrumental measurements
- Large enough for mask area
  - Best for interim evaluations

Ongoing Contact

- If no services are scheduled, the test labs *generally* won't be contacting you about the test.
  - Don't expect a call every month, sorry!
  - But you can call us at any time
  - That's why it is important to request interim evaluation reports
- Q-Lab will definitely contact you if we notice any problems with the test or specimens
  - Significant early failure, for example
- Services may be added upon request at any time (normal charges apply)
  - Add more evaluation intervals
  - Extend the duration of the test
  - Expedited requests are charged extra fee

Evaluations

- Evaluations **always** recommended
  - As frequently as needed
  - Evaluate relevant properties
- Visual evaluations are the best value
  - Cracking, Checking, Chalking, Blistering, Erosion, Flaking, Visual Color, Face Rust, Dirt Pickup, Mold Growth
  - Subjective - yes, but experienced evaluators are trained in rating scales
- Evaluations can help ensure the best exposure duration
  - When is enough, enough?

Evaluation Scheduling

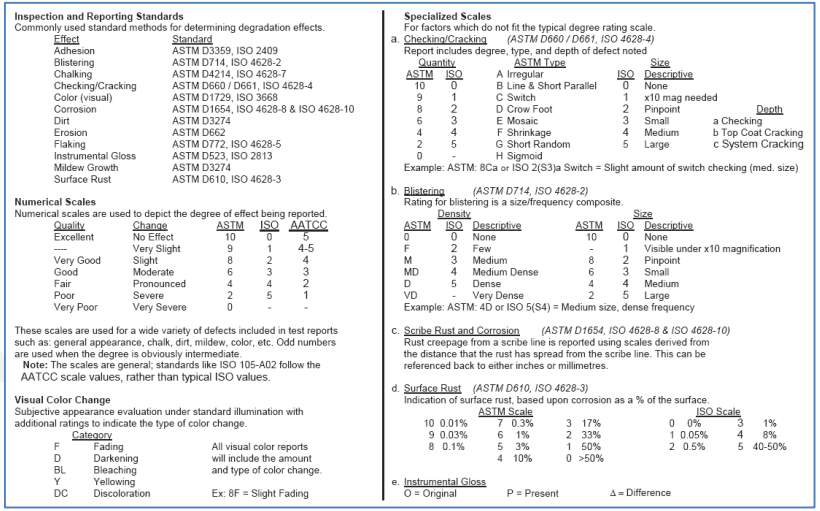
- Good schedule: Divide exposure duration by 4
  - Initial, and every 25% of the final exposure term (5 readings)
  - Very long-term tests: yearly minimum
- If unsure about duration, front load the schedule
  - Don’t miss the inflection point
- Can add more evaluations to schedule if test is extended
- Can end the test if the results are achieved early
  - No point in continuing to expose if end point reached

Evaluation Reports

- Reports available as Excel and PDF files
  - Excel is best for data transfer and manipulation
  - PDF is signed, locked and great for presentation
- We use ASTM or ISO standard scales
  - ASTM 10 to 0, whereas ISO is 0 to 5
- Reports are not uploaded to the web site instantaneously!
  - Takes a couple of days to get ready
    - Everything must be checked for accuracy

Website for Test Results

- All reports and certificates are posted to our custom website
- Login required
- Has a Legend showing the scales used
- Only one “owner” per test
- Automatic notification of new data
- Always available if you lose your copy
- No expiration date on data



Inspection and Reporting Standards
Commonly used standard methods for determining degradation effects.

Effect	Standard
Adhesion	ASTM D3359, ISO 2409
Blistering	ASTM D714, ISO 4628-2
Chalking	ASTM D4214, ISO 4628-7
Checking/Cracking	ASTM D660 / D661, ISO 4628-4
Color (visual)	ASTM D1729, ISO 3668
Corrosion	ASTM D1654, ISO 4628-8 & ISO 4628-10
Dirt	ASTM D3274
Erosion	ASTM D662
Flaking	ASTM D772, ISO 4628-5
Instrumental Gloss	ASTM D523, ISO 2813
Mildew Growth	ASTM D3274
Surface Rust	ASTM D610, ISO 4628-3

Numerical Scales
Numerical scales are used to depict the degree of effect being reported.

Quality	Change	ASTM	ISO	AATCC
Excellent	No Effect	10	0	5
----	Very Slight	9	1	4-5
Very Good	Slight	8	2	4
Good	Moderate	6	3	3
Fair	Pronounced	4	4	2
Poor	Severe	2	5	1
Very Poor	Very Severe	0	-	-

These scales are used for a wide variety of defects included in test reports such as: general appearance, chalk, dirt, mildew, color, etc. Odd numbers are used when the degree is obviously intermediate.
Note: The scales are general; standards like ISO 105-A02 follow the AATCC scale values, rather than typical ISO values.

Visual Color Change
Subjective appearance evaluation under standard illumination with additional ratings to indicate the type of color change.

Category		
F	Fading	All visual color reports will include the amount and type of color change.
D	Darkening	
BL	Bleaching	
Y	Yellowing	
DC	Discoloration	Ex: 8F = Slight Fading

Specialized Scales
For factors which do not fit the typical degree rating scale.

a. Checking/Cracking *(ASTM D660 / D661, ISO 4628-4)*
Report includes degree, type, and depth of defect noted

Quantity ASTM	Quantity ISO	ASTM Type	ISO	Size Descriptive
10	0	A Irregular	0	None
9	1	B Line & Short Parallel	1	x10 mag needed
8	2	C Switch	2	Pinpoint
6	3	D Crow Foot	3	Small
4	4	E Mosaic	4	Medium
2	5	F Shrinkage	5	Large
0	-	G Short Random		
		H Sigmoid		

Depth	
a	Checking
b	Top Coat Cracking
c	System Cracking

Example: ASTM: 8Ca or ISO 2(S3)a Switch = Slight amount of switch checking (med. size)

b. Blistering *(ASTM D714, ISO 4628-2)*
Rating for blistering is a size/frequency composite.

Density ASTM	Density ISO	Density Descriptive	Size ASTM	Size ISO	Size Descriptive
0	0	None	10	0	None
F	2	Few	-	1	Visible under x10 magnification
M	3	Medium	8	2	Pinpoint
MD	4	Medium Dense	6	3	Small
D	5	Dense	4	4	Medium
VD	-	Very Dense	2	5	Large

Example: ASTM: 4D or ISO 5(S4) = Medium size, dense frequency

c. Scribe Rust and Corrosion *(ASTM D1654, ISO 4628-8 & ISO 4628-10)*
Rust creepage from a scribe line is reported using scales derived from the distance that the rust has spread from the scribe line. This can be referenced back to either inches or millimetres.

d. Surface Rust *(ASTM D610, ISO 4628-3)*
Indication of surface rust, based upon corrosion as a % of the surface.

ASTM Scale				ISO Scale	
10	0.01%	7	0.3%	3	17%	0	0%	3	1%
9	0.03%	6	1%	2	33%	1	0.05%	4	8%
8	0.1%	5	3%	1	50%	2	0.5%	5	40-50%
		4	10%	0	>50%				

e. Instrumental Gloss
O = Original P = Present Δ = Difference

www.q-portal.net

How Invoicing Works

- All invoices for outdoor testing are for services already rendered
- Sometimes only exposure charges - no services, no returns
  - Bills are not always connected to a tangible delivery
- There may be multiple tests per invoice
  - Each test is listed separately
- Separate invoices each for Florida, Arizona, Q-TRAC, AIM Box
- Return shipping is either added to the invoice or can be billed directly to customer's account.

Invoicing Schedule

- Outdoor Florida or Arizona
  - Typically every month or quarter depending on totals
- Laboratory Accelerated
  - Usually prepay for entire test if short duration
  - Long tests may be billed in installments such as every 3,000 hours
- Accelerated Outdoor Tests (solar concentrator)
  - Ongoing billing every month
- Special Projects Construction
  - Typically 50 % up front

Return Shipping

- The shipping charges are added to the invoice and shown as "Partial Return" or "Final Return"
- For prepaid tests, we have to return ship **collect**
  - Customer must provide a shipping account
- Test labs will ship based on the customer's instructions
  - If you have a specific preference, please tell us
- If not specified, labs will generally ship UPS ground
- Return shipping is usually mentioned on the cost estimate
  - But may be "estimated" only

Value-Added Items from Q-Lab Testing

Extras that are part of the service but not charged

- Web access to data and reports
- Weather Data
- Barcoded labeling and inventory control
- Secure exposure location
- Expert specimen handling
- “Been There, Done That” experience
- Accreditation to ISO 17025

Frequently-Asked Questions

Can you change the ID on specimen 3 on the reports?

A specimen cannot be renamed once any kind of report has been issued. It is very important that the customer check the identifications that we have used and correct them before any status update is generated. We request that the customer send us an electronic list of the specimen identifications as they would like them to appear on the reports. There is however a 25 character maximum for the ID in order to fit on the specimen labels that we use.

Where is the ISO 17025 accreditation body logo?

We do not use the ISO Accredited logo on our reports. Our accreditation status is confirmed from our Certificate and reviewing the standards we are accredited for as they are listed on our Scope. Our Certificate and Scope can be found and downloaded on our customer portal.

Frequently-Asked Questions

Can I get a Certificate for an ongoing test?

Authorized certificates are only produced at the end of a significant exposure period. This is when specimens are being returned. The cover letter of an evaluation report also contains the same information as a Certificate and is intended to be used to verify exposure type, location and duration for an intermediate interval.

Can you remove the 4 specimens that failed from these reports?

Specimens cannot be removed from a report because they failed or for any other reason. We are required to report all test specimens on all reports. One way around this is to have all poor-performing specimens recalled from the test prior to the final report.

Frequently Asked Questions

I'm manufacturing these materials for another company. Can you put their name on the reports, instead, or can I have another set of reports with their name?

If you let us know before the test has begun, we can create the reports using another name. Once the test has been checked in we cannot change the owner information. For confidentiality and non-disclosure purposes, we only issue reports with one name as the owner.

Can you send reports to me and my customer?

We can create multiple reports, with different names on each copy. They are all going to the single Q-Portal location. We create reports for multiple customers, but it's up to our customer to distribute them to reach of those other contacts.

Frequently Asked Questions

Where is my overall report?

Q-Lab does not routinely create an “overall report”, or a report that summarizes all the previous reports. Our reports are designed to be collated so that an overall report is created as the test progresses. We do not believe in charging for an extra report that is not necessary. We can, however, combine visual evaluation, gloss and color reports at each interval. We can also provide an overall final summary if requested for an additional fee.

Where are my photos?

Photographs are available as a service - customers must assess the overall cost and value. Many customers rely on the evaluation reports we provide and the final return of their exposed specimens. If you request photographs they will be downloaded onto the Q-Portal customer access website. You will receive an email when something is put in your folder, which you can then access using your online account. Photos take a little longer to upload than other reports.

Thank you for your time.

We make testing simple.

Q·LAB