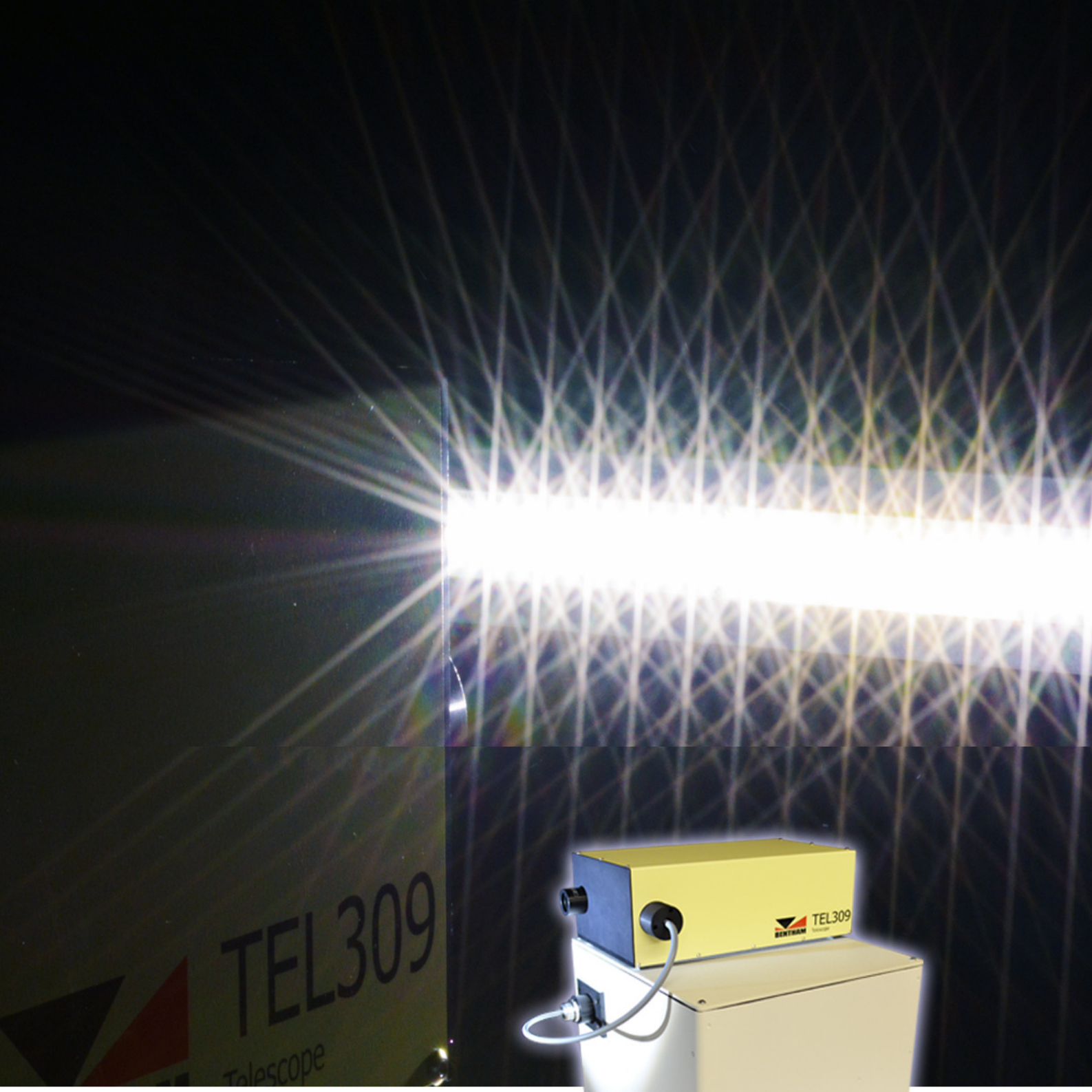

BENTHAM

ISR300-PSL
Blue Light Hazard Testing of Luminaires

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ISR300-PSL Blue Light Hazard Testing of Luminaires

The simple and accurate blue light hazard testing of luminaires starts with the ISR300-PSL.

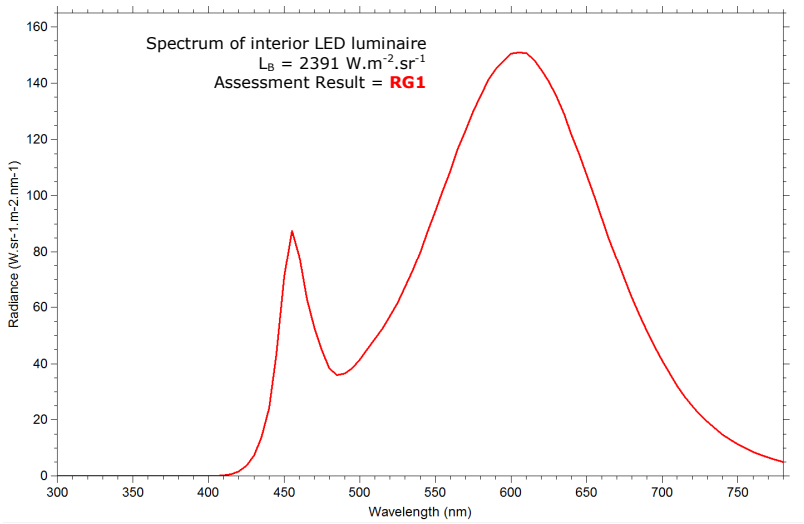
According to recently revised international standards[1], the new approach to the blue light hazard testing of luminaires should be performed in implementing IEC TR 62778[2].

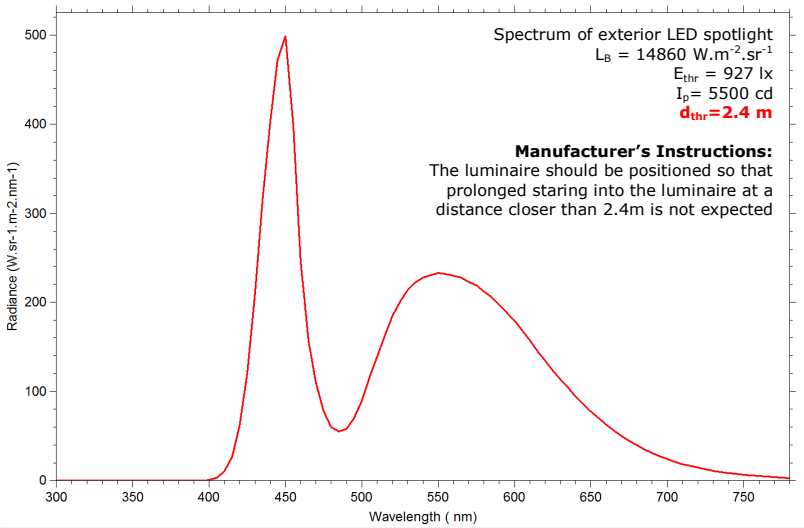
The ISR300-PSL offers the luminaire manufacturer the most reliable and accurate direct assessment of blue light hazard, devoid of overly conservative assessment results caused by employing an approach based on calculation and estimation.

Warning symbol for portable or handheld luminaires in excess of RG1 at 200mm

Key features include:

- Scanning monochromator for superior stray light performance
- Exceptionally wide dynamic range of detection
- Direct measurement of spectral radiance using telescope
- Measurement at 200mm and greater distances allows refinement of d_{thr}
- Easy to use Windows® control software and
- Reports blue light radiance, luminance, E_{thr} and d_{thr}





[1] IEC/EN 60598-1: 2014, "Luminaires - Part 1: General requirements and tests"

[2] IEC TR 62778: 2014, "Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires"

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System Overview

ISR300 Spectrometer

The ISR300, incorporating a single monochromator with all detection electronics integrated to the base of the unit, combines measurement accuracy with the convenience of a compact and easily transportable spectrometer.

Two photo-detectors are employed to offer exceptionally wide dynamic range, allowing measurement off all types of product, from interior/ decorative luminaires to high power exterior spotlights.

TEL309 Telescope

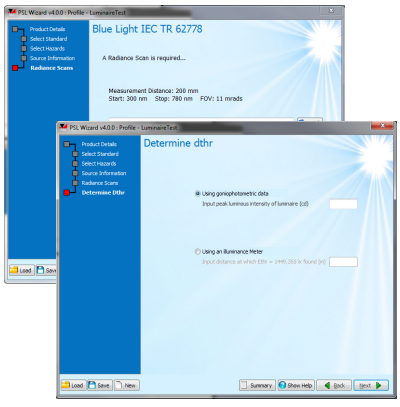
The TEL309 is a computer-controlled direct view telescope. Designed to allow measurement of spectral radiance in specific measurement fields of view specified by photobiological safety standards, measurement at distances from 200mm to greater than 10m are enabled.

SRS12 Radiance Standard

The SRS12 is used to calibrate the ISR300-PSL to ensure the highest measurement accuracy.

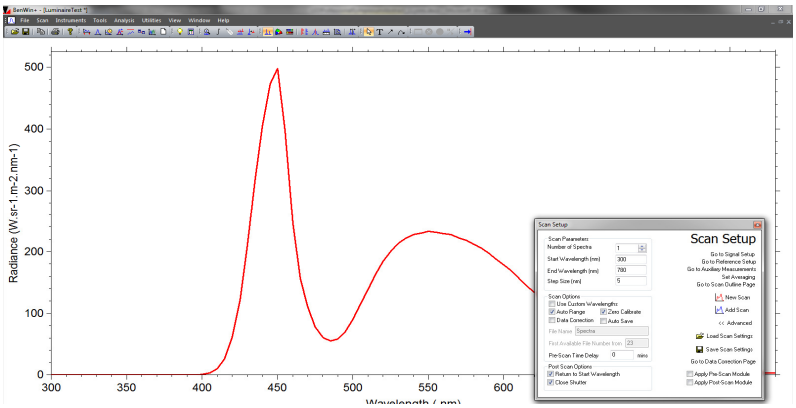
Comprised of a quartz halogen source in a barium sulphate coated integrating sphere, the SRS12 spectral radiance standard provides a stable source and excellent uniformity. Calibration is provided traceable to PTB, Germany.

Software Control



The ISR300-PSL is fully automated through the USB interface, and controlled by the Benwin+ Windows® software, allowing easy calibration and luminaire measurement.

This package is complemented by the PSL Wizard, offering guidance to measurements required, calculation and reporting of blue light radiance and the assessment result.



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Specification

Spectral range of operation	300-780 nm
Spectral data interval	5 nm
Spectral bandwidth (FWHM)	5 nm
Wavelength accuracy	± 0.3 nm
Wavelength reproducibility	± 0.05 nm
Stray light rejection at 2.5 FWHM	10^{-4}
Photo-detectors	Multi-alkali PMT and Silicon photodiode
Photo-current measurement	Dual-channel, six decade trans-impedance amplifier / ADC
Measured quantity	Spectral radiance
Minimum measurement distance	200 mm
Maximum measurement distance	>10 m
Fields of view	11, 5 and 1.7 mrad
Range of blue light radiance (typ.)	10-100000 $W.m^{-2}.sr^{-1}$
Bench space required	0.5x 0.5 m not including working space for computer and luminaire under test
Computer requirements	OS: Windows 7 or newer (32-/64-bit) Minimum hard disk space: approx. 100MB Minimum RAM: 2 GB 1 x USB 2.0 ports
Services requirements	2 x 110/220V AC mains sockets, 400VA total

Overview of IEC TR 62778

IEC TR 62778 provides guidance on the evaluation of the retinal blue light hazard of sources of light intended for lighting applications.

Assessment is to be made to determine, through a measurement of spatially averaged spectral radiance, whether or not the luminaire under test exceeds the limits of Risk Group 1 (RG1) at a distance of 200mm.

A source classified as RG1 is one which does not pose a hazard due to normal behavioural limitations on exposure (including aversion response and not actively staring at the source).

In the case of luminaires in excess of this limit, the illuminance, E_{thr}, at which RG1 is expected to be found should be simply computed and the corresponding distance, d_{thr}, from the luminaire to be determined and reported.

The peak luminous intensity of the luminaire (obtained from goniophotometric data) and the inverse square law are used with E_{thr} to compute d_{thr}. In the absence of such data, E_{thr} can be found directly using an illuminance meter.

In many cases, the determination of d_{thr} will result in an over-estimation of the hazard which may have an impact upon the marketing of the product.