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Light. Measurement. Excellence.

BENTHAM

PTCal150

Enabling Precision Dosimetry in Phototherapy & PDT

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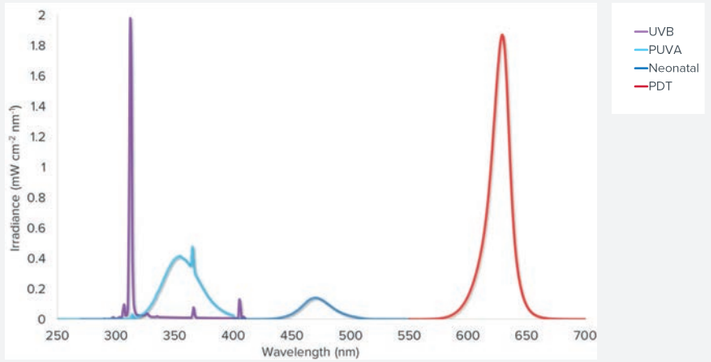
Source of Confidence in Phototherapy

Accurate determination of the spectral irradiance produced at the plane of the skin is the foundation of safe and effective phototherapy and PDT.

PTCAL150

Safe and effective phototherapy and PDT relies on accurate dosimetry. Ensure the precise spectral irradiance measurement of all phototherapy sources with the PTCal150 spectroradiometer. Benefit from the highest accuracy data on patient exposure and calibrate radiometers with confidence.



Introduction

Superlative Spectral Analysis
Ultimate accuracy in spectral irradiance starts with a precision cosine-corrected diffuser and is assured with a double monochromator.

Simple Calibration
Alignment-free calibration standards ensures your link to national metrology standards.

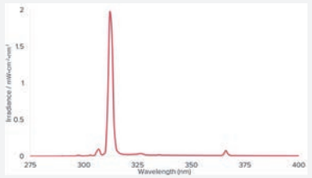
Tailored Spectral Coverage
A choice of UV and UV-vis configurations adapt the PTCal150 to your individual phototherapy requirements.

Full Automation
Fully automated over the USB interface, directly access spectral irradiance data and integrals appropriate for your application.

In hospitals and in clinical research, the PTCal150 is trusted as the gold standard to determine the spectral irradiance of sources used in phototherapy and PDT.

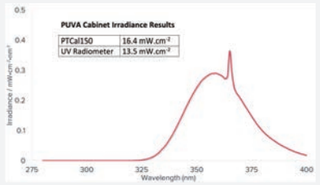
1. Direct Source Spectral Irradiance Characterisation

For ultimate measurement confidence and exploring novel sources in research.



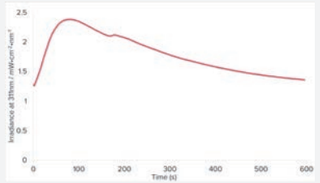
2. Calibrate radiometers for day to day use

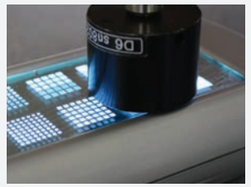
Perform source-specific calibration of radiometers to provide confidence in regular source checks.



3. Determine warm-up characteristics

Guide the application of phototherapy with knowledge of the temporal variation of irradiance.





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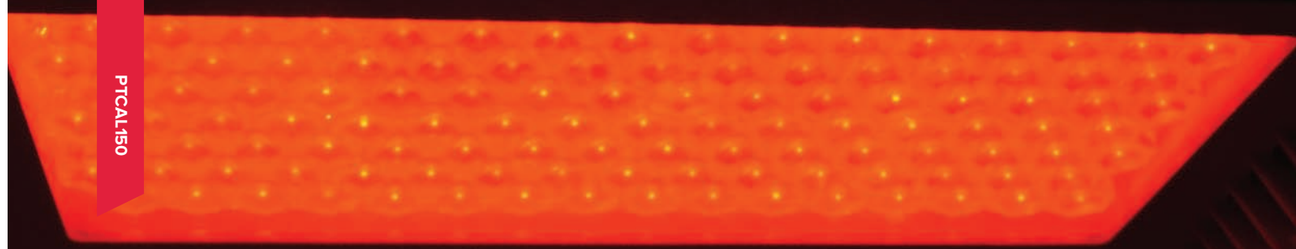


Go Beyond the UV

With the UV-Vis configuration of PTCal150, characterise a wide range of sources in clinical use and research

Overview

Designed with leading optical components, the PTCal150 sets the benchmark for the precise spectral irradiance measurement of all phototherapy sources.

System Components

1

Entrance optic
A precision cosine-corrected transmission diffuser (f_2 < 1%) ensures accurate collection of light from the entire hemisphere above the measurement plane.

2

Fibre bundle
A flexible fibre bundle couples light from the transmission diffuser to monochromator, ensuring ease of reaching the required measurement plane.

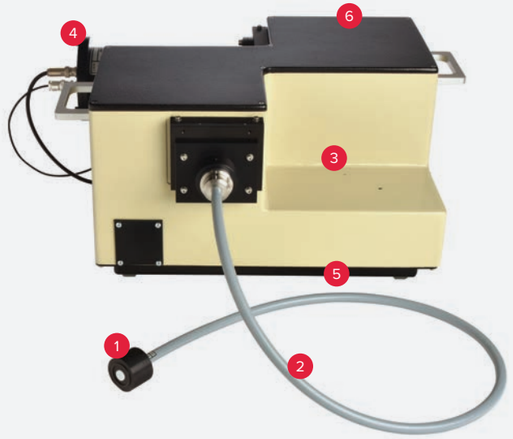
3

Double monochromator
The un-rivalled stray-light rejection of a double monochromator ensures superlative spectral analysis.

4

Photomultiplier
A selected S20 photocathode, end-window photomultiplier offers excellent noise performance and linearity.

PTCAL150

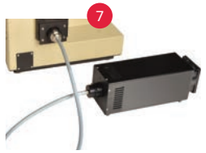


5

Detection Electronics
Built-in to the PTCal150 is a PMT high voltage supply and dual channel, six-decade picoammeter, offering an impressive dynamic range.

7

Enclosed Calibration Standards
Enclosed spectral irradiance standards, with NMI traceable calibration and entrance optic adaptors, allows quick and simple alignment-free calibration.



6

Single Portable Unit
Set in a single, robust housing, the PTCal150 can easily be transported between clinics and laboratories.

8

Side View Entrance Optic
For phototherapy products with limited access to the source, a side view entrance optic ensures you can measure in the correct plane.

Accurate Spectroradiometry Starts Here

A precision cosine-corrected transmission diffuser (f_2< 1%) ensures accurate collection of light from the entire hemisphere above the measurement plane.

PTCAL150

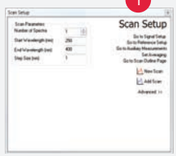
Measurement Procedure

Accurate spectroradiometry in just a few steps with the PTCal150

1. Power on the PTCal150 and run Benwin+

- Get ready to launch a measurement over your spectral range of interest.

1



2. Calibration, your link to national metrology standards

- Simply connect the transmission diffuser to the enclosed irradiance standard, power on and run a calibration procedure.
- It is recommended to calibrate once at the beginning of a measurement session to minimise measurement uncertainty.

2

3. Set-up measurement of phototherapy source under test

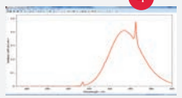
- Position the cosine-corrected transmission diffuser at the patient exposure plane.
- Where required perform alignment to find location of peak spectral irradiance.

3

4. Run a measurement

- Power on the source, an accurate spectral irradiance measurement is just a click away.
- A warm-up delay can be introduced before acquiring a spectrum.

4



5. View results

- The spectral irradiance result will unfold on screen.
- View pre-defined spectral integrals for quick and easy analysis.
- Export a measurement report or transfer the spectral data to your favourite platform.

5

Measurement	Value
UVA Irradiance	16.292437 mW cm-2
UVB Irradiance	0.073168935 mW cm-2

Specifications

Entrance Optic

Entrance optic type	Benflect precision transmission diffuser (in-line or right angle configuration)
Aperture diameter	10mm
f_2'	<1%
Coupling	Randomised pure fused silica fibre bundle, from 0.5m long

Monochromator

Monochromator Type	Compact double monochromator, additive dispersion. Czerny-Turner mount	
Focal-length	150mm (each unit)	
Slits	Fixed, interchangeable	
Gratings	Grating pair, kinematically mounted, 33x33mm	
Stray light rejection at 10x FWHM from peak	10^{-8}	
Optical Performance/ Configuration	2400 g/mm (UV configuration)	1800 g/mm (UV-Vis configuration)
Spectral range	200-600nm	250-800nm
Typical bandwidth	1, 2 or 5nm	1, 2 or 5nm
Wavelength accuracy	± 0.15nm	± 0.20nm
Wavelength reproducibility	± 0.05nm	± 0.07nm

Detector & Detection System

Detector type	S20 photocathode end window photomultiplier tube
Detector High Voltage	-750V (adjustable)
Detector response range	200-850nm
Detector dark current (typ.)	500pA
Picoammeter current range	Sub 1pA to 100µA
Picoammeter ADC resolution	> 14 ½ bit
Picoammeter ADC integration time	100ms

General

Interface	USB 2.0
Software control	BenWin+ Windows application
Operating System	From Windows 7
Minimum HD/ RAM required	100MB/ 256 MB
Overall dimensions	Approx. 395L x 315W x 250H (mm)
Power	Mains input 110/220V 50/60Hz

PTCAL150

Ordering Information

Calibration Standard (200-300nm)

Lamp type	Deuterium lamp
Nominal lamp power and voltage	30W, 100 V
Operating current	300mA DC
Expected lifetime	2000h
Power Supply	PSU_706 deuterium lamp supply
Calibration type and wavelength range	Spectral irraidance at 5.5mm from plane of front face, 200-400nm (2nm steps)
Calibration traceability	Physicalish Technische Bundesanstalt (PTB, Germany)

Calibration Standard (250-800nm)

Lamp type	Halogen lamp
Nominal lamp power and voltage	150W, 24 V
Operating current	6.300 A DC
Expected lifetime	2000h
Power Supply	PSU_610 current stabilised lamp power supply
Calibration type and wavelength range	Spectral irradiance at 5.5mm from plane of front face, 250-800nm (5nm steps)
Calibration traceability	Physicalish Technische Bundesanstalt (PTB, Germany)

Ordering Information

PTCal150_0001	PTCal 150 spectroradiometer (250-600nm)
PTCal150_0002	PTCal 150 spectroradiometer (200-600nm)
PTCal150_0003	PTCal 150 spectroradiometer (250-800nm)
PTCal150_0004	PTCal 150 spectroradiometer (200-800nm)