



# A Choice of Lamps for the QUV Accelerated Weathering Tester

Your exposure application determines which type of UV lamps should be used. The QUV accelerated weathering tester's lamps typically emit mainly ultraviolet (UV) light rather than visible or infrared (IR) light. All lamps 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. Several different categories of fluorescent UV lamps are available, as described below.

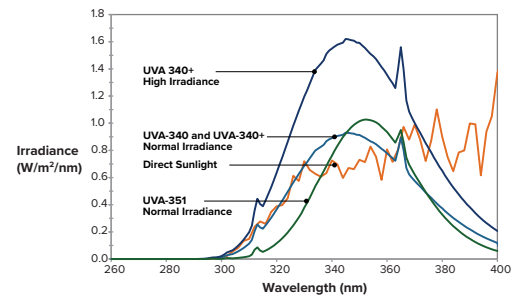
## UVA Lamps

UVA lamps are especially useful for comparing different types of polymers. Because UVA lamps do not have any UV output below the normal solar cut-on of 295 nm, they usually provide better correlation with actual outdoor weathering.

**UVA-340 and UVA-340+:** These lamps provide the best possible simulation of sunlight in the critical short wavelength region from 365 nm down to the solar cutoff of 295 nm. Peak emission is at 340 nm. UVA-340 lamps are especially useful for comparison tests of different formulations. The UVA-340+ lamps provide the same spectrum, but can be used for testing at higher output levels.

**UVA-351:** These lamps simulate the UV portion of sunlight filtered through window glass. They are most useful for interior applications, testing of some inks, and for polymer damage that can occur in an environment near a window.

UVA Lamps vs. Sunlight



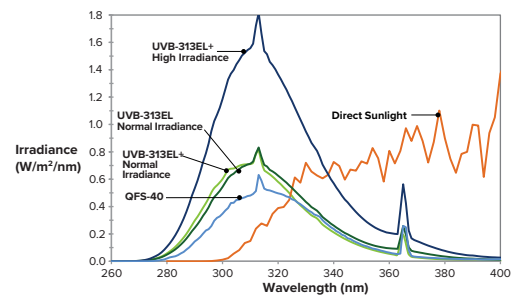
## UVB Lamps

Fluorescent UVB lamps are widely used in QC and R&D for fast, cost-effective results. UVB lamps extend below the shortest wavelengths of UV found on earth's surface, below the solar cutoff of 295 nm. While this can speed up testing, it can also lead to anomalous results.

**UVB-313EL and UVB-313EL+:** These lamps give fast results and are particularly useful for QC and R&D applications, and for durable materials. UVB-313EL+ offer higher maximum output with a similar spectrum to the UVB-313EL lamps.

**QFS-40:** Also known as FS-40 or F40 UVB, this is the original QUV tester lamp. Although they are still specified in some automotive test methods, QFS-40 lamps have mostly been replaced by UVB-313 lamps, and should only be used in QUV/basic testers.

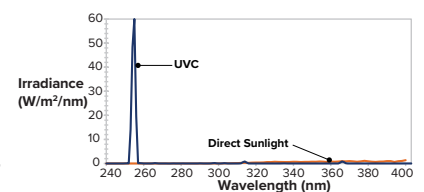
UVB Lamps vs. Sunlight



## UVC Lamps

**UVC-254:** UVC lamps deliver high-intensity shortwave UV light at 254 nm. This represents the most common UVC emission used for use for disinfecting 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.

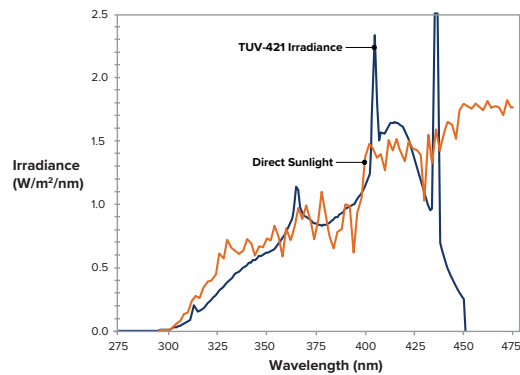
UVC Lamps vs. Sunlight



## TUV-421 Lamps

**TUV-421:** TUV-421 lamps provide the same excellent match to shortwave UV light as UVA-340 lamps, but also deliver long-wavelength UV and short-wavelength visible light. This extended spectrum may reproduce color change effects in materials susceptible to these wavelengths and provide a more complete test. The spectrum from TUV-421 lamps meets the "Type I Daylight" classification for xenon arc lamps with optical filters given in ASTM G155 and ISO 4892-2.

### TUV-421 Lamps vs. Sunlight



## General Lamp Recommendations

<b>UVA-340 UVA-340+</b>	Especially useful for comparison tests of different formulations. Recommended for correlation with outdoor results for most plastics, textiles, coatings, pigments, and UV stabilizers.
<b>UVA-351</b>	Most useful for UV "sunlight through glass" simulations. Recommended for some automotive interiors, textiles, and inks.
<b>UVB-313EL UVB-313EL+</b>	Best for quality control applications. Recommended for durable materials such as roofing and exterior coatings.
<b>QFS-40 (F40 UVB)</b>	Automotive exterior coatings specifications. Not required if using SOLAR EYE irradiance controller.
<b>UVC-254</b>	Best for testing materials exposed to UVC light as part of germicidal disinfection processes.
<b>TUV-421</b>	Excellent for evaluating color fade of colorants like dyes and pigments that are susceptible to longer-wavelength light.

### 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.

## SOLAR EYE Irradiance Control

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

SOLAR EYE irradiance control allows you to operate the QUV tester at various intensity levels for different applications and still maintain realistic test conditions. Typical irradiance levels give good acceleration while maintaining good correlation; higher irradiance values may offer further acceleration.

**Other Manufacturers.** UV lamps may be available from other manufacturers. These are often intended to be copies of Q-Lab's fluorescent lamps. Although the names may be the same (e.g., UVB-313 or UVA-340), other manufacturers' 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-Lab lamps in your QUV weathering tester.



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