



This letter confirms that Q-SUN xenon arc testers meet the test requirements established in the COLIPA (European Cosmetic Toiletry and Perfumery Association) guideline, “*In Vitro Method for the Determination of UVA Protection Factor and ‘Critical Wavelength’ Values of Sunscreen Products*” (Edition 2011). Q-SUN xenon arc testers also meet the requirements of a related international standard, ISO 24443, “*Determination of sunscreen UVA photoprotection in vitro.*” Although they are very similar, the two documents have slightly different requirements and will be described separately below.

COLIPA standard

The requirement for an exposure light source is given in the document as follows:

The lamp that is used as the source in the measurement of transmittance must emit a continuous spectrum of radiation with no peaks over the measurement range of 290-400nm, and its irradiance should be sufficiently low so that photostability of the product is not unduly challenged (e.g., a xenon flash lamp is a convenient solution).

The xenon arc lamps used in Q-SUN accelerated weathering testers meet this standard. Indeed, xenon lamps are specifically noted in the text.

Two requirements are given for “Light Source specifications” in the document:

- Total UV irradiance (290 to 400 nm): **50 – 140 W/m²**
- Irradiance ratio of UVA (320 to 400 nm) to UVB (290 to 320 nm): **8 - 22**

A Q-SUN xenon arc chamber with Daylight-B/B filters can deliver between 20 – 75 W/m² of TUV irradiance, with a UVA/UVB ratio of approximately 14. Therefore these spectral conditions are met.

A temperature requirement is also provided:

The device should be able to maintain samples below 40°C (preferably by using cooling trays and / or air-conditioning devices).

These low specimen temperatures can be achieved in Q-SUN accelerated weathering testers by use of an external chiller. This accessory is included as part of Q-SUN models Xe-1-BC, Xe-1-SC, Xe-3-HC, and Xe-3-HSC. Q-Lab recommends performing this test at low irradiance to reduce specimen temperatures.

The COLIPA guideline does reference a specific testing apparatus, but the language is clearly non-mandatory (emphasis Q-Lab’s):

An example of an appropriate UV source is the long-arc xenon Atlas Suntest™ insoleator, type CPS, CPS+or XLS/XLS+.

This non-mandatory inclusion of the Atlas apparatus is reinforced later with this comment:

If a Suntest TM is used as an appropriate UV source...

This COLIPA guideline is therefore a performance-based standard that can be met by Q-SUN xenon arc testers.

ISO 24443

This international test standard includes the same language as COLIPA with respect to use of a xenon arc light source. The actual spectral requirements for that source reference COLIPA but are slightly different:

The spectral irradiance at the exposure plane of the UV exposure source that is used for irradiation (to take into account any photoinstability) shall be as similar as possible to the irradiance at ground level under a standard zenith sun as defined by COLIPA or in DIN 67501. The UV irradiance shall be within the following acceptance limits (measured at sample distance).

- **Total UV irradiance (290 nm to 400 nm):** 40 W/m² to 200 W/m²
- **Irradiance ratio of UVA to UVB:** 8:22

The TUV irradiance specification is higher than in COLIPA guidelines but well within the Q-SUN tester's capability, as described previously.

ISO 24443 includes a lower temperature requirement than does COLIPA:

The UV exposure source device should have the ability to maintain samples within the range of 25 °C to 35 °C. It is important that the temperature of the sample itself be measured and not just the surrounding air temperature. To maintain samples at a temperature less than or equal to 35 °C, a filter system that particularly reduces IR radiation should be used to achieve the specified temperature range. Cooling trays for the sample plates or ventilators should be used to maintain a temperature below 35 °C and warming devices to maintain samples at or above 25 °C.

These specimen temperatures can also be achieved using Q-SUN models equipped with a chiller (Xe-1-BC, Xe-1-SC, Xe-3-HC, and Xe-3-HSC). Q-Lab recommends performing the test at the minimum allowable irradiance (40 W/m²) to maintain the required low specimen temperatures.

Summary

The test apparatus requirements for both COLIPA guidelines and the ISO 24443 standard are met by Q-SUN xenon arc testers equipped with a chiller. The two related documents have slightly different temperature and irradiance requirements, both within the performance capabilities of Q-SUN xenon arc testers.

Please contact Q-Lab with any questions about this document.

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