

## The LightLab CIS series of Spectrum Enabled Integrating Spheres

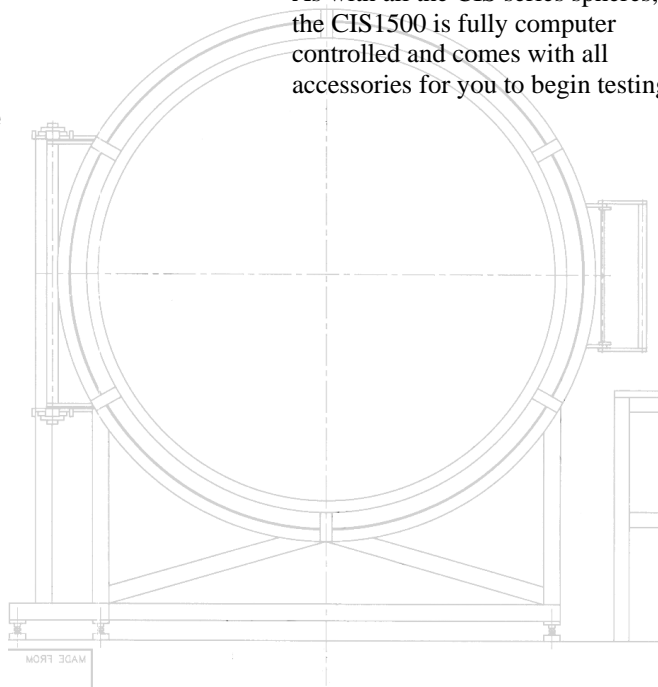
Introducing the LightLab International CIS series of spectrum enabled integrating spheres. A complete solution to your integrating sphere requirements. Incorporating cutting edge developments combined with the experience of more than a decade in the photometric field, the CIS series sphere has more to offer than any other on the market.

- Our fibre optic based sphere is two instruments in one. Each CIS series sphere combines conventional lumen output measurements with a solid state spectrometer. Imagine: a sphere that will measure a full colour spectrum.
- The fibre optic sensor in the CIS sphere eliminates the colour induced errors of photocell based spheres and is immune to temperature drift that plagues traditional sphere designs. The CIS series sphere is a complete integrated system. The three major components of the system, the sphere itself, the sensors and the control computer work in unison to automate the process of getting results.
- Fully integrated testing environment using the Windows operating system and our innovative step-by-step "guiding hand" control software make the LightLab sphere powerful, flexible and easy to use.
- Precision machined solid steel construction throughout provides for trouble free operation and reduced maintenance.
- Staff will be fully trained by LightLab technicians at your facilities.
- LightLab has a commitment to support second to none.



The CIS1500 1.5m diameter sphere is our standard model in this series. It can accommodate lamps and luminaires up to 600 mm in length.

As with all the CIS series spheres, the CIS1500 is fully computer controlled and comes with all accessories for you to begin testing.



LightLab's standard model CIS series integrating sphere is the CIS1500. The sphere itself is 1.5 metres in diameter and hinged vertically from a supporting pillar. One hemisphere is fixed to the framework, the other swings open to allow operator access. Whether the sample to be tested is suspended from above, below or horizontally in one of the three fixture mounting ports, it is always at a comfortable working height. An over-centre positive locking closure provides a lifetime of repeatable positioning of the hemispheres for accurate results.

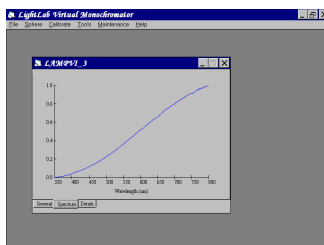
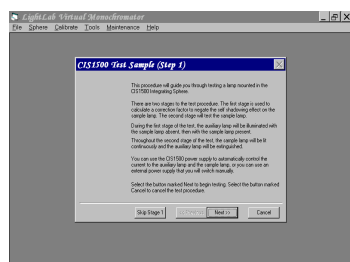
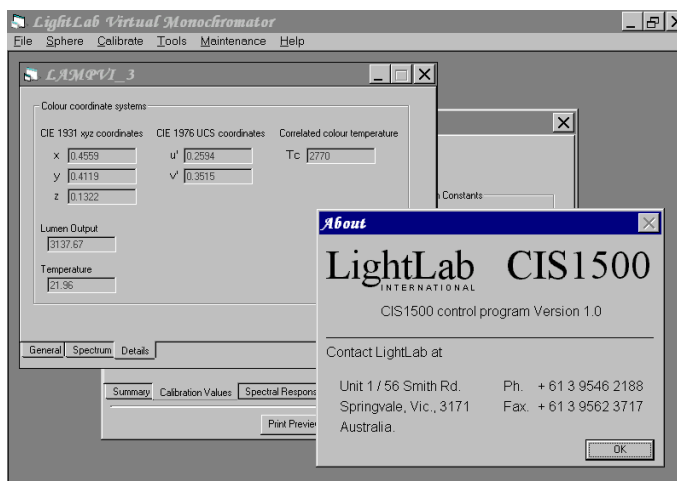
Inside, the sphere is coated with our spectrally neutral barium sulphate formulation to provide a true diffusing environment. Diffuse light is directed to the fibre optic sensor by the cone shaped direct light shield and thence to the solid state spectrometer in the computer. The sphere is sealed against light ingress and achieves a thermally stable interior. An RTD type temperature probe samples the interior temperature under computer control.



An auxiliary lamp is mounted into the swinging hemisphere and powered by a GPIB DC power supply controlled by the computer. During a test, the auxiliary lamp illuminates first the empty sphere then the sphere with sample to measure the self shadowing effect.

Sphere operation is fully computer controlled by the LightLab SPHERE program, which executes under Windows 95. SPHERE automates all sphere operations, from calibration, to testing, to viewing real time results. Each operation is divided into a series of simple steps; SPHERE guides you through each step, one at a time.

SPHERE generates LightLab format ASCII files containing the measured results from each test and can calculate: lumen output, XY and UV colour coordinates and correlated colour temperature. Test reports can be easily printed.



## Benefits of using a spectrometer

Traditional integrating spheres have used photocells as optical sensors. Unfortunately, photocells suffer from two major disadvantages.

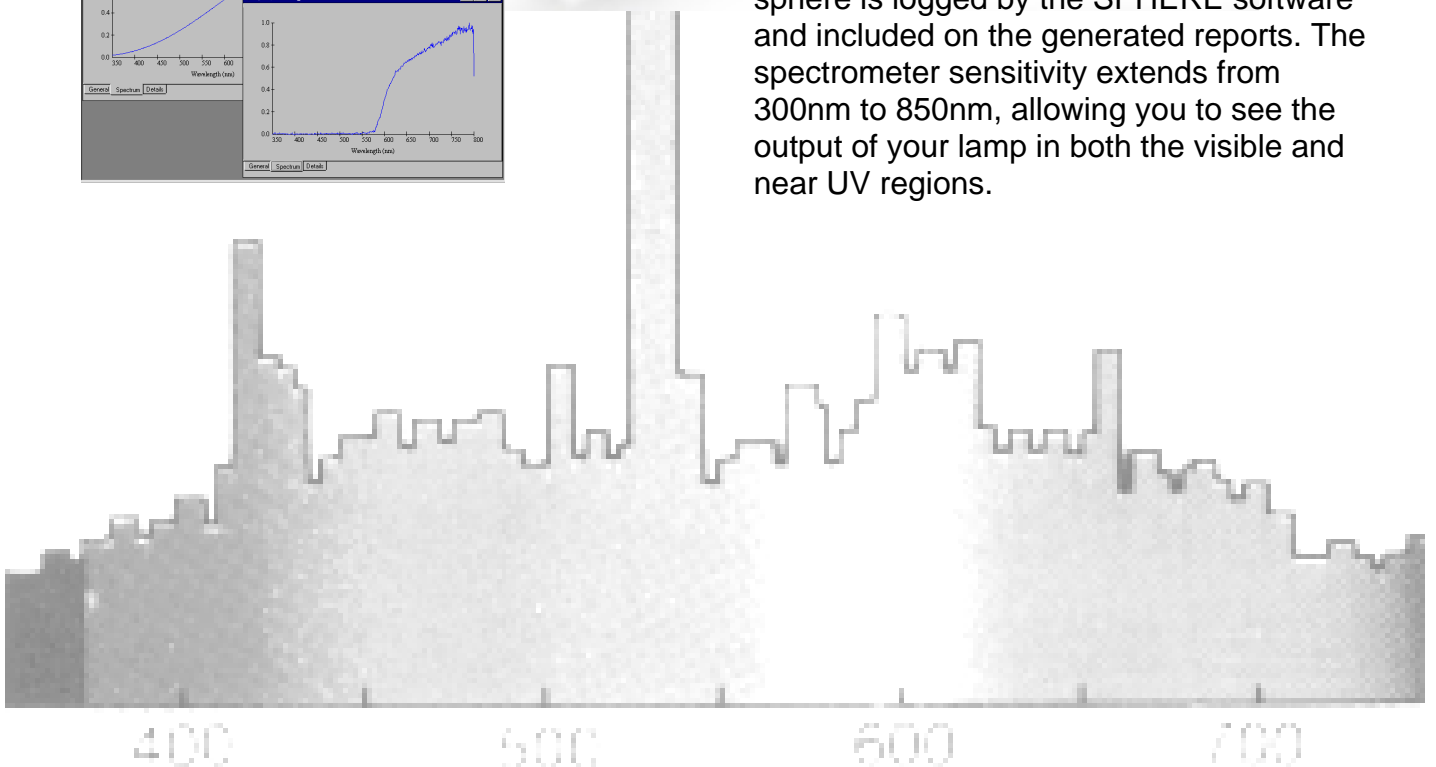
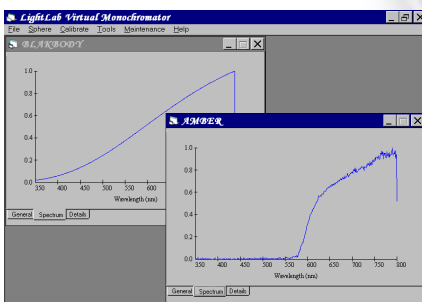
Firstly, the response of a photocell changes with temperature and the temperature inside an integrating sphere can vary considerably.

Secondly, for optimal performance, the paint inside the sphere must have a flat response across the entire visible spectrum for the photocell to register the correct output. Although there have been advances in paint technology, none to date has achieved this.

All LightLab CIS series spheres use a fibre optic sensor coupled with a solid state spectrometer in place of a photocell. By removing the sensor from direct contact with the sphere, temperature induced effects are neutralised.

The spectrometer samples the entire visible spectrum in 0.5 nanometre steps. Each spectrometer channel is calibrated independently. Hence, when measuring the spectrum from the sphere, the spectral reflectance characteristics of the paint are irrelevant to the lumen output measurement.

The spectrum measured by the CIS series sphere is logged by the SPHERE software and included on the generated reports. The spectrometer sensitivity extends from 300nm to 850nm, allowing you to see the output of your lamp in both the visible and near UV regions.



## Standard Configuration

The CIS series sphere comes standard in the following configuration.

- CIS1500 1.5 metre integrating sphere with fibre optic sensor and RTD temperature probe.
- IBM PC compatible Pentium computer with Super VGA screen and Hewlett Packard Laser Printer. All LightLab and third party software is pre-installed and tested.
- SPHERE Windows95 integrating sphere control program.
- 2 channel GPIB Tectronix DC power supply.
- Mounting fixtures for 3 different varieties of lamp bases.
- One week training at our Melbourne facility.

Three days training on completion of installation.

## Accessories / Options

- One set of three standard lamps with National Measurement Laboratory or NIST certificates. Lamps are calibrated for lumen output and spectral irradiance.
- Stabilised AC power supply to your requirements.

## Technical Specifications

**SPHERE** The sphere is constructed from two moulded fibreglass hemispheres with steel inserts for rigidity. The hemispheres are attached to a solid steel frame. Ports are provided for the auxiliary lamp, fibre optic sensor, RTD temperature probe and 3 mounting fixture locations.

**COMPUTER** An IBM compatible Pentium II 64MB of memory, 8.4GB hard disk and SVGA display. Hewlett Packard 600dpi Laser Printer.

**SPECTROMETER** Solid state 2000 channel spectrometer covering the visible and near UV regions from 300 to 850 nm in 0.5 nm steps.

**TEMPERATURE PROBE** Sealed RTD type. Temperature range from 0 to 600° C.

**DC POWER SUPPLY** A two channel GPIB DC power supply. One channel is dedicated to operating the auxiliary lamp. The other is available for powering samples and is supported by the SPHERE software.

**STANDARD LAMPS** Standard lamps are rugged, frosted 120V or 240V tungsten halogen lamps. Lamps are supplied in sets of three and come with calibration certificates for lumen output and spectral irradiance traceable to a national laboratory.

To order, contact LightLab International or our authorised agents.