



# Q-SUN<sup>®</sup> Xe-8

Large Capacity, Rotating Rack Xenon Arc  
Weathering Test Chamber



# Weathering Basics

Sunlight, heat, and moisture cause millions of dollars in product damage every year. Cracking, crazing, hazing, fading, and yellowing can occur indoors or outdoors. With Q-SUN Xe-8 xenon arc test chambers, you can simulate the damage caused by full-spectrum sunlight, temperature, and moisture. In just a few days or weeks, a Q-SUN Xe-8 tester can reproduce the damage that occurs over months or years outdoors.

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



# Why Q-SUN Xe-8?

Q-SUN Xe-8 is the **NEW** standard in large capacity, rotating rack xenon arc weathering testers.

## Realistic

Q-SUN Xe-8 xenon arc test chambers are the ultimate research & development and quality control tool for testing materials that are exposed to direct sunlight or sunlight through window glass. With a variety of options, you can customize your Q-SUN Xe-8 chamber to fit your testing needs.

The Q-SUN Xe-8 is a rotating rack, full-featured weathering, lightfastness, and photostability chamber, and meets virtually all major industry and OEM standards.

The Q-SUN Xe-8 test chamber is designed to support dozens of different industries and applications to aid in the selection of new materials, the improvement of existing materials, quality control, or the evaluation of how changes in formulation affect product durability.

## Affordable

The Q-SUN Xe-8 xenon arc tester has the lowest total cost of ownership in the industry. Its low purchase price, incredibly long-lasting lamps, and low operating costs set a new standard for weathering and lightfastness testing.

## Easy to Operate

The Q-SUN Xe-8 tester's simple yet sophisticated design makes it easy to install, easy to use, incredibly reliable, and easy to maintain.

- > Specimen mounting and evaluations are simplified with user-friendly and reversible specimen holders.
- > Automated controls allow continuous operation, 24 hours per day, 7 days per week, without supervision
- > Self-diagnostic warnings and service reminders notify users when maintenance and calibration are needed
- > Multicolored LED allows tester status to be viewed from a distance
- > LIGHT/YEAR® lamps are warranted for 8,000 hours at normal irradiance

## Reliable and Easy to Maintain & Repair

Q-SUN Xe-8 subsystems are modular, easy to troubleshoot, and even easier to replace. The Q-SUN Xe-8 is 100% air-cooled, for maximum simplicity and reliability. All maintenance and basic repairs can be performed from the front or top of the tester. This saves significantly on the amount of laboratory floor space needed. Typical maintenance and repair of Q-SUN Xe-8 testers is simple enough that you don't need a field technician (but we're here if you need us).

## Q-Lab's Experience

Q-Lab provides expert-level applications assistance to help with your weathering testing program. Our scientists and engineers participate and offer leadership in ISO, ASTM, SAE, IEC, GB, and numerous other professional organizations in creating standardized weathering test methods and procedures.

# Q-SUN Xe-8 Features

The Q-SUN Xe-8 xenon arc tester offers a huge-capacity rotating rack. It supports 164 specimens of 51 × 102 mm (2.0 × 4.0") or 96 specimens of 67 × 145 mm (2.6 × 5.7") each. Its four 4200 W air-cooled lamps are more economical than water-cooled lamps, highly efficient, and very low maintenance. The versatile Q-SUN Xe-8 tester is the simplest, most reliable, and easiest-to-use large-format rotating rack xenon arc tester available.



**CONVENIENT SPECIMEN HOLDER RACK**

*allows short-term storage during lamp and filter changes*

**REVERSIBLE SPECIMEN HOLDERS**

*for simpler top-to-bottom specimen repositioning*

**LIGHT/YEAR<sup>®</sup> XENON ARC LAMP TECHNOLOGY**

*requires lamp changes about once per year under typical settings*

**180 W/m<sup>2</sup> ("3-SUN") IRRADIANCE CAPABILITY**

*optional accessory with reduced specimen capacity and lamp life*

**OPTICAL FILTERS**

*do not require replacement if maintained properly*

**DURABLE CONSTRUCTION**

*uses stainless steel and painted aluminum, for corrosion-free operation*

**100% AIR COOLING**

*for low-cost operation; automatically detects when filters require cleaning*

**LEVELING CASTER WHEELS**

*allow one person to easily move the tester when needed*

**EFFICIENT, FLOOR SPACE SAVING DESIGN**

*allows all repairs/maintenance to be performed from the front and top*

**HUGE SPECIMEN CAPACITY**

*for testing up to 164 specimens at the same time*

**DUAL FULL-COLOR TOUCHSCREEN DISPLAYS**

*and simple user interface programmable in 17 different languages*

**ON-SCREEN VIRTUAL STRIPCHART™**

*displays and records key tester parameters for troubleshooting, analysis, and auditing*

**MULTI-COLOR LED LIGHT**

*conveniently indicates tester status at a glance*

**USB PORT**

*enables easy data transfer, troubleshooting, and free future software updates*

**WATER SPRAY**

*includes both front and back spray standard, to perform major automotive tests, including SAE*

**UNIVERSAL CALIBRATOR SYSTEM**

*allows fast, easy, reliable temperature and irradiance AUTOCAL<sup>®</sup> calibrations*

**CHAMBER AIR TEMPERATURE AND RH CONTROL**

*fully meets nearly all ASTM, ISO, SAE, AATCC, IEC, and GB and Automotive weathering test standards*

**TRI-BAND SOLAR EYE<sup>®</sup> IRRADIANCE SENSOR ARRAY**

*allows for 340 nm, 420 nm, or TUV irradiance control, in a single sensor panel*

**DUAL BP & IBP SENSORS**

*for the ultimate in test standard flexibility, and temperature uniformity performance*

# Xenon Arc Weathering Testing

Xenon arc laboratory weathering tests expose specimens to repetitive cycles of sunlight, heat, and water to simulate the forces of weathering experienced by materials in their service environments. Q-SUN xenon arc weathering testers provide a wide range of conditions to meet the testing needs for materials including plastics, coatings, sealants, textiles, photovoltaics, and more.

## FORCES OF WEATHERING

Sunlight, heat, and water are the primary “Forces of Weathering” simulated in xenon arc laboratory testing. Full-spectrum sunlight is reproduced by xenon arc lamps and modified by optical filters (see pages 8-9). Heat is provided in the form of elevated temperatures and/or temperature cycling to produce thermal shock. Water is delivered in the form of water spray, in addition to controlled relative humidity.



## TEST CYCLE SELECTION

A broad array of international and OEM xenon arc test standards are available, making selection of the “right” standard a challenge. Referring to standards committees in ISO and ASTM can help select the right test designed for your application. Q-SUN Xe-8 xenon test chambers are capable of running a wide variety of test standards, ranging from simple, historic test cycles like ISO 4892-2, to more complicated modern test cycles designed to better simulate real world environments like ASTM D7869. The Q-SUN Xe-8 offers complete flexibility in test selection by featuring dual insulated and uninsulated black panels, as well as 340 nm, 420 nm, and 300-400 nm TUV irradiance control, all standard on the same onboard control sensor array.



### SPECIMEN MOUNTING

Q-SUN Xe-8 specimen holders are reversible for easy operation

## PRACTICAL CONSIDERATIONS FOR XENON ARC TESTING

Xenon arc laboratory testing can generate valuable data about the relative performance of materials and products, when performed correctly. This includes proper water, air, and electrical supply, calibration of onboard sensors, and basic maintenance of lamps and filters.

Rank-ordered data from xenon testing can be a powerful tool for directional decision making, both for quality control and research and development. Correlation between laboratory and actual outdoor results does not adhere to one general acceleration factor, but varies significantly depending on the material, test type, and failure mode. Proper correlation for a given product and degradation type needs to be established by comparison with actual outdoor test data.

## OUTDOOR TESTING FOR BENCHMARK DATA

Degradation of materials depends strongly on the service environment. Tropical environments like Florida are harsh on materials due to their combination of high temperatures, abundant sunshine, and high humidity. Desert environments like Arizona feature even higher temperatures and sunlight levels, but with far less moisture.

Combining outdoor testing in benchmark locations with accelerated lab testing helps build a library of data for comparative analysis and ensures that your products will last in the most demanding service environments. Q-Lab offers both types of benchmark testing.



Florida



Arizona

## Standards

Q-SUN Xe-8 xenon arc testers meet the specifications in nearly all major international, national, and industry test standards, including tests from ASTM, ISO, SAE, AATCC, IEC, and GB. The ability to meet a particular test standard depends on the tester model and configuration. A small subset of important international standards are shown here; refer to Q-Lab’s Standards Search tool for a more comprehensive list.

### GENERAL

- ▶ ASTM G155
- ▶ MIL-STD-810H

### AUTOMOTIVE

- ▶ ASTM D7869
- ▶ ISO 105-B06, -B10
- ▶ JASO M346, M351
- ▶ SAE J2412, J2527

### PAINTS

- ▶ ASTM D6695
- ▶ ISO 16474-2

### TEXTILES

- ▶ AATCC TM 16.3, 169
- ▶ ISO 105-B02, -B04
- ▶ Marks & Spencer C9, C9A

### OTHERS

- ▶ IEC 60068-2-5 (Photovoltaics)
- ▶ ASTM C1442 (Sealants)

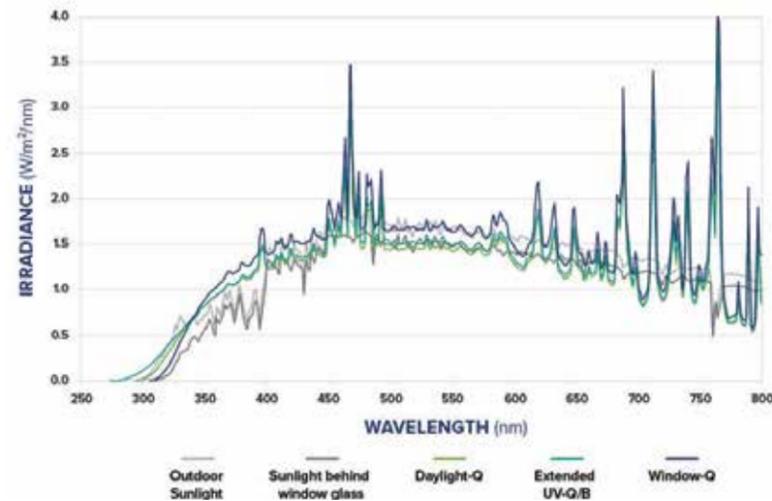
### PLASTICS

- ▶ ASTM D2565
- ▶ ASTM D4459
- ▶ ISO 4892-2

# Sunlight Simulation

Q-SUN Xe-8 xenon arc lamps deliver the most realistic reproduction of full spectrum sunlight, including ultraviolet, visible light, and infrared radiation. For many materials, exposure to the full spectrum is necessary to provide an accurate simulation, especially when testing for color change and lightfastness.

Selection of the right optical filter and light intensity helps to provide the most realistic testing for your application. Precise onboard irradiance sensors and feedback loops ensure consistent conditions throughout your test for the best test repeatability and reproducibility.



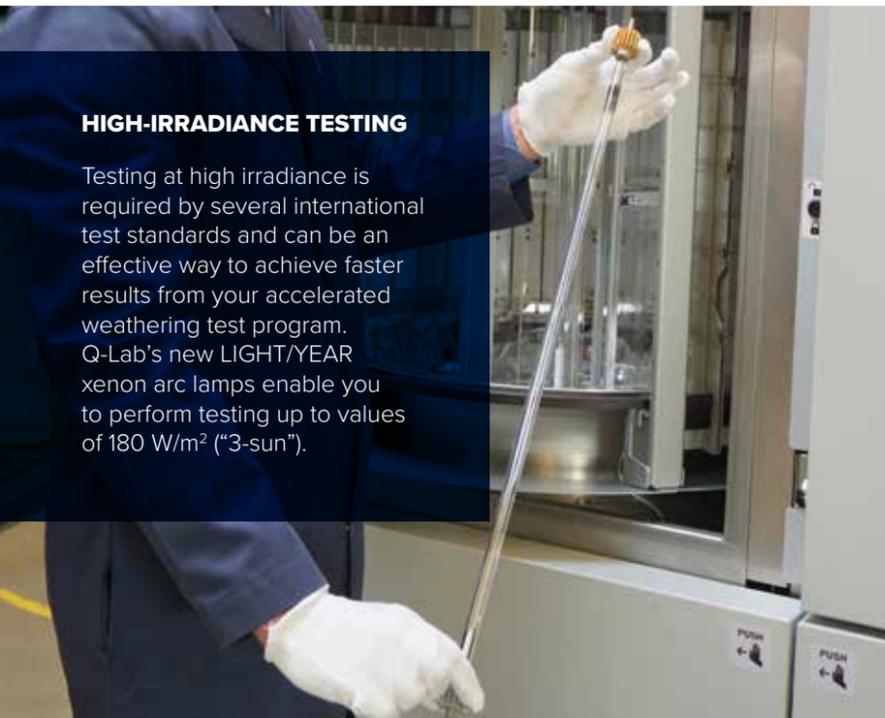
## LIGHT/YEAR XENON ARC LAMP TECHNOLOGY

Q-SUN Xe-8 xenon arc test chambers use four air-cooled xenon arc lamps to significantly reduce operating and maintenance expenses, compared to competing water-cooled test chambers. No expensive deionized cooling water is required. Q-Lab's breakthrough LIGHT/YEAR technology guarantees lamp life for 8,000 hours at normal irradiance and 2,000 hours at high irradiance.

Changing lamps is quick and easy and does not interfere with the specimen exposure. Simply remove some specimens for access, open the lantern latch to access the lamp, and lift the lamp out of the tester.

### HIGH-IRRADIANCE TESTING

Testing at high irradiance is required by several international test standards and can be an effective way to achieve faster results from your accelerated weathering test program. Q-Lab's new LIGHT/YEAR xenon arc lamps enable you to perform testing up to values of 180 W/m<sup>2</sup> ("3-sun").



## LONG-LIFE OPTICAL FILTERS

Xenon light must be properly filtered to achieve the appropriate spectrum for each particular application. Differences in spectra can affect both the speed and the type of degradation. Three categories of optical filters are available to simulate a variety of service environments. The application or test method dictates which filters should be used.

Q-SUN optical filters are exceptionally durable and maintain the required spectrum indefinitely under normal use, unlike in competitive water-cooled machines. The Q-SUN Xe-8 tester's optical lanterns consist of an inner quartz cylinder and 12 outer filters, arranged in a two-tier hexagon.

### Daylight Filters

Daylight filters are used to simulate direct sunlight. They provide the best correlation to natural outdoor exposures for most applications. Materials that are typically used outdoors like roofing or exterior coatings should be tested using Daylight filters. Three different types of Daylight filters are available for Q-SUN Xe-8 xenon test chambers. Daylight-Q and Daylight-F filters meet the requirements of Type I Daylight filters as defined in ASTM and ISO standards. Daylight-B/B filters are classified as Type II Daylight filters.

### Window Glass Filters

Window glass filters produce spectra equivalent to sunlight coming through window glass. This can also simulate other indoor lighting found in a typical commercial or office environment. Window glass filters are used for indoor materials such as printing materials or textiles. Four different Window Glass filters are available: Window-Q, Window-B/SL, Window SF-5, and Window-IR.

### Extended UV Filters

Extended UV filters transmit excess UV, below the normal cut-on of natural sunlight. They are used to produce faster or more severe test results. Extended UV filters are specified in some automotive test methods and are sometimes used for aerospace applications. There are two available Q-SUN Xe-8 filters of this type: Extended UV-Q/B and Extended UV-Quartz.

## SOLAR EYE IRRADIANCE CONTROL

All Q-SUN xenon test chambers are equipped with SOLAR EYE irradiance control, a patented, precision light control system. The SOLAR EYE system allows the user to choose the desired level of irradiance. It automatically monitors and maintains the programmed light intensity. Irradiance is monitored and controlled at 340 nm, 420 nm, or TUV (Total UV, 300-400 nm), which are all included standard on every Q-SUN Xe-8 tester.



# Environmental Simulation

## MOISTURE

Moisture in the form of water spray, condensation, and humidity is critical for testing many materials. All Q-SUN Xe-8 testers feature standard front and back water spray and control of relative humidity.

### WATER SPRAY

The damaging effects of outdoor moisture attack are simulated by direct, pure water spray. The spray can be programmed to operate during light or dark periods and can be useful for creating thermal shock and/or mechanical erosion.

### RELATIVE HUMIDITY

Q-SUN Xe-8 testers come standard with relative humidity control. Humidity can affect degradation when a material becomes physically stressed while attempting to maintain moisture equilibrium with its surroundings. Relative humidity also influences the rate at which a specimen dries. Controlled humidity is required in a number of widely-used test methods.



#### SPRAY VERSATILITY

Water spray simulates the effects of outdoor moisture. Q-SUN Xe-8 testers are equipped with both front and back spray to meet test requirements.

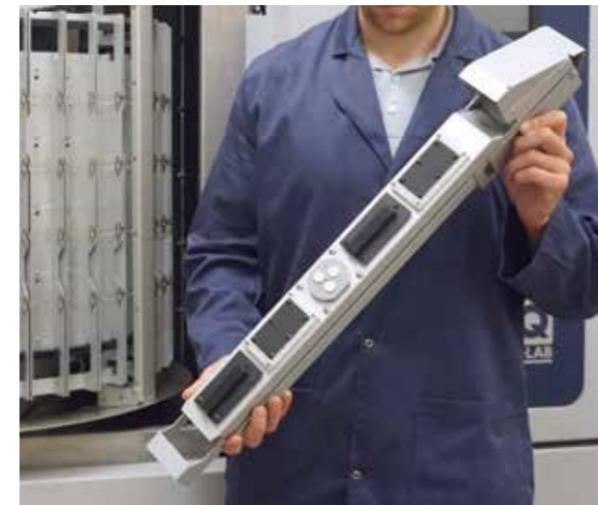
## TEMPERATURE

Control of temperature is critically important because it significantly influences the rate of degradation. Specimen exposure temperature is precisely controlled in all Q-SUN Xe-8 xenon arc chambers using black panel and chamber air temperature sensors.

### BLACK PANEL

A black panel thermometer is used to control temperature in the Q-SUN test chamber. Due to its black coating that absorbs all wavelengths uniformly, it provides an estimate of the maximum temperature of specimens in the chamber. Black panel temperatures can be controlled at any point between 25 °C and 105 °C (77 °F to 221 °F) depending upon the irradiance level, lamp age, ambient room temperature, black panel sensor, and specific tester model.

Dual insulated or uninsulated sensors (black standard and black panel) are standard on the Q-SUN Xe-8. The sensor array includes upper and lower BP and IBP, to ensure optimal temperature control and uniformity.



### CHAMBER AIR TEMPERATURE

Chamber air temperature (CAT) can also be controlled simultaneously with black panel to give the ultimate control of specimen temperature. The low-cost, disposable sensor assembly also monitors and controls relative humidity, and is recommended to be replaced annually.



#### HEAT EFFECTS

Materials exposed to sunlight can experience very high temperatures in service.

# Operation

Q-SUN xenon test chambers are extremely simple to operate. Specimen mounting and evaluations are simplified with specially-designed specimen holders. Programming is intuitive. All models are completely automated and can operate continuously, 24 hours per day, 7 days per week.

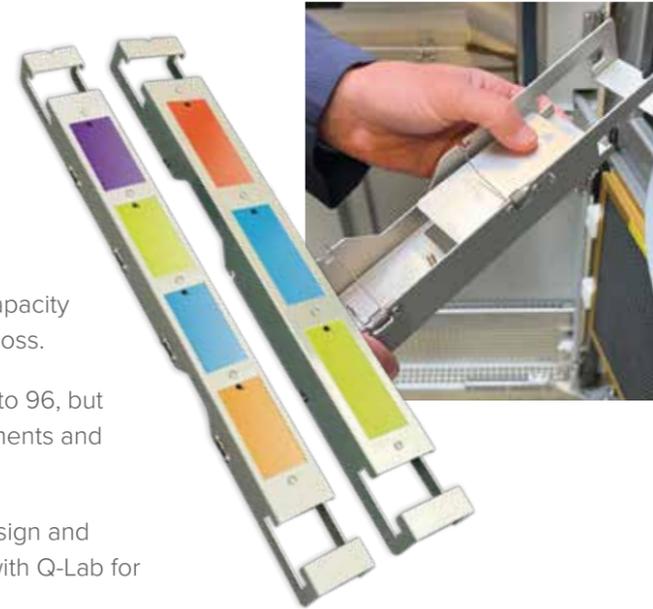
## SPECIMEN MOUNTING

Holders are available in a number of sizes to accommodate traditional flat specimens, like painted Q-PANEL standard substrates and plaques. Specimen holders are fully reversible, to make specimen repositioning easier.

Q-SUN Xe-8 specimen holders come in two standard sizes. The 51 × 102 mm (2 × 4") holder size offers the greatest specimen capacity (164), with enough size to record typical evaluations like color and gloss.

The 67 × 145 mm (2.6 × 5.7") holders reduce the specimen capacity to 96, but accommodate wider panels that are used in competitive test instruments and favored by many xenon arc test users.

For specimens that cannot fit in the standard holders, Q-Lab can design and build custom specimen holders for nearly any application. Consult with Q-Lab for recommendations on custom holder designs.



## DUAL TOUCHSCREEN DISPLAYS

Designed to be both functional and easy to use, the Q-SUN 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). Users can program and store up to 10 tests in memory, which has a battery back-up feature.



# Maintenance and Repair

## MAINTENANCE

All Q-SUN Xe-8 maintenance operations are designed to be performed easily by the user, using simple tools. Typical maintenance includes replacing lamps, calibrating onboard sensors, and washing inexpensive air filters.

The Q-SUN Xe-8 main 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.

## ACCESSIBILITY AND LAB SPACE

Q-SUN Xe-8 xenon arc testers are designed for simplicity - all maintenance and routine repair can be performed from the front or top of the tester.

The clever design of the Q-SUN Xe-8 minimizes the amount of floor space required for installation and use. Only minimal spacing is required on the left and right sides.



# Calibration

## IRRADIANCE

The Q-SUN Xe-8 tester's on-board SOLAR EYE irradiance sensor needs to be calibrated periodically by the user to assure accurate and consistent results. With the patented AUTOCAL system, calibration is simple using the Universal Calibrator system's UC80 calibration radiometer, and takes only a few minutes. UC80 devices are equipped with 340, 420, and TUV sensors to calibrate the corresponding onboard sensors of the Q-SUN Xe-8 testers.

Calibration of the UC80 radiometer itself needs to be performed annually. Simply send the UC80 calibration sensor to Q-Lab for an inexpensive recalibration.

Our global calibration labs are accredited by A2LA for ISO 17025. Additionally, our field calibrations are 17025-accredited.



## TEMPERATURE & RELATIVE HUMIDITY

All Q-SUN Xe-8 black panel temperature sensors need to be calibrated periodically by the user for optimal performance. Calibrating the black panel temperature sensor is simple using a the Universal Calibrator system's UC80 calibrated temperature sensor. UC80 thermometers come with both black panel and insulated black panel sensors.

The onboard chamber air temperature and relative humidity sensor is inexpensive and requires replacement once per year.



# Summary

● Standard ○ Optional

Feature	Xe-8
Chamber Type	Rotating Rack
Specimen Capacity (41 holders × 4 specimens per holder) @ 51 × 102 mm	164
Specimen Capacity (32 holders × 3 specimens per holder) @ 67 × 145 mm	96
Specimen Orientation (measured from horizontal)	90°
Full Spectrum, Ozone-Free LIGHT/YEAR Xenon Arc Lamps (4200 W/each) for replacement ~once/year	●
Long-Life Optical Filters that don't require replacement (with proper maintenance)	●
SOLAR EYE Irradiance Control with integrated 340 nm, 420 nm, and TUV onboard sensors	●
Dual Uninsulated and Insulated Black Panels for precise control of temperature uniformity	●
Meets almost all common industry Weathering Standards including ISO, ASTM, SAE, GB, and more	●
Chamber Air Temperature control	●
Relative Humidity control	●
Programmable Front Water Spray	●
Programmable Back Water Spray to meet some automotive standards	●
AUTOCAL UC80 Ride-Around Universal Calibrator System	●
Dual, full-color touchscreens and Gen 4 main controller	●
USB port for free software updates and tester data export	●
Selection of 17 operating languages	●
Fully Repairable from the front and top (side access not required) to minimize floor space	●
On-screen VIRTUAL STRIPCHART data logging software	●
High-irradiance testing up to 180 W/m <sup>2</sup> ("3-Sun") with reduced specimen capacity and lamp life	○
Type I and II Daylight, Window, and Extended UV Optical Filters	○
Water Purity Monitor to verify quality of water supply	○
Custom specimen holders	○



## OUR GLOBAL NETWORK

We are committed to provide world-class technical, sales, and repair support in over 80 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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