



QUV[®]

The world's most widely used
weathering tester



Weathering Basics

Sunlight, heat, and moisture cause millions of dollars of material damage every year. The QUV accelerated weathering tester reproduces the damage caused by sunlight, rain and dew. In a few days or weeks, the QUV can generate the same degradation that occurs over months or years outdoors. The QUV tests materials by exposing them to alternating cycles of ultraviolet (UV) light and moisture at controlled, elevated temperatures. The QUV simulates the effects of sunlight with fluorescent UV lamps, and it simulates dew and rain using condensing humidity and/or water spray.

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



WHY QUV?

Realistic

The QUV with UVA-340+ lamps produces the most realistic simulation of sunlight in the short wavelength portion of the ultraviolet spectrum. This region of the solar spectrum is most damaging to durable materials like plastic and paints. The result is a tester that provides excellent correlation with outdoor tests.

Affordable

The QUV is economical to purchase and to operate. This is a result of its efficient design, which incorporates low-cost fluorescent UV lamps for sunlight simulation and ordinary tap water for condensation.

Easy to Operate

The QUV tester's simple yet sophisticated design makes it easy to install, easy to use, and almost maintenance-free.

- > Simple user interface for easy programming
- > Exposure conditions displayed continuously
- > Self-diagnostic warnings and service reminders
- > Quick calibration with patented AUTOCAL™ system
- > Multicolored LED for viewing tester status from a distance

Reliability and Ease of Repair

QUV testers are legendary for their reliability. Q-Lab's innovative REPAIRPEDIA™ online troubleshooting guide allows users to quickly diagnose and correct tester performance issues. And it's free to all Q-Lab customers.

The World Standard In Weathering

With thousands of testers in service worldwide, the QUV is the world's most widely used weathering tester.

Q-Lab's Experience

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

QUV Models

QUV/se

The most popular QUV model features the SOLAR EYE Irradiance Control for precise maintenance of UV light intensity. The QUV/se uses a proven condensation mechanism to simulate outdoor moisture attack. It allows faster, more reproducible testing, longer lamp life, and calibration according to international standards.

QUV/spray

The QUV/spray is the same as a standard QUV/se, but also includes a water spray system for enhanced water delivery. Short periods of spray can be used to create a thermal shock. Longer periods can be used to achieve mechanical erosion. The QUV/spray can be set to generate UV light, condensation, water spray, and even combinations of light and moisture.

QUV/cw

Some industries have test methods that specify the use of cool white lamps for indoor photostability testing. To reproduce indoor light conditions, the QUV/cw has a SOLAR EYE Irradiance Control system which has been modified to monitor and control the light output of cool white fluorescent lamps. See Q-Lab Bulletin LU-0823, *QUV/cw Cool White Photostability Tester* for more information.

QUV/uvc

UV light is used widely in ultraviolet germicidal irradiation (UVGI), a technique used to eliminate harmful viruses and bacteria. This short-wavelength, high-energy UVC light can also degrade the materials and surfaces it disinfects. The QUV/uvc model uses UVC lamps to deliver light concentrated at 254 nm to test for material durability against photodegradation effects resulting from exposure to UVC light. The QUV/uvc tester has multiple safety features to prevent stray UVC light from escaping; it is also not equipped with condensation or water spray.

QUV/basic

This is a simplified version of the QUV for the lab where economy is critical. Irradiance is controlled by periodic lamp replacement and repositioning. The QUV/basic has a condensation system for moisture simulation. It does not have water spray. It also retains Q-Lab's Gen 3 controller, with simple touchpad controls and 2-line LCD display.



UV & Sunlight Simulation

UV light is responsible for almost all photodegradation of durable materials exposed outdoors. The QUV tester's fluorescent lamps simulate the critical short-wave UV and reproduce the physical property damage caused by sunlight. Several different types of UV lamps are available for different applications.

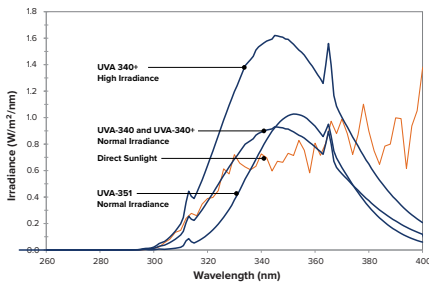
QUV LAMPS

Q-Lab supplies the highest-quality UV fluorescent lamps available. The technology behind the lamps produces a spectrum that is inherently stable throughout their use. Each manufacturing lot is required to pass a stringent series of tests before it is approved for sale. The result is that the QUV provides a consistent, stable spectrum, year after year.



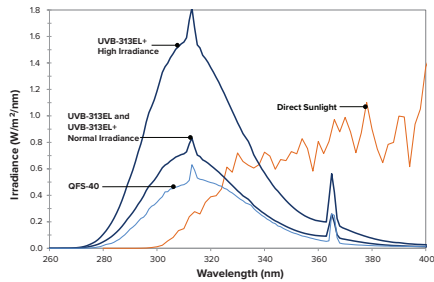
UVA LAMPS

UVA-340 lamps give an excellent simulation of sunlight in the critical short wavelength region from 365 nm down to the solar cut-on of 295 nm. UVA-340+ “plus” lamps enable testing at elevated irradiances - up to 1.70 W/m²/nm - that meet or exceed the highest irradiance values called for in major test standards. UVA-351 lamps simulate the UV portion of sunlight filtered through window glass. Cool White lamps are also available to simulate office environments.



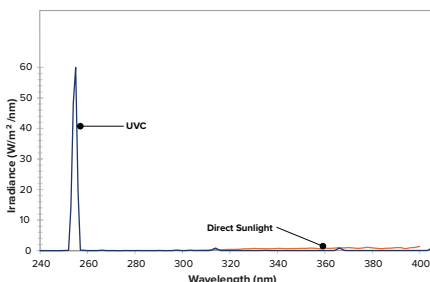
UVB LAMPS

UVB-313EL (and legacy QFS-40) lamps deliver short-wave UV more severe than the UV normally found at the earth's surface. UVB-313 lamps are most useful for QC and R&D applications or for testing exceptionally durable materials. UVB-313-EL+ lamps are also available to provide high irradiance levels for the harshest fluorescent UV tests. Care should be taken to ensure failure mechanisms are realistic when using UVB lamps.



UVC LAMPS

UVC lamps deliver high-intensity short-wave UV light at 254 nm, which is well below the solar cut-on. This represents the most common UVC emission used for disinfection of surfaces exposed to harmful bacteria and viruses. While it can kill these pathogens effectively, UVC light can also cause degradation of plastics, coatings, and fabrics. UVC lamps reproduce this damaging irradiance, in order to evaluate durability of materials exposed to UVC light.



NEW “PLUS” LAMPS

New UVA-340+ and UVB-313EL+ lamps provide a consistent, stable spectrum plus extended lifetime at high irradiance

SOLAR EYE® IRRADIANCE CONTROL

Changes in light intensity may affect the speed of material degradation. Changes in spectrum may affect both speed and type of degradation. Therefore, a weathering tester must control irradiance to achieve reproducible test results. Most QUV models are equipped with SOLAR EYE Irradiance Control. The SOLAR EYE is a precision control system that automatically maintains light intensity through a feedback loop. The controller monitors UV intensity and compensates for lamp aging or any other variability by adjusting power to the lamps. The SOLAR EYE system allows better reproducibility and repeatability than manual systems.

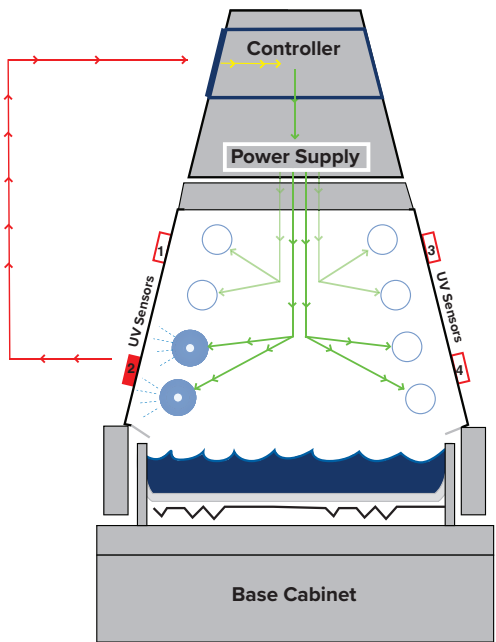
SOLAR EYE:

- > Monitors and maintains programmed light intensity
- > Operates lamps until set point can't be maintained
- > Maximizes effects with high irradiance
- > Operates at higher irradiance than noon summer sunlight
- > Extends lamp lifetime

1. During the UV cycle, built-in sensors measure the light from each pair of lamps and transmit this data to the controller.

2. The controller compares the measured irradiance to the set point.

3. The controller instructs the power supply to adjust the current to the lamps to maintain the set point.



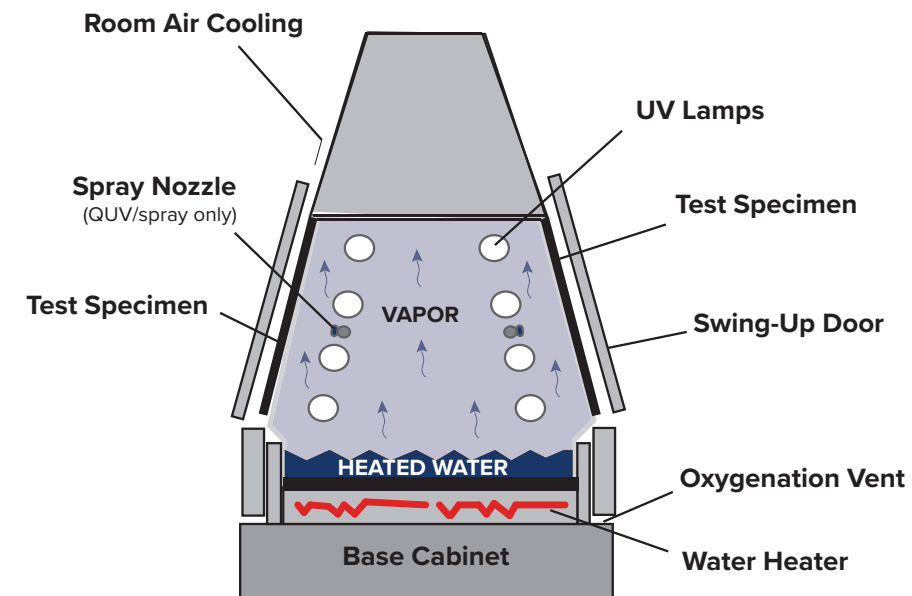
Moisture Simulation

The QUV allows two approaches to moisture simulation. For most applications, condensing humidity is the best way to simulate outdoor moisture attack. All QUV models except QUV/uvc allow a programmed condensation cycle. Because certain applications also require water spray to achieve realistic results, some QUV models can produce both condensation and water spray.

CONDENSATION

In many outdoor environments, materials are wet more than 12 hours each day. Research indicates that the main cause of this outdoor wetness is dew, not rain. The QUV simulates this using a unique condensation mechanism. During the condensation cycle, a water reservoir in the bottom of the test chamber is heated to produce vapor. The hot vapor maintains the chamber at 100% relative humidity, at an elevated temperature.

The QUV is designed so that test specimens form the external walls of the chamber. Thus, the reverse side of the specimens is exposed to ambient room air. This room-air cooling causes the test surface to drop a few degrees below the interior vapor temperature, ensuring that water continually condenses on the specimen surface. The evaporation process naturally distills the water, resulting in only pure water collection on specimens even when ordinary tap water is used.



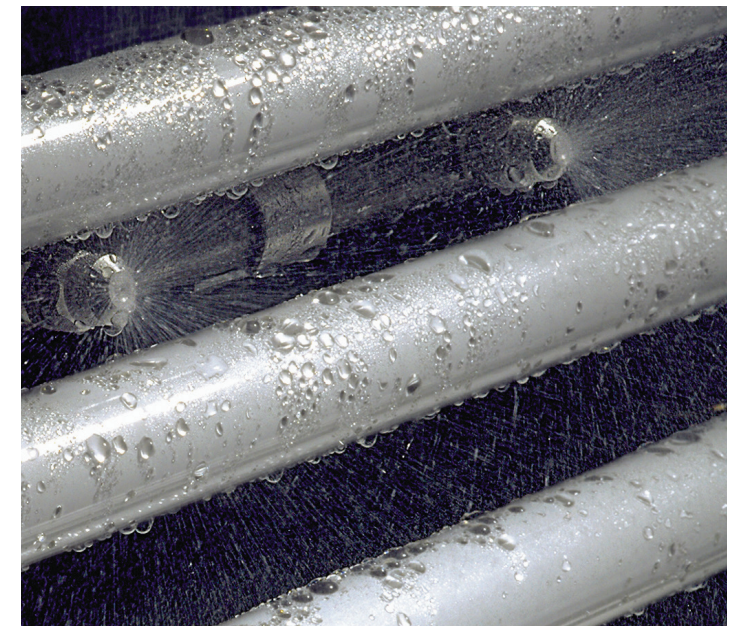
CONDENSATION:

- > Best simulation of natural wetness
- > Elevated temperatures for acceleration
- > Ordinary tap water input
- > Pure water output - no spotting or contamination of specimens
- > Minimal maintenance

WATER SPRAY

In some service environments, material temperatures can suddenly decrease when heat builds up over the course of a sunny day and a sudden rain shower rapidly dissipates the heat. The resulting thermal shock is a challenge for many materials. Additionally, some materials are susceptible to mechanical erosion from rainfall. The QUV with water spray is useful for simulating both environments.

Unlike the condensation system that works effectively with ordinary tap water, the water spray system requires laboratory grade pure water. See page 14 for information on a water re-purification system for the QUV/spray.



REALISTIC SIMULATION

Dew, not rain, is responsible for most of the wetness that occurs in outdoor exposure.

Specimen Mounting

Coatings, plastics, and films are easily accommodated in the QUV tester using standard flat panel specimen holders. Other specimens can be mounted using specialty holders. Q-Lab also offers custom specimen holders for unique needs. All of Q-Lab’s panel holders are designed to meet the requirements of ASTM G154 and other international standards.



FLAT SPECIMEN HOLDERS

Q-Lab offers flat specimen holders in three sizes. All sizes include an individual holder for two specimens, aluminum panels, and circular retaining rings. For thicker specimens, the use of thick panel retaining clips is recommended.



SPECIALTY SPECIMEN HOLDERS

All Q-Lab specialty specimen holders are designed to test a variety of materials while retaining chamber heat and moisture for proper temperature control. Options include tensile bar holders, wood or artificial lumber holders, and large and small three-dimensional (3D) part holders. Specialty specimen holders are in stock and ready to ship.



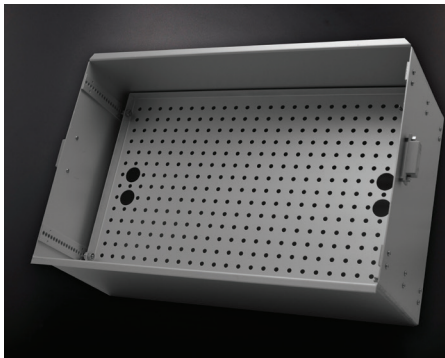
TENSILE BAR SPECIMEN HOLDERS

This popular specimen shape allows for evaluation of physical strength retention of materials after exposure to sunlight, heat, and water. Similar to a flat panel holder, tensile bar holders include multiple clips for exposing “dog bone” shaped polymer specimens prior to tensile strength testing. Use one, two, or all three clips to test your materials.



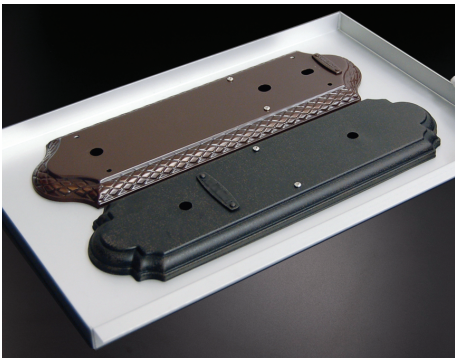
CUSTOM SPECIMEN HOLDERS

For unique applications or for specimens that cannot fit in the standard or specialty holders, Q-Lab can make custom specimen holders for nearly any application. Custom specimen holders can include brackets and other modifications to hold heavy or unusual-shaped specimens, such as concrete blocks. Three-dimensional holders with customized dimensions can also be made to accommodate products like fuel tanks, beverages, shoes, and hardware.



ADJUSTABLE 3D QUADRANT BOXES

These three dimensional part holders include a perforated plate to allow for easy specimen positioning and mounting. The plate can be adjusted forward or backward in 3 mm (0.0125 in) increments. The Adjustable 3D Holders are available in two depths, 100 mm (4 in) or 200 mm (8 in). No matter what is being exposed, it is critical that the front surface of the specimen is at the same distance from the lamps as the flat panel holder.



Operation

QUV accelerated weathering testers are simple to operate. Programming is intuitive. All models are completely automated and can operate continuously, 24 hours per day, 7 days per week.

Designed to be both functional and easy to use, the QUV controller can be programmed in 17 user-selectable languages (English, French, Spanish, Italian, German, Chinese, Japanese, Korean, Czech, Dutch, Polish, Portuguese, Russian, Swedish, Thai, Turkish, and Vietnamese). Additional languages are being added on an ongoing basis. Users can program and store up to 13 tests in memory, which has a battery back-up feature.

The dual, full-color touchscreen displays on QUV testers allow for real-time viewing of test parameters and performance along with control of tester operation and settings. The multi-color LED light indicates, at a quick glance, the tester's operational status. The screens are fully redundant, allowing for operation even in the unlikely event that one of them fails. Tester performance data is recorded automatically and easy to export via USB drive. Software updates can also be performed quickly using the USB port without interrupting tester operation.



GEN 4 CONTROLLER

The QUV now features dual full-color touch screens with a simple and intuitive interface in multiple languages.

Maintenance & Calibration

The QUV controller includes complete self-diagnostic error checking. The controller constantly monitors the status and performance of all systems. It also displays simple warning messages and routine maintenance reminders and performs safety shutdown, as needed. Typical maintenance items include lamps, sensor calibrations and inexpensive air filters.

The QUV SOLAR EYE on-board irradiance sensors need to be calibrated periodically by the user to assure accurate and consistent results.

Calibration is simple using the Universal Calibrator and AUTOCAL system. It takes only minutes and virtually eliminates human error. Universal Calibrator smart sensors are disposable, inexpensive, and replaced yearly.



Standards

The QUV conforms to the specifications in nearly all major international, national and industry test standards, including those below. Refer to Technical Bulletin LU-8012 for a more comprehensive list.

- | | | |
|--------------|--------------|------------------|
| > ASTM G154 | > ASTM D5894 | > ISO 16474-3 |
| > ASTM C1442 | > ASTM E3006 | > ISO 12944-6 |
| > ASTM D4799 | > EN 927-6 | > SAE J2020 |
| > ASTM D6662 | > ISO 4892-3 | > JIS K 5600-7-8 |
| > ASTM D4587 | > ISO 11507 | > AATCC TM186 |

Accessories & Options

The QUV accelerated weathering tester is available in a variety of models with different options to suit all testing needs. Additional accessories are available to best integrate the QUV weathering testers and accommodate the space and utilities available in most laboratory spaces.



SPACE SAVER FRAME

QUV space saver frames from Q-Lab help preserve space in crowded labs with multiple QUV test chambers. By allowing QUV testers to be stacked two-high, the frames efficiently make use of the same floor space in the lab. Frames are available in two different models for compatibility with all new and existing QUV testers.



WATER REPURIFICATION SYSTEM

To significantly reduce the cost of running the QUV tester’s optional water spray system, Q-Lab offers a water repurification system. The system can save over 1,000 liters of expensive, purified water per day in a test cycle that calls for several hours of water spray, and can pay for itself in a matter of months.

The system is packaged inside a separate housing as a standalone system. Note the repurification system is not a primary system for purification. Purified water must still be supplied to the tester. The system maintains the proper purity level for continued use.

Summary

● Standard ◐ Optional

Feature	/se	/spray	/cw	/uvc	/basic
SOLAR EYE® Irradiance Control	●	●	●	●	–
User Interface Available in 17 Languages	●	●	●	●	●
Dual Full-Color Touch-Screen Displays	●	●	●	●	–
Multi-color LED Status Indicator	●	●	●	●	–
Easy Calibration with Universal Calibrator Smart Sensors	●	●	●	●	–
Condensation	●	●	●	–	●
Water Spray	–	●	–	–	–
USB Port for Software Updates and Data Acquisition	●	●	●	●	●
Automatic Fault Recognition and Alarms	●	●	●	●	●
Automatic Shut-down Timer	●	●	●	●	●
Uninsulated Black Panel (BP) Temperature Control	●	●	●	●	●
Insulated Black Panel (IBP) Temperature Control	◐	◐	◐	◐	◐
Near-Room-Temperature BP Control	–	–	–	●	–
Adjustable 3D Specimen Holder Boxes	◐	◐	◐	◐	◐
Space Saver Frame for Stacking	◐	◐	◐	◐	◐
Water Repurification System	–	◐	–	–	–

QUV Accelerated Weathering Tester



Overview

Sunlight, heat, and moisture cause millions of dollars of material damage every year. The QUV® accelerated weathering tester exposes materials to alternating cycles of UV light and moisture at controlled, elevated temperatures. In a few days or weeks, QUV testers can reproduce the damage that occurs over months or years outdoors. And with its newest model, QUV testers can now reproduce the damage caused by 254nm UVC light used in sterilization equipment. With thousands of testers in service worldwide, the QUV tester is the world's most widely used weathering tester.

Features

QUV testers are available in five different models: QUV/basic, QUV/se, QUV/spray, QUV/cw, and QUV/uvc. Each air-cooled tester features Q-Lab's renowned reliability and ease of maintenance. All testers have standard datalogging via ethernet and/or USB, a variety of standard sample holders, automatic fault recognition and alarms, automatic shut-down timer, and a remarkably simple user interface available in more than eight languages.

	basic	se	spray	cw	uvc
SOLAR EYE® Irradiance Control ²	—	●	●	●	●
Dual Full-Color Touch-Screen Displays	—	●	●	●	●
Uninsulated Black Panel (BP) Temp. Control	●	●	●	●	●
Insulated Black Panel (IBP) Temp. Control ³	●	●	●	●	●
Condensation	●	●	●	●	—
Water Spray	—	—	●	—	—
Near-Room-Temperature BP Control	—	—	—	—	●
Adjustable 3D Specimen Holder Boxes ¹	●	●	●	●	●
Space Saver Frame for Stacking ⁴	●	●	●	●	—
Water Repurification System	—	—	●	—	—

● Standard Feature ● Optional Feature

¹ See LU-8001 for more information on other standard and custom specimen mounting holder options.

² See L-3000 for information about SOLAR EYE Irradiance Control calibration using the Universal Calibrator System.

³ Black Panel (BP) temperature control is standard. IBP control recommended for use with plastic specimens and/or 3D specimen holder boxes.

⁴ See LU-0820 for more information on space saver frames.

Lamps & Irradiance Control

The SOLAR EYE® irradiance control system (used in all models except QUV/basic) continuously monitors and precisely maintains irradiance by adjusting power to the lamps. Irradiance control is very important because changes in light intensity may affect both speed and type of material degradation. The QUV/basic model relies on lamp rotation to approximate controlled irradiance levels.

Models with irradiance control feature programmable setpoints. For example, with UVA-340 lamps, an irradiance of 0.89 W/m²/nm @ 340nm is a good match with noon summer sunlight. For faster results, the QUV tester can operate at about double the irradiance of noon summer sunlight. See below for some common set points and LU-8160 for more information about selecting lamps for your application.

	UVA-340	UVA-340+	UVA-351	UVB-313EL	UVB-313EL+	UVC-254 ¹	QFS-40	Cool White ¹
Minimum Irradiance	0.20	0.70	0.20	0.20	0.20	1.0	0.20	2,000
Typical Irradiance	0.89	0.89	0.76	0.71	0.71	6.0	0.48	6,000
High Irradiance	1.55	1.55	1.25	1.23	1.55	13.0	0.86	20,000
Maximum Irradiance		1.70			1.70			

¹ Values above are in units of W/m²/nm, except for UVC-254 (mW/cm²) and Cool White (Lux).

² All lamps in testers equipped with SOLAR EYE irradiance control are warranted for 8,000 hours at Typical Irradiance; UVA-340+ and UVB-313EL+ are also warranted for 1,500 hours at High Irradiance and 750 hours at Maximum Irradiance. Italicized values above are not warranted.

Irradiance Calibrations

The QUV SOLAR EYE irradiance control system and on-board sensors can be calibrated quickly and inexpensively using the Universal Calibrator (UC) system. Disposable, ISO 17025-accredited smart sensors can be connected directly to the dual touchscreen display, dramatically simplifying the calibration process and lowers operating costs for users (see L-3000 for more information).

QUV Tester Operating Specifications:

Models	basic	se	spray	cw	uvc
Specimen Orientation	75° from horizontal				
UV Fluorescent Lamps	Quantity: 8 (T12 x 121 cm long) @ 40W ea				
Onboard Irradiance Sensor	—	Wideband (250-400 nm)	Wideband (250-400 nm)	Broadband (300-800 nm)	Narrowband (254 nm)
Black Panel Temp (°C) Light Cycle Temp. ¹ Condensation Cycle Temp.	45-80 40-60	45-80 40-60	45-80 40-60	35-80 — ²	24-76° — ³
Specimen Exposure Area	20 x 50 cm (2x front side) 20 x 108 cm (1x rear side) 4160 cm² total	20 x 50 cm (2x each side) 4000 cm² total 20 x 50 cm (2x each side) 4000 cm² total			
Specimen Capacity ⁴	50 Specimens (75 x 150 mm)	48 Specimens (75 x 150 mm)			
Inlet Water Pressure	0.2-5.5 bar (2-80 psi)	0.2-5.5 bar (2-80 psi)	2.8-5.5 bar (40-80 psi) ⁵	0.2-5.5 bar (2-80 psi) ²	— ³
Inlet Water Purity ⁶	Tap Water	Tap Water	> 200 kΩ·cm < 5 µS/cm < 2.5 ppm TDS 6-8 pH	Tap Water ²	— ³
Water Consumption ⁷ Condensation Spray	5 liters/day —	5 liters/day —	5 liters/day 7 liters/minute	5 liters/day ² — ³	— ³ — ³
External Dimensions (w x h x d)	137 x 135 x 53 cm (54 x 53 x 21 in)				
Weight ⁸	136 kg (300 lbs)				
Electrical Requirements ⁹	120V ± 10%, 1-Φ 60 Hz, 14A 230V ± 10%, 1-Φ 50/60 Hz, 7A	120V ± 10%, 1-Φ 60 Hz, 16A 230V ± 10%, 1-Φ 50/60 Hz, 8A			

¹ Minimum and maximum black panel temperatures are dependent on irradiance settings and ambient temperatures.

² The QUV/cw model is able to perform condensation cycles; however, this is not usually applicable for testing indoor materials.

³ The QUV/uvc model can achieve a BP temperature range of 24-64°C at min irradiance, and 36-76°C at max irradiance. This model does not allow for condensation or water spray. It also features a high-power blower for near-room-temperature BP testing capabilities, to best replicate conditions experienced during UVC sterilization efforts.

⁴ Other specimen sizes and shapes (including three-dimensional specimens) are readily accommodated in standard or custom specimen holders (see LU-8001).

⁵ Optional booster pump (X-10570-K) is available.

⁶ Water purity requirements can be met by most reverse osmosis, deionization, or distillation systems.

⁷ Water consumption values are dependent upon test and lab conditions. Values shown are maximum for many common standards. To reduce water consumption during spray cycles, consider an optional water repurification system (see LW-6048 for more information).

⁸ Actual shipping weights will be higher and depend upon whether the shipment is domestic, ocean, or air.

⁹ Transformer kits available for 100V (part number V-149-K-INST) or 200V (part number V-149-I-K-INST) operation.

Warranty

The QUV accelerated weathering tester is guaranteed against defects in workmanship or materials for one year. Liability is limited to replacing or repairing any part or parts which are defective in materials or workmanship and are returned to our factory, shipping costs prepaid. Liability in all events is limited to the purchase price paid. Damage due to accident or abuse is not covered. Labor and travel costs are not covered. Q-Lab Corporation makes no other warranties, including implied warranties of merchantability or fitness for a particular purpose, except as may be expressly provided by Q-Lab Corporation in writing. Q-Lab Corporation shall not be liable for any incidental, consequential, special, or contingent damages arising out of the sale or use of any product.



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A Choice of Lamps for the QUV

Your exposure application determines which type of UV lamps should be used. All of the QUV's lamps emit mainly ultraviolet rather than visible or infrared light. All are electrically equivalent to an ordinary 40-watt fluorescent. However, each lamp type differs in the total amount of UV energy emitted and in its wavelength spectrum. Fluorescent UV lamps are usually categorized as UVA or UVB lamps, depending on the region into which most of their output falls.

UVA Lamps

UVA lamps are especially useful for comparing different types of polymers. Because UVA lamps do not have any UV output below the normal solar cutoff of 295 nm, they usually do not degrade materials as fast as UVB lamps. However, they usually provide better correlation with actual outdoor weathering.

UVA-340. The UVA-340 provides the best possible simulation of sunlight in the critical short wavelength region from 365 nm down to the solar cutoff of 295 nm. Its peak emission is at 340 nm. UVA-340 lamps are especially useful for comparison tests of different formulations.

UVA-351. The UVA-351 simulates the UV portion of sunlight filtered through window glass. It is most useful for interior applications, especially reproducing polymer damage which can occur in a window environment.

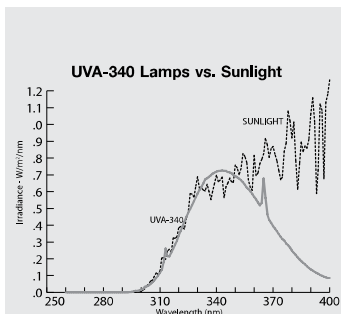
UVB Lamps

UVB Lamps are widely used for fast, cost-effective testing of durable materials. Two types of UVB lamps are available. They produce the same UV wavelengths, but differ in the total amount of energy produced. All UVB lamps emit short wavelength UV, below the solar cutoff of 295 nm. Although this short wave UV accelerates testing, it can sometimes lead to anomolous results.

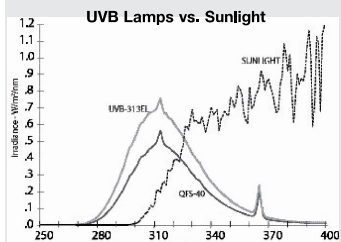
UVB-313EL. The UVB-313EL is the most widely used QUV lamp for UVB exposures. It is especially useful to maximum acceleration when testing very durable products like automotive coatings and roofing materials. UVB-313EL lamps are also frequently used for QC applications.

QFS-40. This is the original QUV lamp. QFS-40 lamps have been used for many years and are still specified in many test methods, particularly for automotive coatings. QFS-40s are best used in a QUV/basic. (These lamps are also known as the "FS-40" or "F40 UVB.")

Using the UVB-313EL to Mimic the QFS-40. Compared with the QFS-40 lamp, the UVB-313EL produces substantially higher UV output and faster test results. When used in a QUV fitted with a Solar Eye Irradiance Control System, the UVB-313EL can be operated at the same irradiance level as a QFS-40. This provides long lamp life and minimizes lamp replacement costs.



UVA-340 lamps are the best available simulation of sunlight in the critical short-wave UV region.



UVB lamps produce mostly short-wave UV for maximum acceleration.

General Lamp Recommendations

UVA-340	Recommended for correlation with outdoor results for most plastics, textiles, coatings, pigments and UV stabilizers.
UVB-313EL	Often used for QC applications. Recommended for very durable materials such as roofing, some exterior coatings etc.
QFS-40 (F40 UVB)	Automotive exterior coating specifications.
UVA-351	Most useful for UV "sunlight through glass" simulations. Recommended for some automotive interiors, textiles and inks.

Other Manufacturers. Other UV lamps are sometimes available from other manufacturers. These are often intended to be copies of Q-Panel's fluorescent lamps. Although the names may be the same (e.g., UVB-313 or UVA-340), other manufacturer's lamps may have very different irradiance, spectral power distribution or aging characteristics. Consequently, they may not give the same test results. For best results, use only Q-Panel lamps in your QUV.

Solar Eye Irradiance Control

Models QUV/se and the QUV/spray are equipped with Solar Eye Irradiance Control. The controller continuously monitors the UV intensity using four sensors at the same plane. The feed-back loop systems allows it to automatically compensate for lamp aging or any other variability by adjusting power to the lamps. Solar Eye allows better reproducibility and repeatability than manual irradiance control systems used in the old-style QUVs and in the QUV/basic.

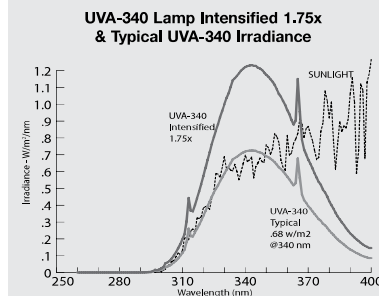
IMPORTANT: DO NOT MIX DIFFERENT TYPES OF LAMPS
Mixing different types of lamps in one QUV will produce major inconsistencies in the light falling on the samples, and may produce samples with "stripes" of greater and lesser degradation.

High Irradiance

With push-button irradiance setting you can operate the Solar Eye at various intensity levels for different applications and still maintain realistic test conditions. For example, with the UVA-340 lamps you could set the Solar Eye to simulate the following sunlight conditions:

Typical: For quick results without sacrificing correlation. With UVA 340 lamps, this irradiance level is equivalent to noon summer sunlight.

Intensified (1.75x): 75% higher than noon summer sunlight for fast test results.



IMPORTANT WARNING NOTICE

LAMP CONTAINS MERCURY (Hg)
Manage in Accordance with Disposal Laws,
See: www.lamprecycle.org or W.E.E.E directive



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Partial List of Test Methods & Standards Met by QUV & QCT Weathering Testers

General

ASTM G151 - Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
ASTM G154 - Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Non-Metallic Materials
BS 2782 - Part 5, Method 540B (Methods of Exposure to Lab Light Sources)
GB/T 14522 - Artificial Weathering Test Method for Plastics, Coatings, and Rubber Materials used for Machinery Industrial Products – Fluorescent UV Lamps

Automotive

Ford FLTM BI 104-02 - Condensing Water Vapor Test (QCT)
GM 4367M (General Motors) - Topcoat Materials - Exterior
GM 9125P (General Motors) - Laboratory Accelerated Exposure of Automotive Material
JIS D 0205 - Test Method of Weatherability for Automotive Parts (Japan)
NISSAN M0007 - Fluorescent UV/Condensation Test
RNES B-00107 (Renault, Nissan) - Test Method of Clearcoat Cracking (UVB)
SAE J2020 - Accelerated Exposure of Automotive Exterior Materials Using a Fluorescent UV & Condensation Apparatus

Adhesives & Sealants

ASTM C1184 - Specification for Structural Silicone Sealants
ASTM C1442 - Standard Practice for Conducting Tests on Sealants Using Artificial Weathering Apparatus
ASTM C1501 - Standard Test Method for Color Stability of Building Construction Sealants as Determined by Laboratory Accelerated Weathering Procedures
ASTM D904 - Standard Practice for Exposure of Adhesive Specimens to Artificial Light
ASTM D5215 - Standard Test Method for Instrumental Evaluation of Staining of Vinyl Flooring by Adhesives
UNE 104-281-88 - Accelerated Testing of Paints and Adhesives with Fluorescent UV Lamps

Roofing

ANSI/RMA IPR-1 - Req. for Non-Reinforced Black EPDM Sheet for Roofing Membrane
ANSI/RMA IPR-2 - Req. for Fabric-Reinforced Black EPDM Sheet for Roofing Membrane
ANSI/RMA IPR-5 - Req. for Non-Reinforced Non-Black EPDM Sheet for Roofing Membrane
ANSI/RMA IPR-6 - Req. for Fabric-Reinforced Non-Black EPDM Sheet for Roofing Membrane
ASTM D3105 - List of Test Methods for Elastomeric and Plastomeric Roofing & Waterproofing
ASTM D4434 - Std. Specification for PVC Sheet Roofing
ASTM D4799 - Test Method for Accelerated Weathering of Bituminous Roofing Materials
ASTM D4811 - Standard Specification for Non-vulcanized Rubber Sheet Used as Roof Flashing
ASTM D5019 - Standard Specification for Reinforced Non-Vulcanized Polymeric Sheet Used in Roofing Membrane
BS 903 Part A54 Annex A & D - Methods of Testing Vulcanized Rubber
CGSB-37.54-M - Canadian General Standards Board Spec. for PVC Roofing & Waterproofing Membrane
EN 534 - Corrugated Bitumen Sheets
EN 1297 - Flexible sheets for waterproofing—Bitumen, plastic and rubber sheets for roof waterproofing Method of artificial ageing by long term exposure to the combination of UV radiation, elevated temperature and water
EOTA TR 010 - Exposure procedure for artificial weathering

Paints and Coatings

ABNT NBR 15.380 - Paints for buildings – Methods for performance evaluation of paints for non-industrial buildings - Resistance to UV irradiation/water vapor condensation, by accelerated test
ASTM D4585 - Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation (QCT)
ASTM D4587 - Standard Practice for Light/Water Exposure of Paint
ASTM D5894 - Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
EN 927-6 - Paints and Varnishes - Coating Materials and Coating Systems for Exterior Wood
GB/T 8013 - Anodic Oxide Coatings and Organic Polymer Coatings on Aluminum and its Alloys
GB/T 16585 - Rubber, Vulcanized Test Method of Resistance to Artificial Weathering – Fluorescent UV Lamps
ISO 15110 - Paints and varnishes - Artificial weathering including acidic deposition
ISO 12944-9 - Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 9: Protective paint systems and laboratory performance test methods for offshore and related structures
ISO 16474-1 - Paints & Varnishes - Methods of Exposure to Laboratory Light Sources - Pt. 1: General Guidance
ISO 16474-3 - Paints & Varnishes - Methods of Exposure to Laboratory Light Sources - Pt. 3: Fluorescent UV Lamps
JIS K 5600-7-8 - Testing Methods for Paints
KS M5982 - Testing Method for Accelerated Weathering

Plastics

ANSI A14.5 - Specification for Accelerated Weathering of Portable Reinforced Plastic Ladders
ANSI C57.12.28 - Specification for Accelerated Weathering of Padmounted Equipment Enclosure Integrity
ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
ASTM D4329 - Standard Practice for Light/Water Exposure of Plastics
ASTM D4674 - Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight
ASTM D5208 - Standard Practice for Exposure of Photodegradable Plastics
ASTM D6662 - Standard Specification for Plastic Lumber Decking Boards
DIN 53384 - Testing of plastics, Artificial Weathering and Exposure to Artificial Light
GB/T 16422.3 - Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps
ISO 4892-1 - Plastics - Methods of exposure to laboratory light sources - Part 1: General Guidance
ISO 4892-3 - Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV Lamps
JIS K 7350-3 - Plastics - Methods of Exposure to Laboratory Light Sources - Part 3: Fluorescent UV Lamps
UNE 53-104 - Stability of Plastics Materials Exposed to Simulated Sunlight

Other

AATCC TM 186 (Textiles) - Weather Resistance: UV Light and Moisture Exposure
ASTM E3006 (Photovoltaics) - Standard Practice for Ultraviolet Conditioning of Photovoltaic Modules Using a Fluorescent Ultraviolet (UV) Lamp Apparatus
ASTM F1945 (Printing Inks) - Lightfastness of Ink Jet Prints Exposed to Indoor Fluorescent Lighting
Colts Standard Test (Dyes) – UV Dye Resistance to Fade - QUV
GSB AL 631 (Architectural) – International Quality Guidelines for the Coatings of Aluminum Building Components
IEC 61215 (Photovoltaics) - Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval
ISO 21898 (Packaging) - Flexible Intermediate Bulk Containers (FIBCs) for Non-Dangerous Goods

Notes:

- 1: Many national standards have been superseded by ISO or IEC standards, which are listed on this document.
- 2: This document is not fully comprehensive. If a standard is not listed here, it may still be met by the QUV/QCT.
- 3: Contact Q-Lab for more information about a specific test cycle.



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