SPECIFICATION BULLETIN LX-5046

# Q-SUN Xenon Test Chambers

## Overview

Q-SUN® xenon arc chambers reproduce the damage caused by full-spectrum sunlight and rain. In a few days or weeks, Q-SUN testers can reproduce the damage that occurs over months or years outdoors.

## Features

Q-SUN xenon arc chambers are available in four different models. The tabletop Xe-1, and full-sized Xe-2 and Xe-3 are covered in this document. The large capacity rotating rack Q-SUN Xe-8 is covered in the *Q-SUN Xe-8 Specifications*. Each tester is 100% air-cooled, for extreme reliability and simple, low-cost maintenance. All testers have standard datalogging via ethernet, a variety of standard specimen holders, and a remarkably simple dual touchscreen user interface available in 17 languages.

| | Xe-1 | Xe-2 | Xe-3 |
|---|---|---|---|
| **Chamber Type** | Flat Array | Rotating Rack | Flat Array |
| **Specimen Capacity** | 17 | 31 | 55 |
| **Specimen Orientation (measured from horizontal)** | 10° | 90° | 10° |
| **Full Spectrum, Ozone-Free Xenon Arc Lamps - 1800 W** | 1 | 1 | 3 |
| **SOLAR EYE® Irradiance Control (340 nm, 420 nm or TUV)** | ● | ● | ● |
| **Relative Humidity Control** | — | ● | ● |
| **Water Spray** | ◑ | ◑ | ◑ |
| **Heated Water Immersion** | ◑ | — | — |

● Standard ◑ Optional — Not Available

## Optical Filters and Radiometers

Q-SUN optical filters are very durable and all filters maintain the required spectrum indefinitely, lasting for years under normal use with proper maintenance (except Window-IR). The application or test standard dictates which filter to use. Xe-1 and Xe-3 filters are flat, while the Xe-2 filter lantern consists of an outer borosilicate or quartz cylinder and 14 inner filters.

| | Xe-1 & Xe-3 Irradiance Values Typical (& Maximum)[1] | | | Xe-2 Irradiance Values Typical (& Maximum)[1] | | |
|---|---|---|---|---|---|---|
| | W/m²/nm @340 nm | W/m²/nm @420 nm | W/m² @TUV (300-400 nm) | W/m²/nm @340 nm | W/m²/nm @420 nm | W/m² @TUV (300-400 nm) |
| **Daylight-F[3]** | 0.80 (1.30) | 1.50 (2.40) | 75 (125) | 0.80 (0.95) | 1.50 (1.70) | 75 (85) |
| **Daylight Q[3]** | 0.68 (1.10) | | | 0.68 (0.80) | | |
| **Extended UV (-Q/B,-Quartz[4])** | | | | | | |
| **Daylight-B/B[3]** | | | | 0.51 (0.61)[2] | | 55 (65) |
| **Window (-Q, -B/SL)** | 0.55 (0.85) | | 70 (108) | 0.55 (0.65) | | 70 (80) |
| **Window (-SF5, -IR, -B04[5])** | - | | 42 (68) | - | | 42 (62) |

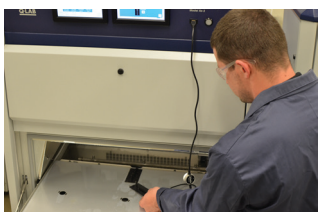
1) For important warranty information, visit Q-Lab.com/Warranty. Warrantied values are dependent on irradiance, lamp type, and tester model:
   - Minimum irradiance is 0.25 @340 nm, 0.45 @420 nm, and 20 @TUV for all lamp types and tester models.
   - Typical irradiance (and all lower values down to Minimum) is warrantied for 3000 hours when using X-1800+ or X-1850+ "plus" lamps in "E" and "X" models, and 1500 hours when using X-1800 or X-1850 lamps or in non-"E" or non-"X" models.
   - Maximum irradiance (and all lower values above Typical) is warrantied for 1000 hours, only when using X-1800+ or X-1850+ "plus" lamps in "E" and "X" models.
2) An "Intermediate" irradiance of 0.55 W/m²/nm for Daylight-B/B filters is additionally warrantied for 2000 hours, only when using X-1850+ lamps in Xe-2 "E" models.
3) Daylight-F and Daylight-Q filters meet the requirements of Type I Daylight filters defined in ISO 4892-2 and ASTM G155. Daylight-B/B filters meet the requirements of Type II Daylight filters.
4) Extended UV-Quartz filters are available for Xe-1 and Xe-3 testers only.
5) Window-B04 lantern is available for Xe-2 testers only.

## Calibration, Temperature and Humidity Control

Q-SUN Xe-2 and Xe-3 testers simultaneously control chamber air temperature (CAT) and black panel (uninsulated/BP) or black standard (insulated/IBP/BST) temperature; the Xe-1 controls either, but not both. A disposable electronic relative humidity and CAT sensor provides precise control of relative humidity of the Xe-2 and Xe-3 and should be replaced annually. All Q-SUN testers can be calibrated quickly and easily using Q-Lab's Universal Calibrator system, featuring the patented AUTOCAL® system.

| | Xe-1 | Xe-2 | Xe-3 |
|---|---|---|---|
| **AUTOCAL UC20 Irradiance Control** | ● | ● | ● |
| **UC202 Black Panel Thermometer** | ● | ● | ● |
| **Chamber Air Temp (CAT) Sensor** | ◑ | ● | ● |
| **Relative Humidity (RH) Sensor** | — | ● | ● |

● Standard ◑ Optional — Not Available



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## Operating Specifications

| Models | Xe-1 | | | | | | Xe-2 | | Xe-3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Configurations**[1] | Xe-1-BE<br>Xe-1-SE | | Xe-1-BCE<br>Xe-1-SCE | | Xe-1-WE | | Xe-2-HE<br>Xe-2-HSE<br>Xe-2-HBSE | | Xe-3-HX<br>Xe-3-HSX | Xe-3-HDSX[2]<br>Xe-3-HBSX | Xe-3-HCE<br>Xe-3-HSCE | |
| **Black Panel Temp**[3] **(°C)** | **BP** | **IBP** | **BP** | **IBP** | **BP** | **IBP** | **BP** | **IBP** | **BP** | **IBP** | **BP** | **IBP** |
| Light | 45-90 | 50-100 | 25-90 | 25-100 | 45-90 | 50-100 | 50-100 | 55-105 | 45-110 | 50-120 | 35-110 | 36-120 |
| Light w/IR Filter | 40-70 | 45-80 | 20-70 | 20-80 | 40-70 | 45-80 | 35-85 | 40-90 | 40-90 | 45-100 | 30-90 | 31-100 |
| Dark | 25-50 | 25-50 | 10-50 | 10-50 | 25-50 | 25-50 | 25-45 | 25-45 | 25-50 | 25-50 | 15-50 | 15-50 |
| Light+Immersion | — | — | — | — | 35-55 | 35-55 | — | — | — | — | — | — |
| Dark+Immersion | — | — | — | — | 30-50 | 30-50 | — | — | — | — | — | — |
| **Chamber Air Temp**[3, 4] **(°C)** | **CAT** | | **CAT** | | **CAT** | | **CAT** | | **CAT** | | **CAT** | |
| Light (any filter) | 35-55 | | 15-55 | | — | | 35-65 | | 35-65 | | 25-65 | |
| Dark | 30-45 | | 10-40 | | — | | 25-45 | | 25-50 | | 15-50 | |
| **Relative Humidity**[3] | N/A | | | | | | 20-95% | | 20-95% | | | |
| **Specimen Area** | 25 × 46 cm (d × w)<br>(9.9 × 18.0 in) | | | | 22 × 42 cm (d × w)<br>(8.8 × 16.5 in) | | 30 × 25 cm (h × dia)<br>(11.9 × 9.8 in) | | 45 × 72 cm (d × w)<br>(17.8 × 28.3 in) | | | |
| **Specimen Capacity**[5] **(qty @ size)** | 17 @ 51 × 102 mm<br>(2 × 4 in) | | | | 15 @ 51 × 102<br>mm (2 × 4 in) | | 31 @ 45 × 132 mm<br>(1.8 × 5.2 in) | | 55 @ 51 × 102 mm<br>(2 × 4 in) | | | |
| **Max Specimen Weight (distributed evenly)** | 14 kg (30 lbs) | | | | | | 4.5 kg (10 lbs) | | 23 kg (50 lbs)[6] | | | |
| **Inlet Water Pressure and Purity**[7] | All non-"S", non-"W" models[1]: 0.7-6.2 bar (10-90 psi); > 200 kΩ·cm; < 5 µS/cm; < 2.5 ppm TDS<br>All "S" or "W" models: 2.1-6.2 bar (30-90 psi); > 5 MΩ·cm; < 0.2 µS /cm; < 0.1 ppm TDS; < 0.1 ppm colloidal silica | | | | | | | | | | | |
| **Water Consumed with Spray On**[8] | 0.12 L/min | | | | ~ 0.0 L/min | | 0.5 L/min (front)<br>1.0 L/min (front & back) | | 0.16 L/min (front)<br>0.4 L/min (front & back) | | | |
| **Water Consumed with Humidifier On**[8] | — | | | | | | 8 L/day | | 90 L/day | | 44 L/day | |
| **External Dimensions (w × h × d)** | 78 × 52 × 65 cm<br>(31 × 21 × 26 in) | | 78 × 138 × 79 cm<br>(31 × 55 × 31 in)<br>*Xe-1 & Chiller* | | 99 × 72 × 65 cm<br>(39 × 28 × 26 in) | | 91 × 166 × 69 cm<br>(36 × 66 × 27 in) | | 91 × 178 × 97 cm<br>(36 × 70 × 38 in)[9] | | 91 × 178 × 99 cm<br>(36 × 70 × 39 in)[9] | |
| **Weight**[10] | 50 kg<br>(110 lbs) | | 124 kg<br>(272 lbs) | | 88 kg<br>(195 lbs) | | 172 kg<br>(379 lbs) | | 190-233 kg<br>(420-512 lbs) | | 190-233 kg<br>(420-512 lbs) | |
| **Electrical**[11] **Requirements** 208 V (230 V) | 1-Φ @ 12 A (11 A) | | 1-Φ @ 19 A (16 A) | | 1-Φ @ 13 A (12 A) | | 1-Φ @ 24 A (23 A) | | 3-Φ @ 39 A (39 A) | | 3-Φ @ 44 A (44 A) | |
| **Electrical**[11] **Requirements** 400 V | — | | | | | | — | | 3-Φ @ 26 A | | | |
| **Compressed Air**[12] | — | | | | | | — | | 1.2 L/s (2.5 cfm)<br>70-115 psi (4.8-7.9 bar) | | — | |
| **Lab Recommendations**[13] | | | | | | | | | | | | |
| Temperature (°C) | 23 ± 5 °C | | | | | | | | | | | |
| Relative Humidity (%) | 50 ± 25% | | | | | | | | | | | |

**Notes:**

1) Nomenclature designations: basic (B), spray (S), humidity (H), dual spray (DS), chiller (C), back spray (BS), water immersion (W).
Model (E) Q-SUN testers feature dual touchscreen displays and enhanced irradiance/lamp efficiency. Model (X) Q-SUN Xe-3 testers include the same features as Model (E) plus improved chamber temperature uniformity and an expanded range of achievable temperature and humidity conditions.
2) Model Xe-3-HDSX has a separate water reservoir that requires additional floor space (not shown in picture).
3) Achievable test conditions, including maximum and minimum setpoints and transitions between steps, are influenced by laboratory ambient conditions and interdependencies between test parameters.
4) CAT control is optional on Xe-1-BE and S models; BP/CAT can only be controlled simultaneously on Xe-2 and Xe-3 models.
5) The Xe-1 and Xe-3 specimen capacity shown is without specimen holders. Xe-2 specimen capacity is shown with specimen holders. Add one additional specimen to Xe-1 specimen capacity if CAT is used in place of BP/IBP.
6) Maximum specimen weight listed is for when the specimen tray is used. If the specimen tray is removed from the Xe-3, the chamber floor can hold evenly distributed specimens with a weight of 90 kg (200 lbs) max.
7) Maintain pH 6-8. For best performance, use a reverse osmosis/deionization (RO/DI) system for all S models.
8) Spray consumption applies to all S models; humidifier consumption applies to all H models. Water consumption values are greatly dependent upon test and lab conditions, and software settings. Values shown are typical for many common standards.
9) Rear Xe-3 components are easily removed to reduce the depth to 88 cm (34.5 in) to fit through small doors.
Xe-3 chiller is separate from tester and measures 78 × 94 × 94 cm (31 × 37 × 37 in).
10) Actual shipping weights will be higher, depending upon model and whether the shipment is domestic, ocean or air.
Xe-3 chiller is separate from tester and weighs 85 kg (186 lbs).
11) Voltages shown are ± 10% and 50/60 Hz.
12) Recommended incoming compressed air quality is General Manufacturing (3-4-2) as per ISO 8573-1.
13) Operating outside these conditions can result in temperature, humidity, or other faults. Never operate in laboratory ambient conditions >36 °C or >80% RH.

## Warranty

For important warranty information, visit Q-Lab.com/Warranty.

**For sales, technical, or repair support, please visit:**

## Q-Lab.com/support

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