Light. Measurement. Excellence.

BENTHAM

Optical Metrology Components Guide

2019

www.bentham.co.uk

Bentham are global leaders in the development and manufacture of high performance scientific instrumentation used in the UV-vis-IR optical characterisation of sources, detectors and materials.

Established in 1975, we have developed a comprehensive product range spanning optical metrology instrument components, turnkey measurement solutions, a bespoke product design capability and a traceable calibration service.

Light is our passion

Our aim is to drive science and industry to a brighter future, delivering market leading optical metrology components and systems to accelerate research, development, quality and certification.

Our Approach

We are passionate about working with our clients so that together we can find the best solution to your optical metrology problem.

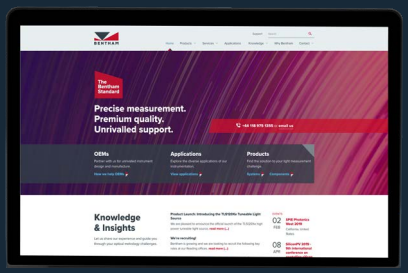
Wide Reaching

We supply instrumentation to a global market in a broad range of applications and industries, serving clients in national laboratories, research institutes, educational establishments, test houses and product manufacturers.

Quality & Technology

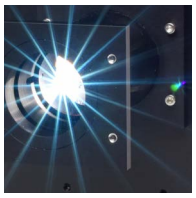
All our products are designed and built in our headquarters in the UK by our dedicated team of optical, mechanical, electronic and software engineers and technicians. Designed for performance. Built to last.

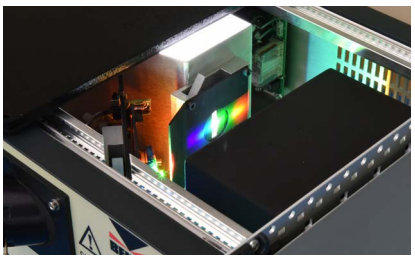
We take pride in the high standards we uphold and the exceptional level of service we provide.



- Components
- Systems
- Services
- Applications

Discover More at bentham.co.uk





We are pleased to introduce to you our portfolio of optical metrology components. Used in light-based measurements across the ultraviolet, visible and infrared, our products are designed to be highly configurable to meet with your requirements.

For further information or to discuss your application with one of our specialists, please contact us through our website or call us on +44 118 975 1355.

Monochromators

The monochromator is at the heart of the Bentham proposition. Our range is founded on over 40 years of experience in developing high performance and reliable monochromators used in a multitude of applications across the UV-vis-IR.

- Spectral range from 200nm-30µm
- Variety of slit options and port configurations
- Wide selection of diffraction gratings
- Single and double monochromators

Configurable Monochromators

TMc150 Single Monochromator

150mm focal length compact monochromator with dual grating turret

- High performance monochromator, small footprint
- Ideal for OEM integration
- Moderate spectral range in single scan

TMc300 Single Monochromator

300mm focal length monochromator with triple grating turret

- Wide spectral range in single scan
- Highly configurable for wide variety of applications
- Most popular single monochromator

TMS300 Single Monochromator

300mm focal length monochromator with triple grating turret and motorised slits

- Wide spectral range in single scan
- Highly configurable for wide variety of applications
- Take full control of instrument bandwidth

DMc150 Double Monochromator

300mm focal length compact double monochromator

- High performance double monochromator, small footprint
- Superlative stray light performance
- Industry standard in UV applications

DTMc300 Double Monochromator

600mm focal length monochromator with triple grating turret

- Wide spectral range in single scan
- Superlative stray light performance
- Additive or subtractive dispersion modes

DTMS300 Double Monochromator

600mm focal length double monochromator with motorised slits and triple grating turret

- Take full control of instrument bandwidth
- Superlative stray light performance
- Wide spectral range in single scan

Monochromators Featuring Detection Electronics

ISR300 Single Monochromator

300mm focal length monochromator with motorised slits, triple grating turret, picoammeter and HV supply

- Convenient single unit solution
- Take full control of instrument bandwidth
- Wide spectral range in single scan

IDR300 Double Monochromator

600mm focal length double monochromator with motorised slits and triple grating turrets, picoammeter and HV supply

- Exit ports and picoammeters ready for up to three detectors
- Take full control of instrument bandwidth
- Wide spectral range in single scan

IDR150 Double Monochromator

300mm focal length compact double monochromator with picoammeter and HV supply

- Compact single unit
- Superlative stray light performance
- Industry standard in UV applications

Broadband Light Sources

A complete range of high stability, single and dual emitter sources. Ensuring you have the photons you need to excel your measurements.

- Deuterium, halogen, xenon and SiN sources
- Optimised for monochromator coupling
- Long life time lamps
- Precision constant current power supplies

Single Emitter

IL6 Deuterium Source

Low stray light UV illuminator

- Spectral range 200-400nm, 30W lamp
- Excellent stability in the UV
- Silica condenser lens coupling

IL1 Halogen Source

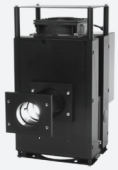
Excellent stability over the vis-IR

- Spectral range 350-4000nm, 100W lamp
- Unsurpassed for stability
- Silica condenser lens coupling

IL75E Xenon Source

High UV-vis-NIR radiance

- Spectral range 250-1500nm, 75W lamp
- High UV radiance
- Ellipsoidal reflector coupling



IL7 Xenon Source

Moderate UV-vis-NIR radiance

- Spectral range 250-1500nm, 150W lamp
- Moderate UV radiance
- Silica condenser lens coupling

IL450Xe Xenon Source

Extremely high UV-vis-NIR radiance

- Spectral range 250-1500nm, 450W lamp
- Extremely high UV radiance with air cooling
- Ellipsoidal reflector coupling

IL8 SiN Infrared Source

High output infrared emitter

- Spectral range 1-30µm, 40W emitter
- High temperature infrared emitter
- KRS5 condenser lens coupling

Dual Emitter

ILD-D2-QH Deuterium-Halogen Source

Emission over entire UV to NIR

- Spectral range 200-2500nm
- 30W deuterium and 100W halogen lamps with automated selection
- Benefit from full UV-vis-NIR range

ILD-Xe-QH Xenon-QTH Source

High radiance from 250nm

- Spectral range 250-2500nm
- 100W halogen and 75W xenon lamps with automated selection
- Benefit from high xenon UV radiance and stable halogen vis-IR emission

ILD-QH-IR Halogen-SiN Source

Superlative stability in vis-FIR applications

- Spectral range 350nm-30µm
- 100W halogen and 40W IR lamps with automated selection
- Benefit from full vis-FIR coverage

Tuneable Light Sources

Benefit from the ease of deployment and use of our pre-configured tuneable light sources. Offering plug-and-play functionality, enjoy high beam power over your range of interest.

- Selected combination of broadband source(s) and monochromator
- Optimised monochromatic beam power
- Compatible with our range of measurement accessories

TLS120Xe High Power Tuneable Light Source

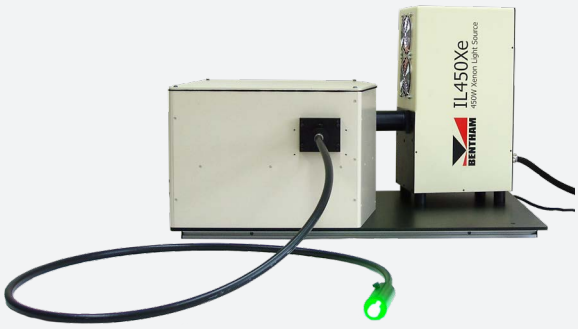
Monochromator based xenon source
with manual or USB control

- Spectral range 280-1100nm
- Plug-and-play functionality
- Portable design with front panel control

TLS300_UV Tuneable Light Source

Monochromator based xenon source
with USB control

- Spectral range 200-600nm
- Extremely high UV radiance from xenon lamp
- Enhanced throughput, high NA monochromator



TLS300_UV-Vis-NIR Tuneable Light Source

Monochromator based deuterium-halogen source
with USB control

- Spectral range 200-1400nm
- Dual deuterium-halogen light source
- Optimised triple grating monochromator

TLS300_SWIR-MWIR-FIR Tuneable Light Source

Monochromator based halogen-SiN source
with USB control

- Spectral range 1.4-20µm
- Dual halogen-SiN light source
- Optimised gold coated optics and nitrogen purge ports

Measurement Accessories

Each measurement type imposes specific illumination or light collection conditions. Our range of measurement accessories allows you to deliver light your way.

- Collimated or focussed beam
- Flexible fibre bundle delivery and coupling
- Uniform illumination
- Hemispherical light collection

COL_1 Collimator

Lens-based collimator

- Produces collimated beam up to 20mm diameter
- Slit or source mounted
- High degree of collimation, limited spectral range

COL_3 Collimator

Reflective-optic-based collimator

- Produces collimated beam up to 12mm diameter
- Slit or source mounted
- High degree of collimation, independent of wavelength

OPT-INT-UV Beam Homogeniser

Microlens array beam homogeniser

- Provides excellent uniformity beam with high throughput in UV
- Slit mounted
- Spectral range 250-600nm

IS4 Integrating Sphere

Integrating sphere beam homogeniser

- Provides excellent beam uniformity over wide spectral range
- Slit mounted
- Spectral range 300-2000nm

FOP Series Fibre Optic Bundles

Flexible light delivery over the UV-vis-IR
High optical transmission

- High optical transmission
- Slit mounted
- Bundle type optimised for wavelength range of interest

UMS Universal Measurement Station

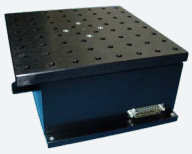
Reflective optic beam delivery to sample

- Relays 1:1 image of exit port
- Slit mounted
- For use with accessories, including goniometer and integrating sphere

DTR6 Integrating Sphere

Diffuse transmission and reflectance sphere

- Accurately characterise diffuse materials
- Ease of sample mounting
- Spectral range 300-2000nm



MOT-GONIO Goniometer

Investigate angular optical properties

- One or two rotational axes
- For use free-space or with UMS
- Precision stepping motor drive

FC306 Bare Fibre Mount

Optimised coupling to bare optical fibre

- Silica or CaF2 objective lens
- Slit mounted
- Bare fibre barrel clamp with XYZ positional adjustment

Entrance Optics

Accurate spectroradiometry begins with the entrance optic. Our range has been designed to ensure correct geometry without compromising on optical throughput.

- Cosine-connected optics
- Direct-view telescopes
- Integrating spheres
- Fibre bundle or direct slit coupling

Irradiance

D7 Transmission Diffuser

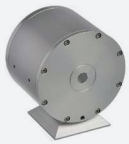
Precision in-line diffuser ensuring excellent hemispherical cosine response

- Spectral range 200-1100nm
- Excellent cosine response (f2<1%)
- In-line fibre-bundle coupling

D7-H Transmission Diffuser

Precision side-on diffuser ensuring excellent hemispherical cosine response

- Spectral range 200-1100nm
- Excellent cosine response (f2<1%)
- Side-on fibre coupling to access hard to reach measurement planes



D8 Integrating Sphere

Optimising the trade-off between cosine error and spectral range

- Spectral range 250-2500nm
- Good cosine response (f2<5%)
- Slit or fibre bundle coupling options

Radiance and Radiant Intensity

TEL301 Telescope

General purpose telescope

- Easy-install apertures and range of lens options
- Fields of view of 6', 20', 1° and 2°
- Slit or fibre bundle coupling options

TEL310 Telescope

Fully-automated telescope

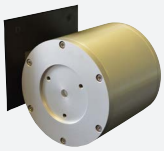
- Motorised telescope with CMOS camera viewer
- Fields of view of 1.7, 5 and 11mrad
- Fibre-bundle coupling

D7_QD Sealed Transmission Diffuser

Environmentally sealed with quartz dome for outdoor use

- Spectral range 200-1100nm
- Excellent cosine response (f2<2%)
- In-line fibre-bundle coupling

Radiant Flux



IS50 Integrating Sphere

Precise laser spectral radiant flux measurement

- Spectral range 250-2500nm
- Input adaption for free space of fibre coupled beams
- High laser damage threshold

IS500 Integrating sphere

Opening integrating sphere for the measurement of compact sources

- Spectral range 350-800nm
- Easy and repeatable sample installation
- Accurate total spectral radiant flux measurement of compact sources

Detectors

A selection of detectors to suit all signal levels and spectral ranges encountered in spectroradiometry and spectrophotometry.

- Range of detectors selected on performance
- Mechanical interfaces to all Bentham monochromators and measurement accessories
- Complemented by detection electronics suite
- UV-vis-IR coverage

Responding from 200nm

DH_3 Multi-Alkali Photomultiplier

End-window S20 photocathode PMT

- Spectral range 200-850nm
- High sensitivity, low noise and excellent linearity
- Detector of choice in the UV-vis low light level applications

DH_30 Multi-Alkali Photomultiplier

Side-window multi-alkali photocathode PMT

- Spectral range 200-850nm
- High sensitivity and excellent linearity
- Economical choice for UV-vis low light level applications

DH_30_TE Cooled Multi-Alkali Photomultiplier

Thermo-electrically cooled, side-window multi-alkali photocathode PMT

- Spectral range 200-900nm
- High sensitivity and excellent linearity
- Cooling ensures stable response and reduced dark current

DH_3_BI Bi-Alkali End-Window Photocathode

End-window KCs photocathode bi-alkali PMT

- Spectral range 200-600nm
- High sensitivity, low noise, low dark current and good linearity
- Ideal for low light-level applications in the UV requiring low dark current

DH_50 Cooled Multi-Alkali Photomultiplier

Thermo-electrically cooled, end-window S20 photocathode PMT

- Spectral range 200-930nm
- High sensitivity, low noise, ultra-low dark current and excellent linearity
- Optimised performance for the most challenging measurements

DH_Si Silicon Photodiode

10x10mm UV enhanced silicon photodiode

- Spectral range 200-1100nm
- Excellent linearity, stability and ultra-low dark current
- Economical solution for UV-vis-NIR applications except low-light level

Responding from 800nm

DH_Ge Photodiode

5mm diameter Germanium photodiode

- Spectral range 800-1800nm
- Excellent linearity and stability
- Enables extension of measurement into SWIR

DH_IGA Photodiode

3mm diameter Indium Gallium Arsenide photodiode

- Spectral range 800-1700nm
- Excellent linearity, stability and low dark current
- High performance photodiode

DH_IGA-EX_TE Photodiode

3mm diameter thermo-electrically cooled, extended Indium Gallium Arsenide photodiode

- Spectral range 1000-2500nm
- Excellent linearity and stability
- Cover wide spectral range with one detector in AC mode only

Responding from 1000nm

DH_PBS_TE Cooled Photodiode

3x3mm thermo-electrically cooled lead sulphide photodiode

- Spectral range 1-3µm
- Enhanced performance without need for liquid cryogen
- Practical solution for measurements to 3µm

DH_PBSE_TE Cooled Photodiode

3x3mm thermo-electrically cooled lead selenide photodiode

- Spectral range 1-5µm
- Enhanced performance without need for liquid cryogen
- Practical solution for measurements to 5µm

DH_INSB Dewar-Cooled Photodiode

3mm diameter indium antimonide photodiode

- Spectral range 1-5.5µm
- Liquid nitrogen cooled, eight hour dewar hold time
- Optimal performance over 2-5µm

DH-MCT12 Dewar-Cooled Photodiode

2x2mm mercury cadmium telluride photodiode, photoconductive operation

- Spectral range 2-12µm
- Liquid nitrogen cooled, eight hour dewar hold time
- Optimal performance over 5-12µm

DH-MCT20 Dewar-Cooled Photodiode

1x1mm mercury cadmium telluride photodiode, photoconductive operation

- Spectral range 5-20µm
- Liquid nitrogen cooled, eight hour dewar hold time
- Optimal performance over 12- 20µm

DH_PY Pyroelectric Detector

2x2mm DLATGS sensor

- Spectral range 1-30µm
- Cover extremely wide spectral range with one detector
- Supplied with power supply

TEC Controllers

CPS1M Temperature Controller Module

Controller for thermoelectrically cooled photodiodes

- Accurate TEC current setting for optimised detector performance
- Available as module or stand-alone unit
- For use with DH_PBS_TE, DH_PBSE_TE

CPS20M Temperature Controller Module

Controller for the DH_30_TE

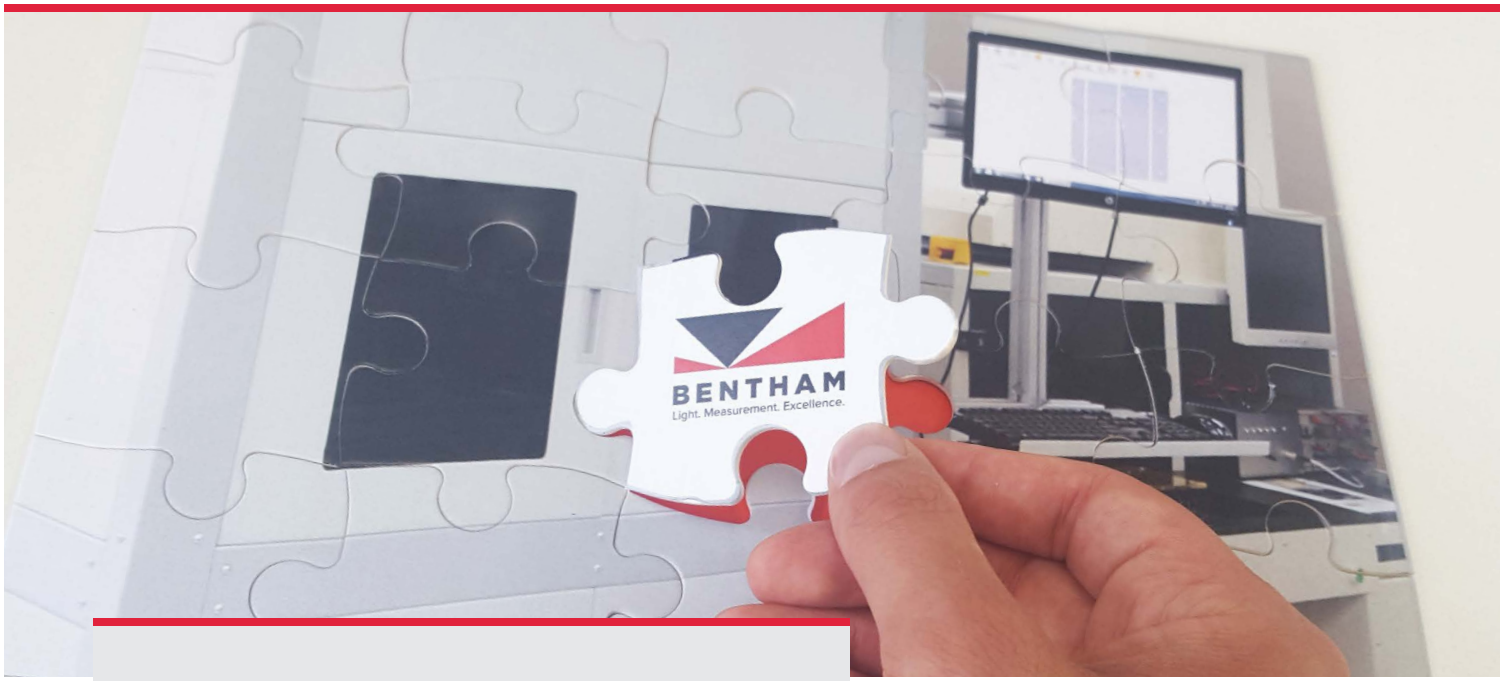
- Accurate TEC current setting for optimised detector performance
- Available as module or stand-alone unit
- For use with DH_30_TE

CPS50 Temperature Controller

Peltier Controller for the DH_50

- Accurate TEC current setting for optimised detector performance
- Available as stand-alone unit only
- For use with DH_50

Optical Metrology OEM
Bentham are the perfect fit



- Global leader in the development and manufacture of high performance scientific instrumentation
- Team of optical, mechanical and electronic design engineers offer customisation on every level
- Prototyping and low to high volume manufacture
- Reliable long-term OEM product source
- Excellent quality of product
- Sensitivity to cost concerns and commercial issues

Discover more online
www.bentham.co.uk/OEM

Detection Electronics

Ensure optimal detector performance and signal recovery with our range of detection electronics, aligned with our optical metrology applications.

- Complements range of detectors
- Modular and free-standing configurations
- Auxiliary electronics for detector operation
- Amplifiers and current meters for signal recovery

Modular

487 Dual-Channel Picoammeter Module

Optimum signal acquisition in DC systems

- High performance picoammeter with six decades of gain
- High gain accuracy and stability
- Single module for two detector systems

477 AC Current Pre-amplifier Module

Lock-in amplifier front end in AC systems with lock-in detection

- High performance lock-in amplifier pre-amplifier with six decades of gain
- High gain accuracy and stability
- Single module for two detector systems

498 AC Current Pre-amplifier/ DC Nanoammeter Module

Agile module for both AC and DC systems

- Incorporates both current pre-amplifier and nanoammeter
- High gain accuracy and stability
- Single module for two detector systems

496 DSP Lock-In Amplifier Module

Simple, intervention-free signal recovery in chopped light measurements

- Free running lock-in amplifier, with no user intervention required
- Two simultaneously running channels
- Signal sampling using high precision ADCs

474 Transformer & Amplifier Module

Lock-in amplifier front-end in AC systems for use with detectors including large DC signal component

- Optimal AC signal recovery from detectors having DC signal component
- Ultra-low noise gain
- Facility to permit detector voltage-biasing

215 High Voltage Power Supply Module

Ensures optimal function of photoemissive and photoconductive detectors

- Single voltage supply for photoemissive and photoconductive detectors
- Excellent stability
- Flexible control options

Free Standing

418F Optical Chopper Controller

High-performance optical chopper with free standing controller

- Reliable optical chopping
- Excellent phase jitter and frequency stability
- Research-grade specification, cost effective solution

ORM400 Picoammeter

Free-standing dual channel picoammeter

- High performance picoammeter with six decades of gain
- High gain accuracy and stability
- Single unit for two detector systems

218M Optical Chopper & Control Module

High-performance optical chopper solution with modular controller

- Reliable optical chopping
- Excellent phase jitter and frequency stability
- Research-grade specification, cost effective solution

Calibration Standards

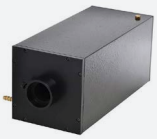
Whatever the application, reliable calibration is key. The route back to national standards. The foundation of measurement confidence. With our range of calibration standards, impart NMI traceability to your measurements.

- Source, detector and material standards
- Traceable to National Metrology Institute
- Minimise measurement uncertainties
- Re-calibration reminder program helps keep your calibrations up to date

CL3 Deuterium Spectral Irradiance Standard

Open-frame deuterium irradiance calibrator

- Spectral range 200-400nm, 30W lamp
- 200mm calibration distance
- Free-space use



CL7 Deuterium Spectral Irradiance Standard

Alignment-free deuterium irradiance calibrator

- Spectral range 200-400nm, 30W lamp
- No dark room, precision optical bench or alignment tools are required
- Directly adapts to entrance optic

CL2 Halogen Spectral Irradiance Standard

Open-frame quartz tungsten halogen irradiance calibrator

- Spectral range 250-3000nm, 100W lamp
- 500mm calibration distance
- Free-space use

CL6 Halogen Spectral Irradiance Standard

Alignment-free quartz tungsten halogen irradiance calibrator

- Spectral range 250-3000nm, 150W lamp
- No dark room, precision optical bench or alignment tools required
- Directly adapts to entrance optic

CL2_RI Spectral Radiant Intensity Standard

Open-frame quartz tungsten halogen radiant intensity calibrator

- Spectral range 250-3000nm, 250W lamp
- Stable, high radiant intensity
- Free-space use

CL2_IR Infrared Spectral Distribution Standard

Open-frame SiN emitter relative spectral distribution calibrator

- Spectral range 1-20µm, 40W emitter
- Enables IR calibration of spectroradiometers
- Evaluate IR spectrometer transfer function

SRS8 Halogen Spectral Radiance Standard

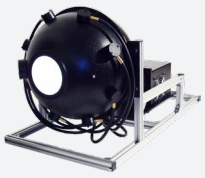
Integrating sphere, quartz tungsten halogen radiance calibrator, 50mm window

- Spectral range 250-2500nm, 50W lamp
- Excellent uniformity over 50mm diameter window
- Improve measurement uncertainties with superlative lamp stability

SRS12 Halogen Spectral Radiance Standard

Integrating sphere, quartz tungsten halogen radiance calibrator, 100mm window

- Spectral range 250-2500nm, 100W lamp
- Excellent uniformity over 100mm diameter window
- Improve measurement uncertainties with superlative lamp stability



ULS300 Variable Radiance Uniform Light Source

Integrating sphere with external quartz halogen source

- Spectral range 350-2000nm, 150W lamp
- Superlative uniformity over 50/100mm diameter window
- Variable radiance using bi-lateral slits

Sources Continued

CL-Hg-CAL Wavelength Calibration Standard

Low pressure mercury wavelength calibrator

- Spectral range 250-600nm
- Portable UV-vis wavelength calibration solution
- Runs directly from a 220V AC mains supply

Total Spectral Radiant Flux Standard

Quartz tungsten halogen flux calibrator

- Spectral range 350-2000nm, 250W lamp
- Easy to use E27 mount
- Stable, high radiant flux source

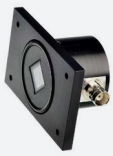
Reflectance

DRS-CAL Spectral Diffuse Reflectance Standard

Benflect reflectance reference standard

- Spectral range 250-2500nm
- Universal mounting to any spectrophotometer
- Stable, high diffuse reflectance

Detectors



Si-CAL Spectral Responsivity Standard

10x10mm UV enhanced silicon photodiode

- Spectral range 200-1100nm
- Excellent linearity, stability and ultra-low dark current
- Economical solution for UV-vis-NIR applications except low-light level

Ge-CAL Spectral Responsivity Standard

5mm diameter Germanium photodiode

- Spectral range 800-1800nm
- Large area detector with excellent linearity and stability
- Extend measurements further into SWIR

DH_IGA-CAL Spectral Responsivity Standard

3mm diameter Indium Gallium Arsenide photodiode

- Spectral range 800-1700nm
- Excellent linearity, stability and low dark current
- High performance photodiode

DH_IGA-EX_TE-CAL Spectral Responsivity Standard

3mm diameter thermo-electrically cooled, extended Indium Gallium Arsenide photodiode

- Spectral range 1000-2500nm
- Excellent linearity, stability and low noise
- Cover wide spectral range with one detector in AC mode only

DH_PBS_TE-CAL Spectral Responsivity Standard

3x3mm thermo-electrically cooled lead sulphide photodiode

- Spectral range 1-3µm
- Enhanced performance without need for liquid cryogen
- Practical solution for measurements to 3µm

DH_PBSE_TE-CAL Spectral Responsivity Standard

3x3mm thermo-electrically cooled lead selenide photodiode

- Spectral range 1-5µm
- Enhanced performance without need for liquid cryogen
- Practical solution for measurements to 5µm

DH_INSB-CAL Spectral Responsivity Standard

3mm diameter indium antimonide photodiode

- Spectral range 1-5.5µm
- Liquid nitrogen cooled, eight hour dewar hold time
- Optimal performance over 2-5µm

DH-MCT12-CAL Spectral Responsivity Standard

2x2mm mercury cadmium telluride photodiode, photoconductive operation

- Spectral range 2-12µm
- Liquid nitrogen cooled, eight hour dewar hold time
- Optimal performance over 5-12µm

DH-MC20-CAL Spectral Responsivity Standard

1x1mm mercury cadmium telluride photodiode, photoconductive operation

- Spectral range 5-20µm
- Liquid nitrogen cooled, eight hour dewar hold time
- Optimal performance over 12- 20µm

Py-CAL Spectral Responsivity Standard

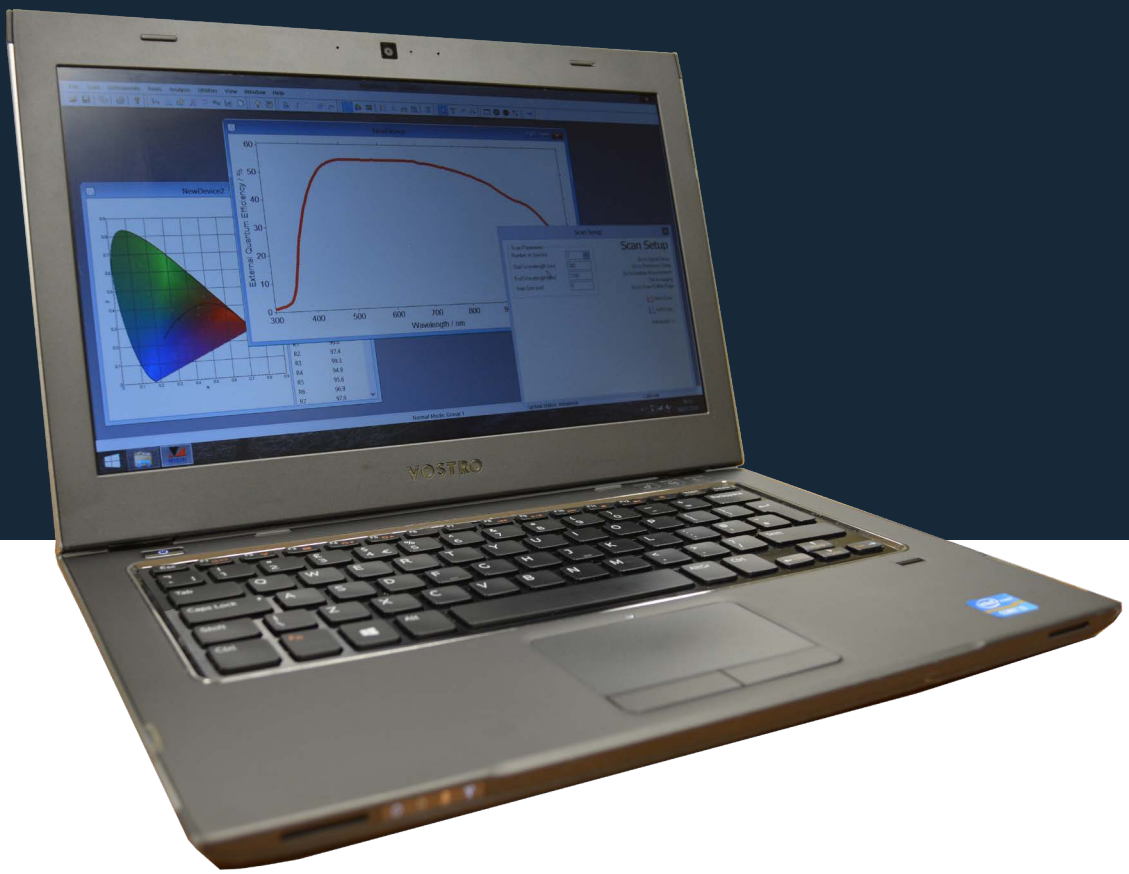
2x2mm DLATGS sensor

- Spectral range 1-30µm
- Cover extremely wide spectral range with one detector
- Supplied with power supply

Software

A range of applications ensure the ease of operation of our high performance light measurement components and systems.

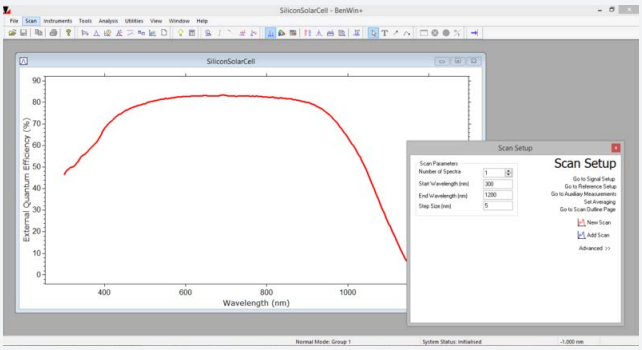
- High and low level applications, offered according to requirement
- Windows compatible
- Communications over USB interface
- Simple user interface



BenWin+ Spectral Acquisition Software

Comprehensive application for the automation and data acquisition from our instrument range

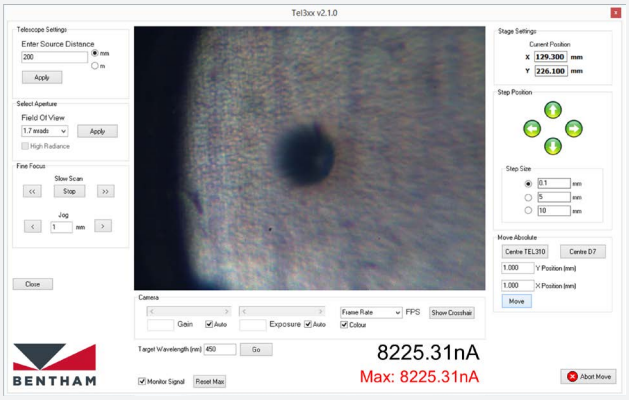
- Easy hardware automation
- Intuitive user interface
- Quickly access measurement results



BenWin+ Utilities

Range of utilities extend the capabilities of BenWin+

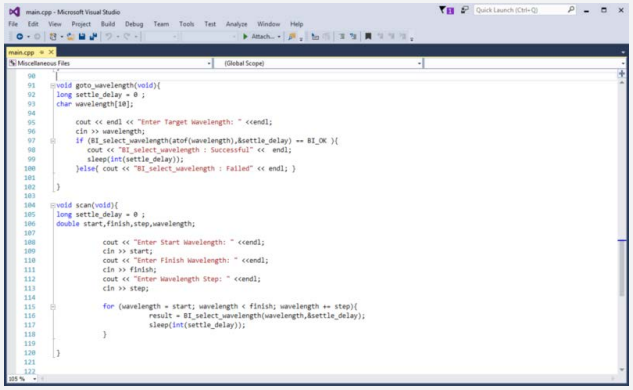
- Automate measurement accessories and entrance optics
- Produce post-scan calculations and reports
- User customisable



Software Development Kit

Software development platform for our range of instruments

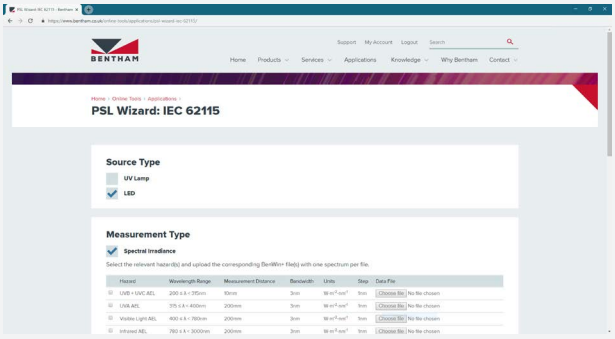
- Powerful suite of high-level functions
- Centred on dynamic link library (DLL)
- SCPI, C++, Delphi, Java, LabView, MatLab, Python and VBA



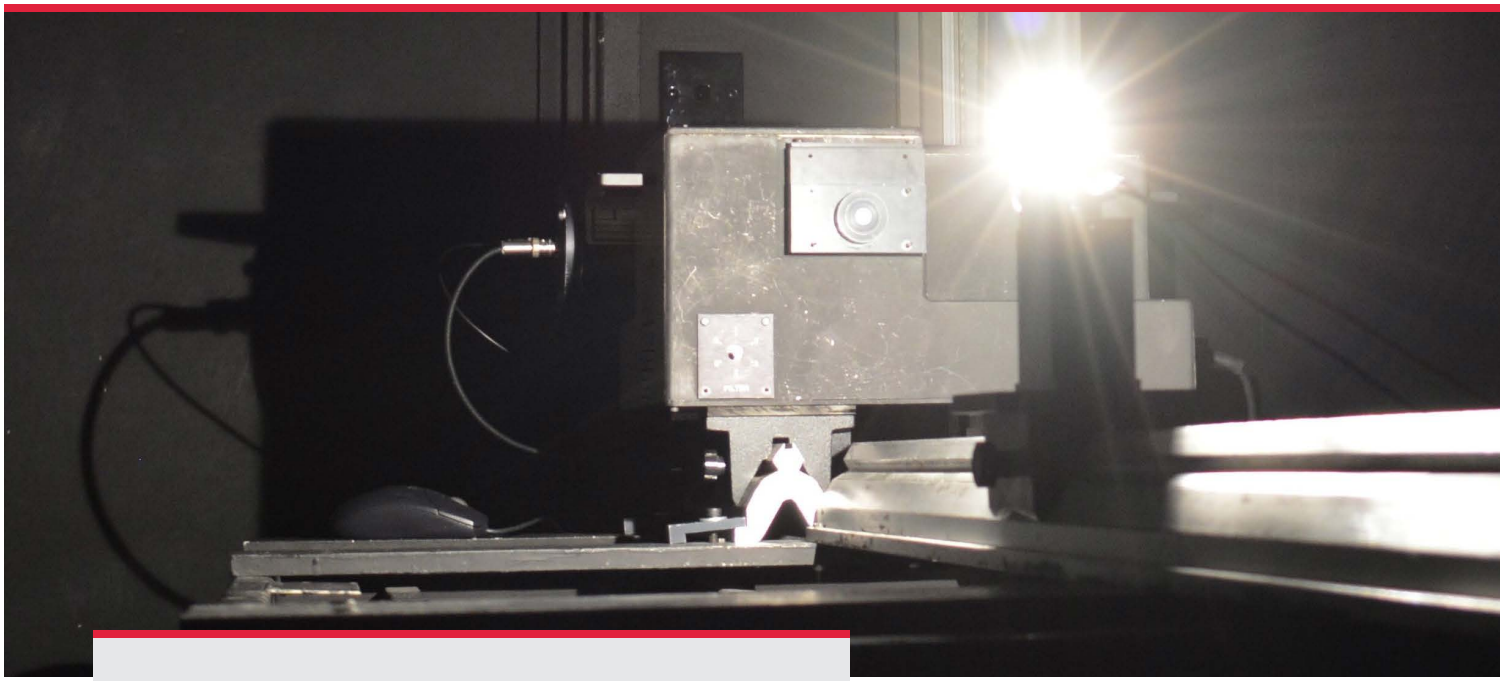
Online Tools

A growing range of web-based tools to facilitate your measurements and data analysis

- Optical metrology calculators and reporting tools
- Access tools wherever you are
- Confidential transfer of data



Traceable Calibration Services
Your link to National Standards



- Have confidence in your measurements with National Metrology Institute traceable calibrations
- Range of optical source and detector calibrations
- From receipt to return we track and take care of your artefact
- Fast turn-around guaranteed
- Calibrations traceable to PTB, Germany / NPL, UK.
- Annual re-calibration reminder program helps keep your calibrations up to date

Discover more online
www.bentham.co.uk/OEM

Since our establishment in 1975, we have earned an enviable reputation for high quality optical metrology instrumentation, built on a number of key in-house capabilities.

Working with you to understand your measurement challenges and leveraging our expertise, we are sure to deliver light measurement excellence to you.

Optical Design

A team of optical experts offer high-proficiency in both imaging and non-imaging optical design, with extensive use of Zemax modelling software together with proprietary in-house optical design optimisation software.

Mechanical Design

Our team of mechanical designers offer extensive practical experience in the design and specification for manufacture, calibration and alignment of optical components and systems for use from ultraviolet through to infrared.

Electronic Design

We offer leading expertise in both digital and analogue electronic circuit design and PCB layout, with extensive use of OrCAD for schematic capture and PCB layout, and PSpice for circuit simulation and characterisation.

Software Development

Our team of software developers create software with the user at the forefront. Our full software suite, easily integrated into your software development stream, can be broken down into three core platforms: EmBen, BenHW and BenWin+.

Optical Component Manufacture

We can offer specialist insight in precision optical alignment and calibration techniques, automated life time testing and product characterisation procedures and a dedicated production streams for OEM products.

Discover More at bentham.co.uk

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