

QUV Operator Training

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Q-Lab Corporation

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Q-Lab's Live Tester Training Series

Today is the first of a three-part webinar series on basic operation of our weathering and corrosion testers featuring live hands-on video content.

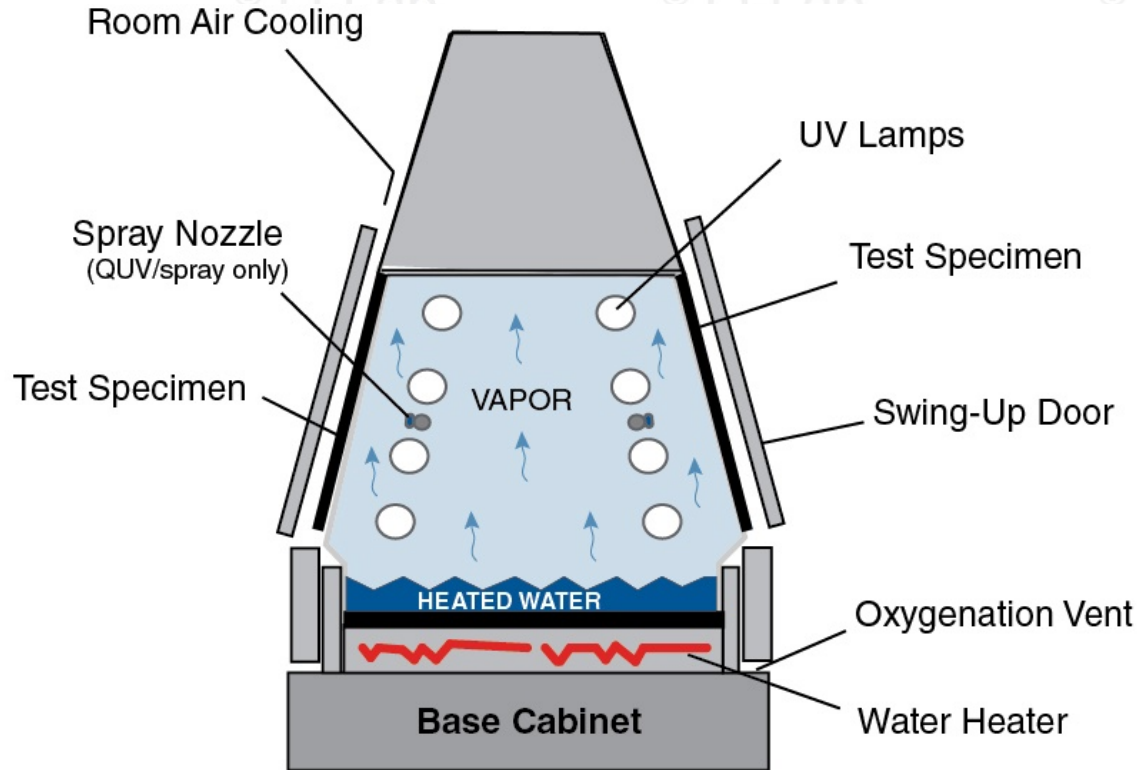
All upcoming and archived webinars can be accessed at:

q-lab.com/webinars

Date	Topic
06 July	QUV
20 July	Q-SUN
27 July	Q-FOG

QUV Principles of Operation

QUV Overview



UV Light System 光照系统

- QUV/basic
 - No control of irradiance
无辐照度控制
 - 4 separate ballasts
4组独立整流器
- QUV/se, QUV/spray, QUV/cw, QUV/uvc
 - Solar Eye Irradiance Control maintains the same irradiance at all times
SE太阳眼辐照控制系统实时控制辐照度水平
 - Single ballast controls 4 banks of lamps
一个整流器控制4组灯管

QUV/basic UV Light System

- 4 Pairs of lamps

4组灯管

- 4 ballasts

4个整流器

- Lamps are on or off

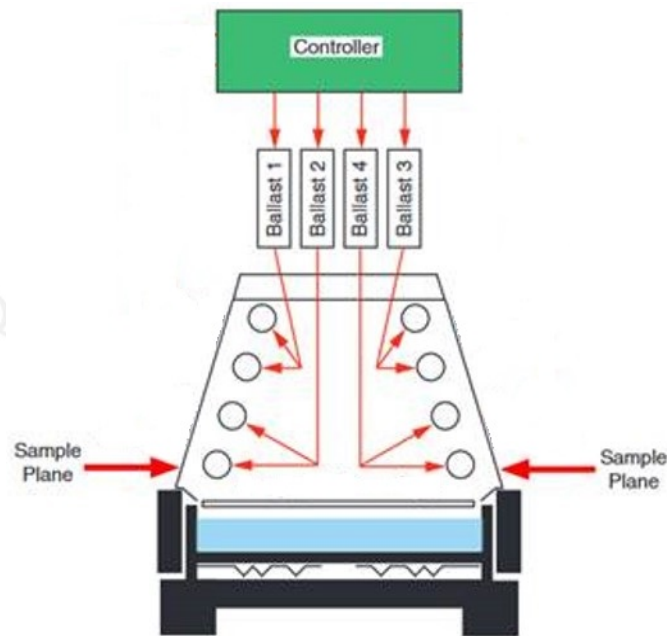
灯管开或暗

- Fixed amount of power

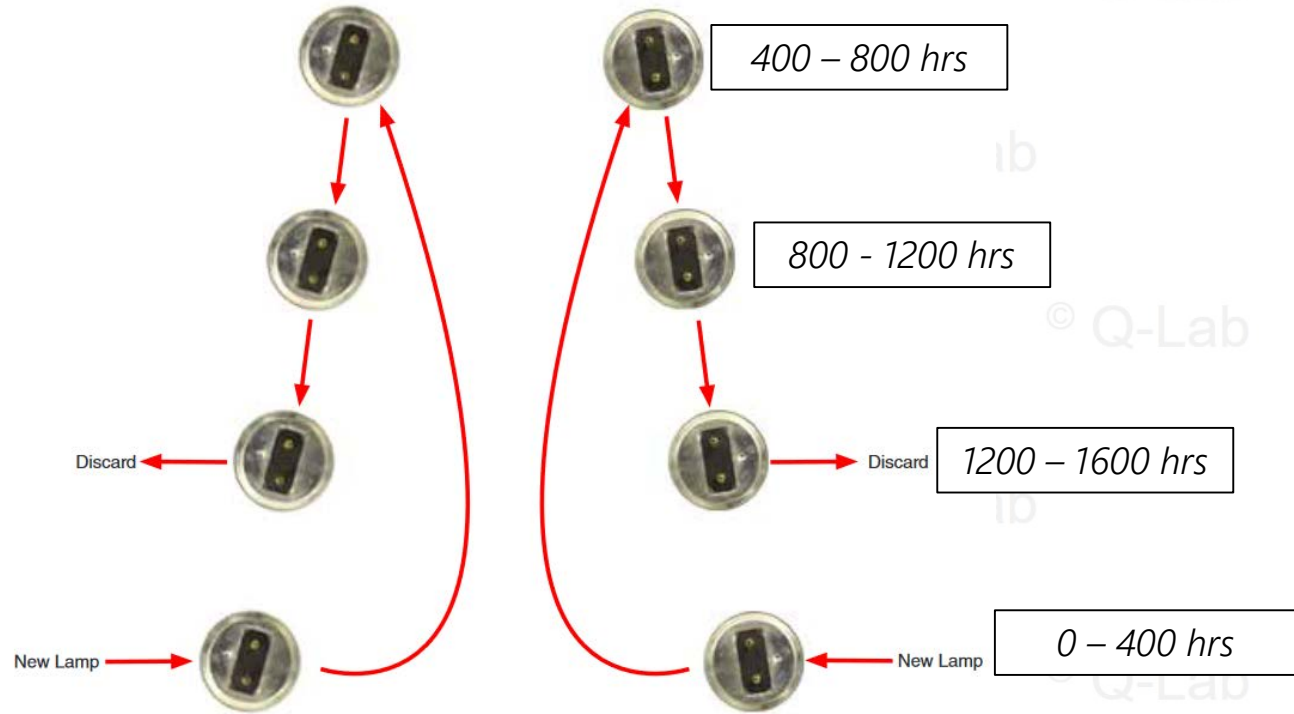
固定的功率

- As lamps age, UV output decreases

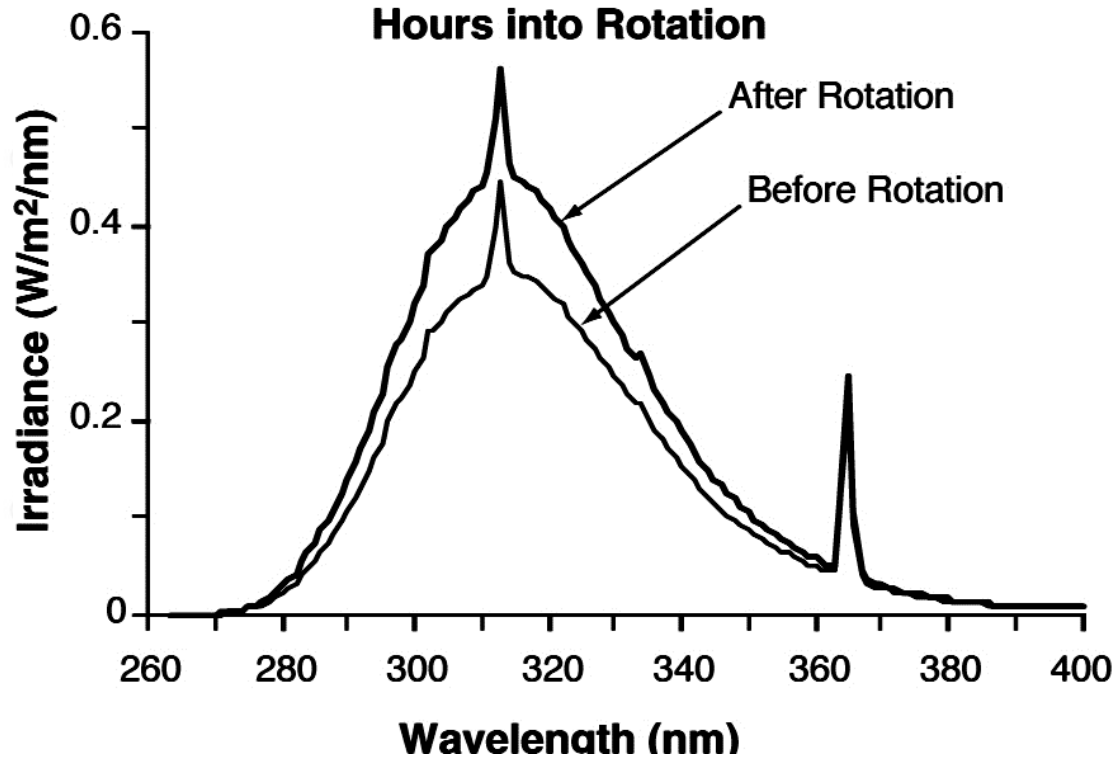
灯管老化紫外辐射下降



QUV/basic Lamp Rotation Sequence



QUV/basic UV Lamp Aging



QUV/basic Limitations

- Lamp-to-lamp and lot-to-lot variability

灯管批次差异

- Inconsistent lamp maintenance

不一致的灯管维护

- Variability in ballast cooling blower and ballast

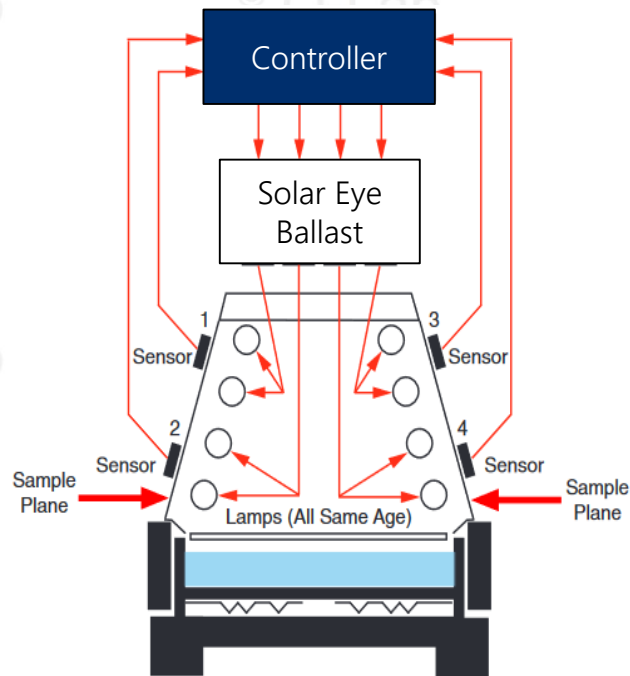
不同整流器及其散热风机

- Higher consumable cost due to frequent replacement of lamps

- 频繁的换灯管导致耗材费用上升

Solar Eye Irradiance Control

- One specialized ballast powers four channels of eight total lamps
整流器点亮4组灯管（8支灯管）
- Power to lamps controlled to maintain constant UV irradiance
控制灯管的功率以保持恒定的紫外线辐照度
- Benefits are numerous –
 - Calibrated light source for better repeatability
经过校准的光源可获得更好的实验可重复性
 - Controlled Higher & Lower Intensity
控制较高和较低辐照强度
 - Replace lamps only when needed
仅在需要时才更换灯管

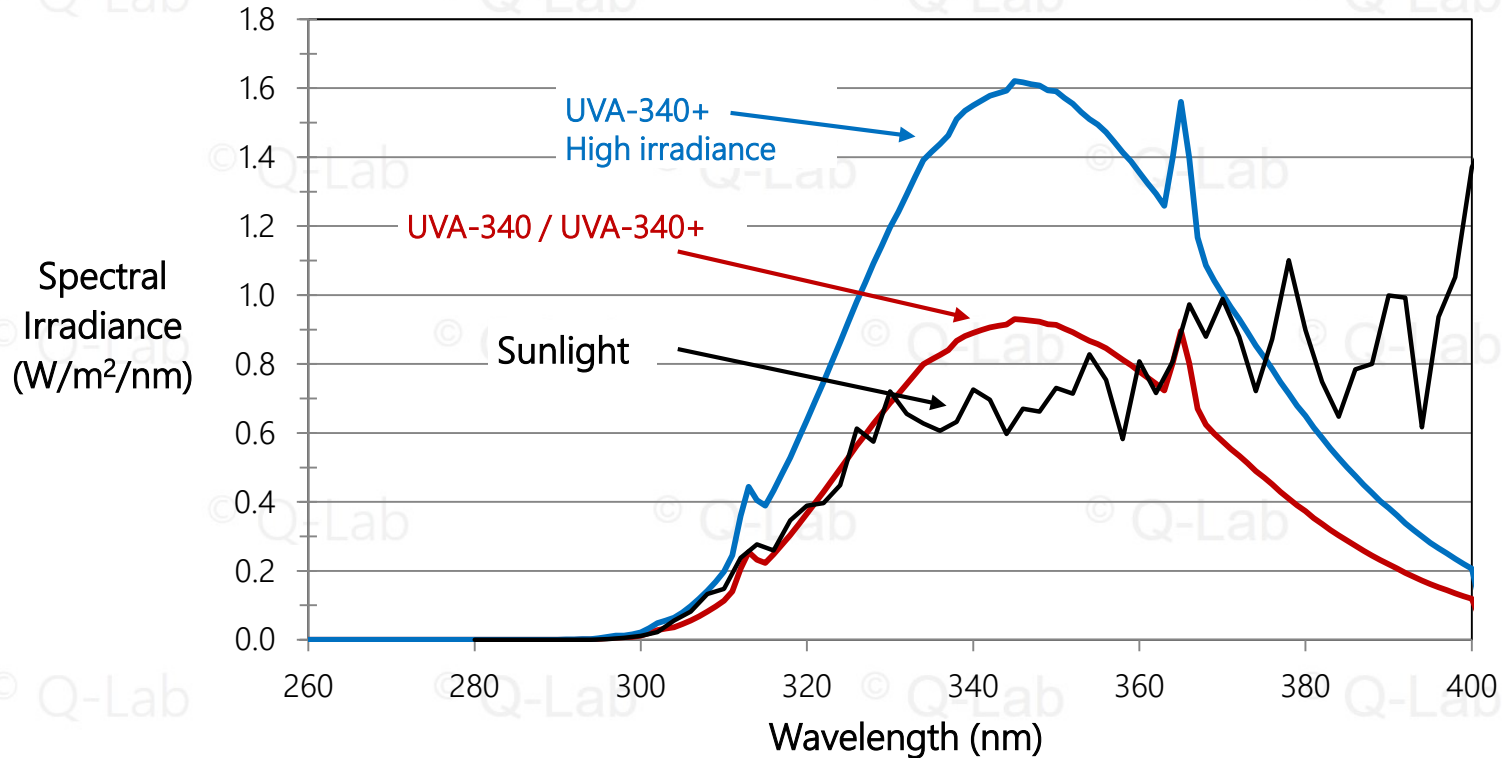


Typical Irradiance

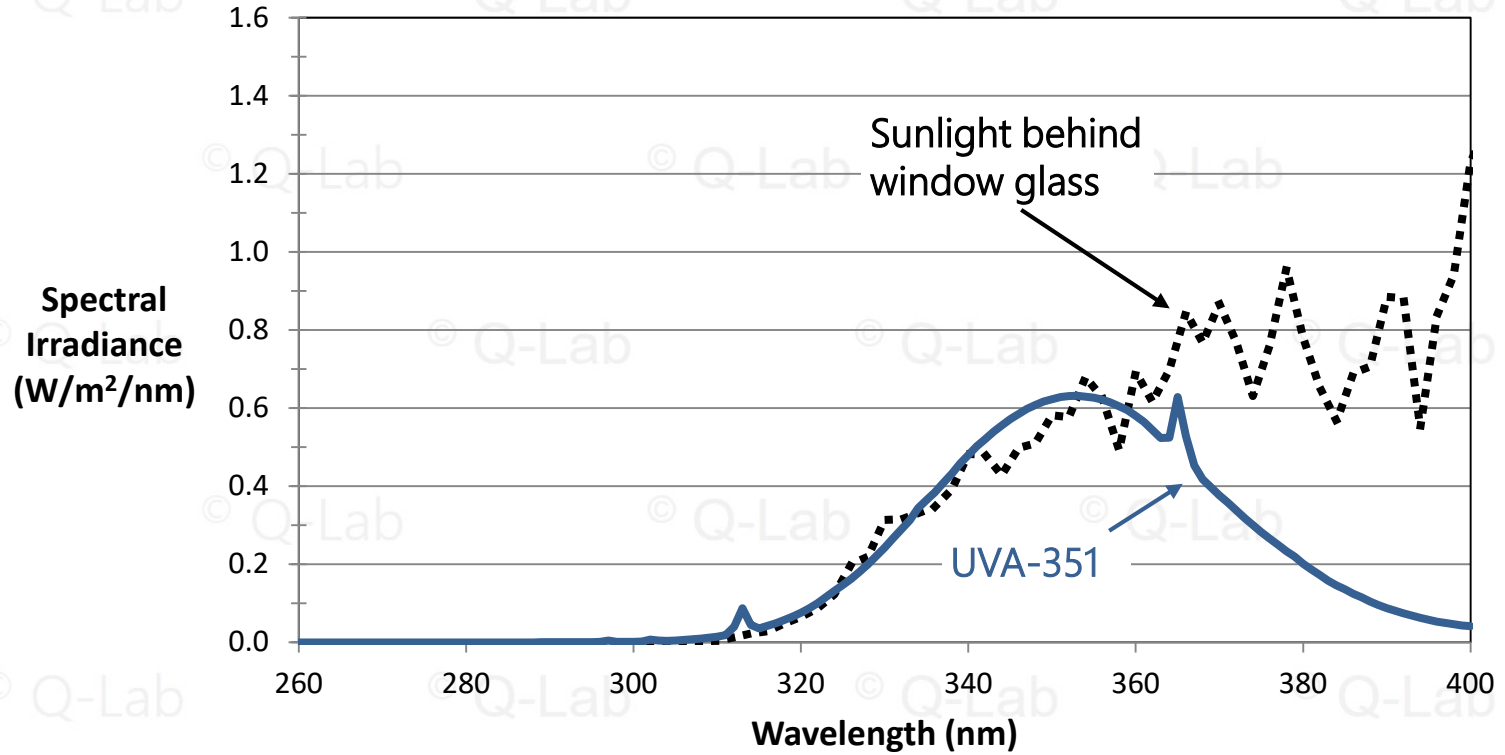
	UVA-340	UVA-340+	UVB-313EL	UVB-313EL+	QFS-40	UVC-254
QUV/basic Typical Irradiance	0.89	Not Recommended	0.71	Not Recommended	0.48	Not Available
QUV with SOLAR EYE Minimum Irradiance	0.20	0.35	0.20	0.20	Not Recommended	1.0
QUV with SOLAR EYE Typical Irradiance	0.68-0.89	0.76-0.95	0.48-0.62	0.48-0.71	Not Recommended	2.0-6.0
QUV with SOLAR EYE Maximum Irradiance	1.55	1.85	1.23	1.85	Not Recommended	13.0

Note: Irradiance value ($W/m^2/nm$) at 340 nm for UVA lamps, 310 nm for UVB/QFS lamps
Irradiance in mW/cm^2 @254 nm for UVC lamps ($10 \times W/m^2$)

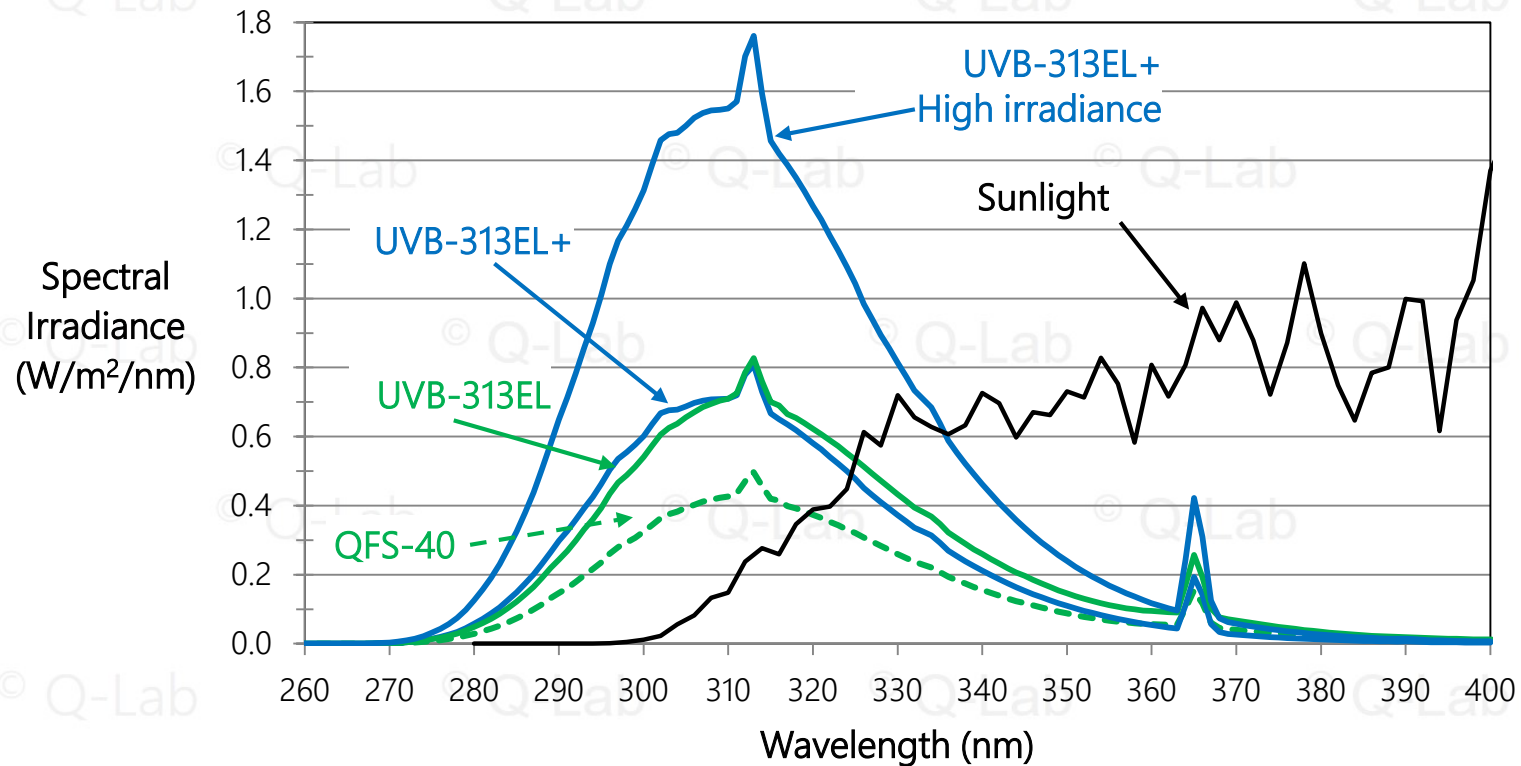
UVA-340 / UVA-340+ Lamps SPD



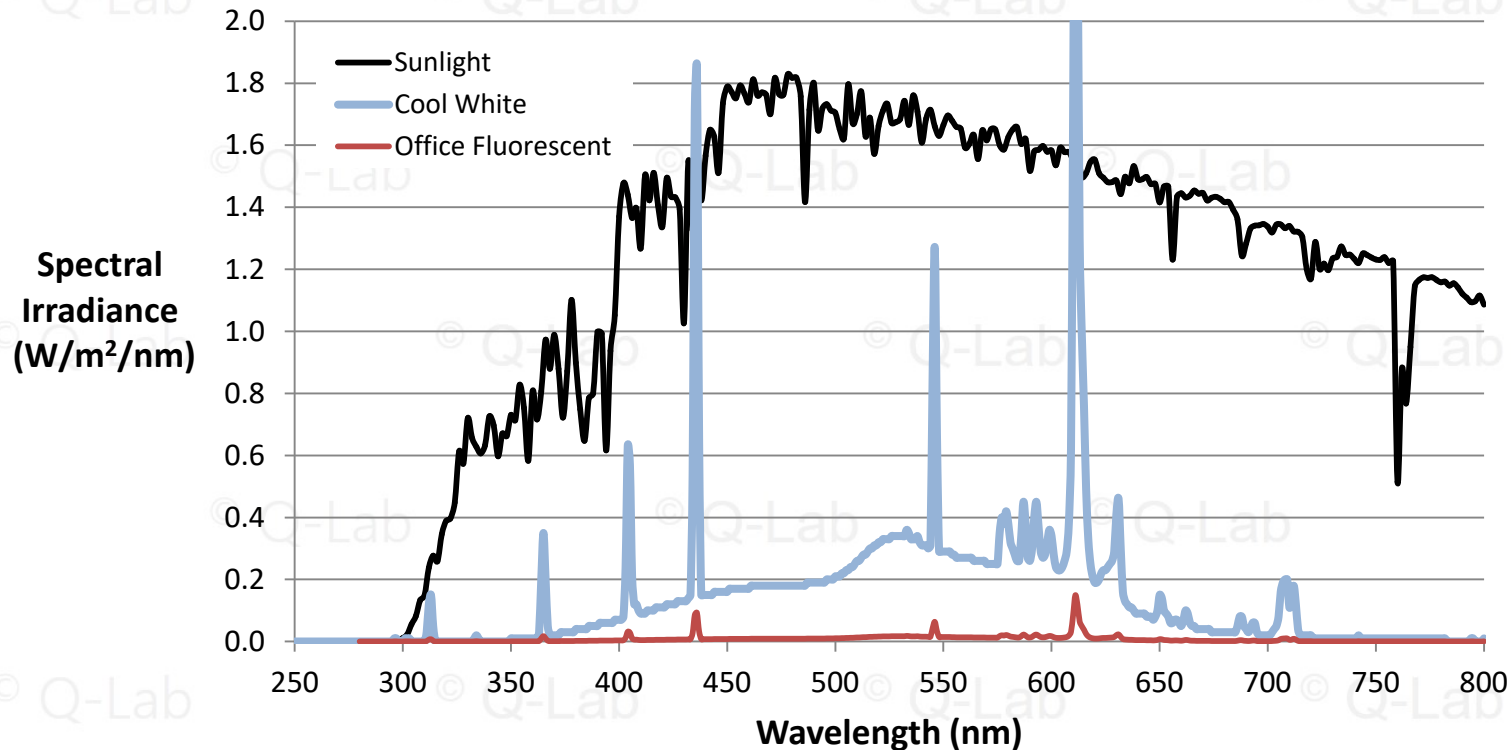
UVA-351 Lamps SPD



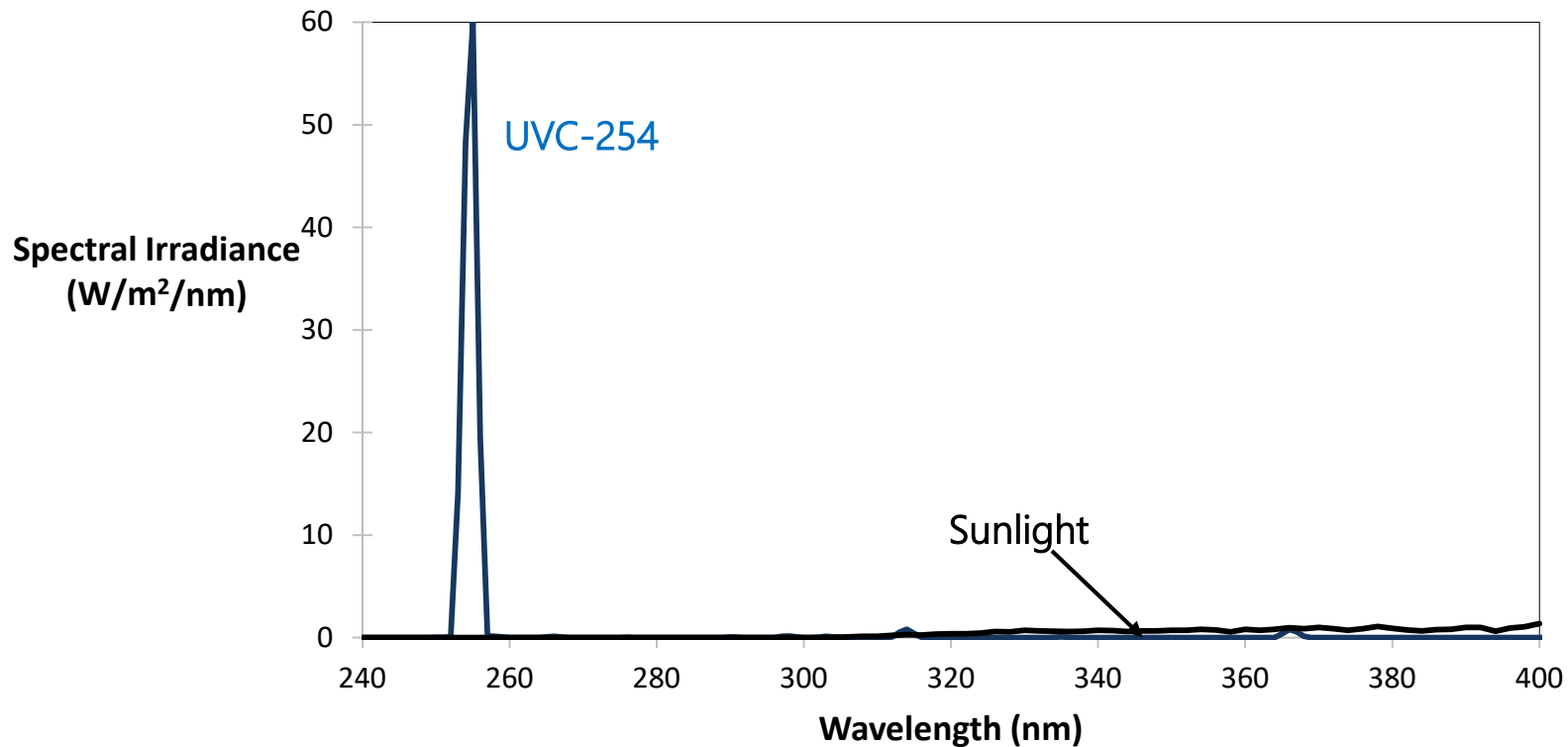
UVB Lamps SPD



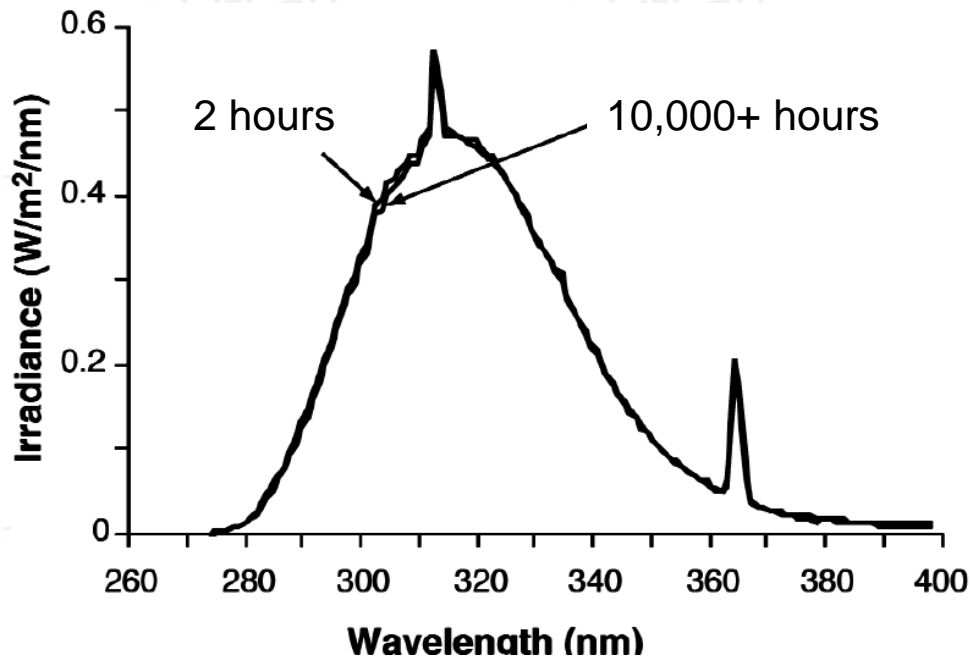
Cool White SPD



UVC Lamps



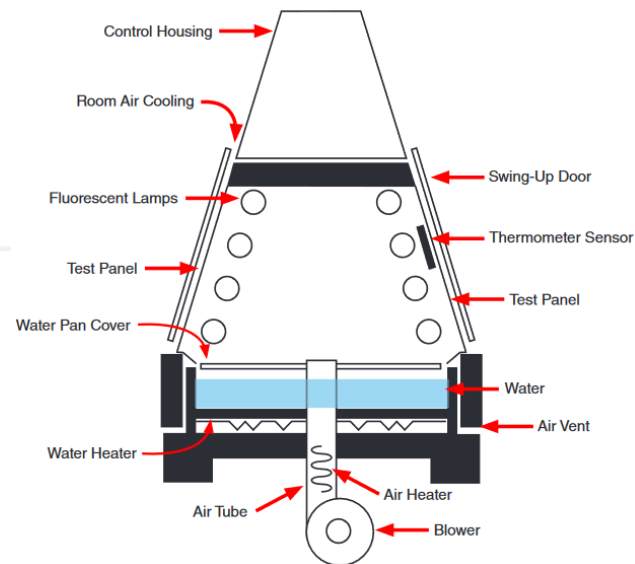
SOLAR EYE Lamp Aging



Minimal to no spectral change after 10,000 hours in SOLAR EYE models.

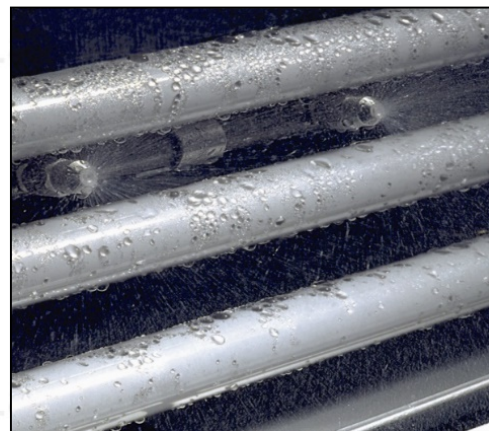
Temperature Control in UV Function

- Controlled by panel temperature sensor
控制（黑）板温度
 - Uninsulated 非绝缘
 - Insulated 绝缘
- Blower 风机
- Air Heater 空气加热器
- Both Blower and Air Heater are on during UV Cycle
在紫外光照时候风机和空气加热器都工作



QUV Moisture

- Condensing Humidity 冷凝
 - Hot condensation 热冷凝
 - Maximum water uptake 最大水吸收
- Water Spray 水喷淋
 - Thermal Shock 热冲击
 - Erosion 侵蚀



QUV Condensation

- Standard in most QUV's

QUV标配冷凝功能

- Requires tap water connection, but distilled water reduces maintenance, do not soften water.

需要自来水连接，但去离子水减少维护，不要用软化水

- Uses approximately 8 liters/day

8升每天的用水量

- Water Heater is on, warming the water and filling the chamber with warm water vapor

水盘加热器加热水，使得箱内充满热蒸汽

- Water Temperature Sensor ensures safety and that the water pan is full

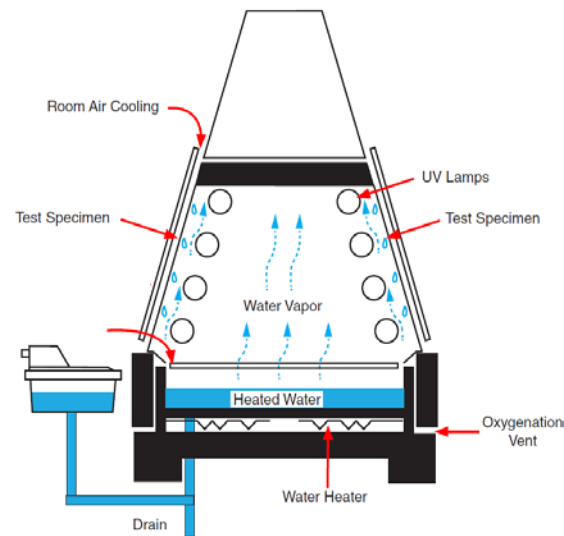
水温传感器确保安全，水盘满水状态

- Blower is on until the panel temperature is met

风机运行直到黑板温度达到设定值

- Lamps and Air Heater are off

灯管和空气加热器不工作



QUV/spray and QUV/spray-RP

- Purified water required (> 200 kΩ resistivity)

水质要求(> 200 kΩ 电阻率)

- 12x nozzles total, 6x on each side

12个喷头，每边6个

- 7 liters/minute

流量7升/分钟

- Panel temperature is displayed but not controlled

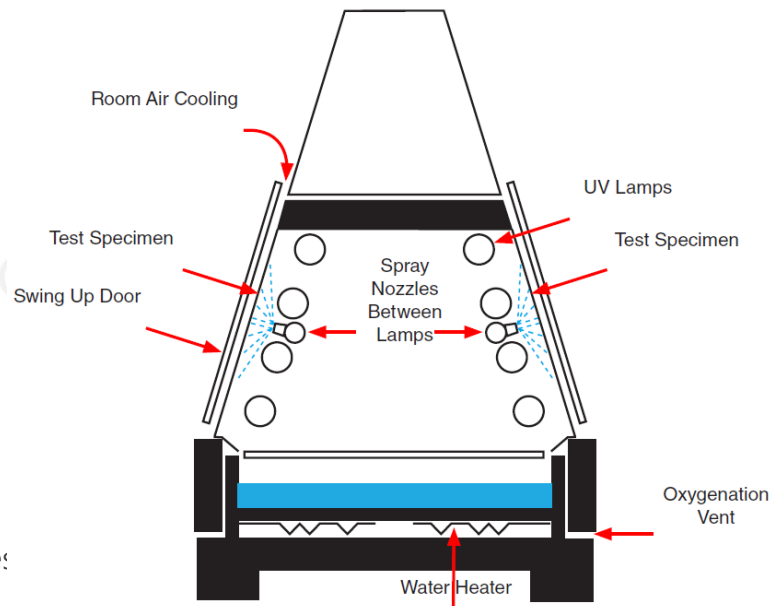
温度有显示但不控制

- Lamps, Water Heater, Air Heater, and Blower are off

灯管、水热水器、空气加热器和风机关闭

- QUV/spray-RP is an optional system that re-circulates and re-purifies water (purified water connection still required)

QUV/spray-RP可以实现水回收再净化（仍然使用去离子水）



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Thank you for your attention!

Questions?

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