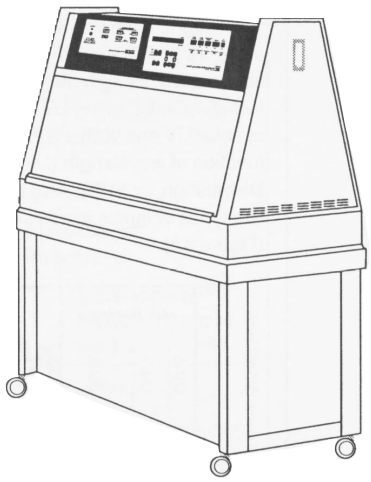
TECHNICAL BULLETIN LU-0823

QUV/cw
Cool White Photostability Tester



The QUV/cw Photostability Tester provides a standard cool white fluorescent test chamber that meets ANSI, ASTM and ISO test methods for indoor photostability testing.

Many products intended for home, office, and commercial environments have never been adequately tested for resistance to indoor lighting. Photodegradation from indoor lighting can cause unexpected product failures that range from the aesthetic to the hazardous. Common indoor light damage includes fade and color change of pigments and dyes, yellowing of plastics and photodegradation of pharmaceutical products.

The QUV/cw Complies With Industry Test Methods

Several industries currently have test methods that specify the use of cool white lamps for indoor photostability testing, while others are working to take steps toward standardization. Since each industry is unique, a brief synopsis of common industries concerned with indoor light stability testing is given below.

Business Imaging. *ASTM F1945, Practice For Determining the Lightfastness of Ink Jet Prints Exposed to Indoor Fluorescent Lighting*, specifies a cool white fluorescent test to simulate indoor office lighting. *ASTM F767, Test Method for Image Stability of Chemical Carbonless Paper to Light* and *ASTM F1721, Practice for Determining Stability of Direct Thermal Imaging Products* are both being updated to allow the use of standard cool white fluorescent test chambers, such as the QUV/cw.

Color Photography. *ANSI IT9.9 Methods for Measuring Color Photographic Images* specifies a cool white fluorescent lamp test. Images are exposed to 450 lux for 12 hours per day. This test, and the alternative xenon arc light tests (for through the window daylight), are intended to provide accelerated light stability data to address a variety of indoor lighting environments.

Digital Inks. The digital ink jet industry is developing an ISO specification for light stability testing of digital hardcopy images. This document is based upon ANSI IT9.9 for color photographic images and also specifies a cool white fluorescent test with a test cycle of 450 lux for 12 hours a day.

Plastics. *ASTM D4674 Color Stability of Plastics* has been updated to include a cool white fluorescent light test. Method III of D4674 consists of exposure to cool white fluorescent lamps at a temperature of 50˚C. This provides an excellent accelerated simulation of indoor office/commercial environments where cool whites are the main illuminant and natural sunlight is not a significant issue. D4674 is designed for testing plastics; however, it has been widely borrowed by other industries for light stability testing of inks, packaging, artists' materials and other indoor products.

Lithographic Inks and Packaging. *ASTM D3424 Lightfastness of Printed Matter* is used by the lithographic printing inks industry for color stability and fade testing of traditional printing inks; it references ASTM D4674 for cool white fluorescent testing of inks.

The packaging industry has used ASTM D3424 & D4674 test methods for their light stability testing needs.

Pharmaceuticals. Pharmaceutical manufacturers follow the *ICH Guidelines for the Photostability Testing of New Drug Substances and Products* for drug light stability testing. Both cool white and xenon arc exposures are specified in the ICH Guidelines.

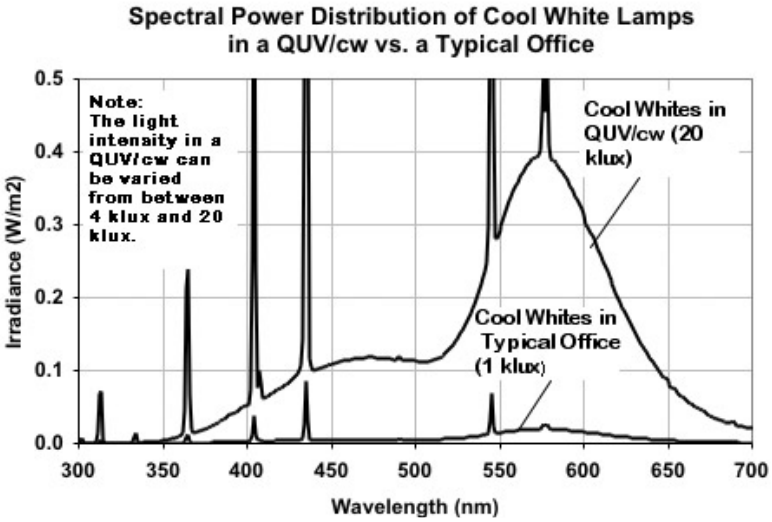
Q-PANEL
LAB PRODUCTS

Standardized Cool White Photostability Test Equipment

Cool white fluorescent testing has typically been conducted using crude, homemade devices or "light boxes" that do not properly control important test parameters, such as temperature and irradiance (light intensity). Inconsistencies in the construction and operation of these devices make it difficult to produce accurate, repeatable and reproducible test results.

With the QUV/cw a standardized, affordable and easy-to-use tester is now available. By providing a controlled environment, the QUV/cw effectively reproduces and accelerates indoor lighting conditions encountered in office and commercial environments as well as retail display lighting.

The QUV/cw is an adaptation of the QUV Accelerated Weathering Tester, which uses *fluorescent UV lamps* to test *outdoor* product durability. The QUV/cw has the same features as the QUV/se, but is modified specifically to use *fluorescent cool white lamps* for accelerated *indoor* product durability testing.



The cool white fluorescent lamp spectrum is representative of visible light encountered in indoor commercial or office environments.

Why Use the QUV/cw with Cool White Fluorescent Lamps?

The QUV/cw has the same features as the QUV/se, but it is modified specifically for accelerated fluorescent cool white lamp testing.

Control of Irradiance. A photostability tester must control irradiance if it is to achieve repeatable and reproducible results. Changes in light intensity may affect the speed of material degradation, while changes in wavelength may affect both speed and the type of material degradation. The Solar Eye Irradiance Control allows the user to choose the desired level of irradiance. In the QUV/cw, you can increase cool white lamp intensity by up to 20 times the typical office illuminance of 1 klux. The illuminance range is 4 to 20 klux (see the SPD chart above). With the Solar Eye feedback loop system, the irradiance is continuously monitored and precisely maintained–automatically.

Control of Temperature. Photochemical reactions are not usually temperature sensitive. However, the rate of subsequent reactions are temperature dependent. Consequently, it is important to control the test temperature. Many researchers prefer to match the maximum temperature the material will be exposed to in a service environment. In the QUV/cw, the temperature can be set at any point between 35˚C - 80˚C depending on irradiance and ambient room temperature.

Programmable. The QUV/cw can be programmed to perform various test cycles (e.g. 100% light, alternating light & dark cycles, etc.). This flexibility allows the user to better simulate end use applications where dark periods may be encountered.

Calibratable. To ensure the accuracy of any irradiance control system, it is necessary to periodically calibrate the sensors. The QUV's patented AutoCal system uses the CR10 radiometer to measure the light intensity of the cool white lamps and electronically transfer the calibration from the radiometer to the Solar Eye controller. Calibrations with the CR10/cw are traceable to the U.S. National Institute of Standards and Technology.

Compliance. The QUV/cw Photostability Tester provides a standard cool white fluorescent test chamber that allows you to conduct reproducible and repeatable tests in accordance to ANSI, ASTM and ISO test methods.

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LU-0823.2