SRS8
Standard of Spectral Radiance

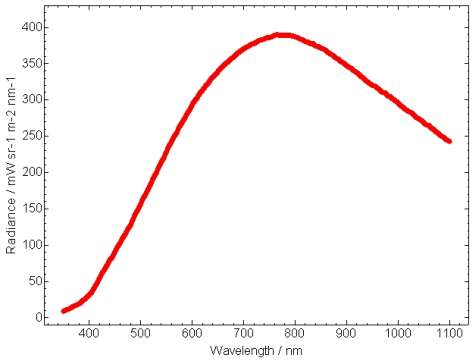
The SRS8 is a uniform source calibrated in spectral radiance designed for routine calibration of spectroradiometers, telephotometers, luminance meters etc. It comprises a 200mm diameter integrating sphere with a 50mm diameter window (diffuser) and is easily mountable on all optical bench systems or flat surfaces.

The calibration is performed with respect to National Physical Laboratory (NPL Teddington, UK) calibrated lamps held by Bentham. Alternatively, direct NPL calibration can be offered.

The SRS8 is fitted with a 50W quartz halogen lamp. It requires a precision constant current dc power supply at 4.000A.

A small diameter aperture can be fitted to the window (option **RI**) and is supplied with spectral radiant intensity calibration.

Standard calibration range is 380-800nm, but this can be extended to cover 300-2500nm as defined in the options table below. Other options include quartz diffuser window in lieu of glass and a filter holder to accommodate a range of neutral density and colour temperature shifting filters.



Typical Values	
Luminance:	18,000 cd.m^{-2}
Colour Temperature:	3200 K
Chromaticity:	x = 0.4262 y = 0.4077

Options	
RI Calibration with radiant intensity adapter	**EX1** Extension of calibration from 800nm to 1100nm
FH Filter holder up to 50 x 50mm	**EX2** Extension of calibration from 800nm to 2500nm
Q Quartz diffuser window	**EX3** Extension of calibration from 300nm to 380nm, used with option Q
EX-ND Neutral density filter with additional calibration	**EX-F** Customer selected filter with additional calibration

Bentham offers two variants of a 250W rated constant current p.s.u. for use with calibration lamps, models 605 and 608. The latter includes a current ramping facility for lamp switch on and off.

605 p.s.u.

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Spectral Radiance

This is probably the most common spectroradiometric measurement, especially in the visible region and is most easily visualised as surface brightness. It is useful for characterising displays.

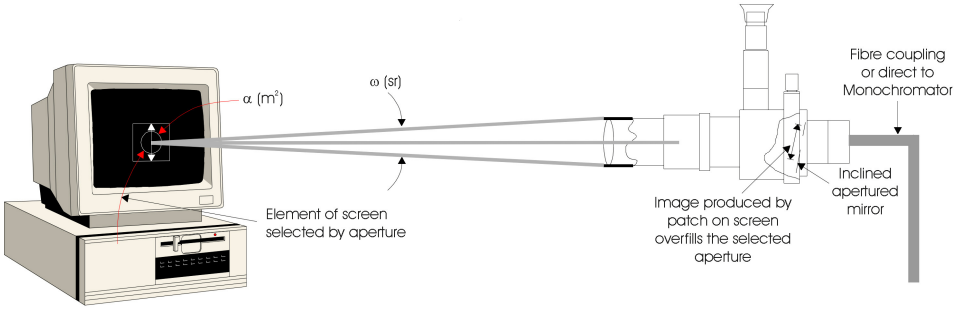

Fig.1

The solid angle ω is set by the diameter of the telescope lens and its distance to the source. The area of the screen from which light is measured is determined by the size of the aperture used in the telescope. For radiance measurement it is essential that the element of the screen actually measured is determined only by the aperture. In practice this is easily achieved by ensuring that the image of the source produced at the aperture overfills the aperture.

The system is calibrated by measuring from a source of known spectral radiance (Bentham SRS8) using the selected aperture. Once again it is essential that the image of the source overfills the aperture.

Accurate measurement of luminance from most sources also requires control of the viewing direction. For lambertian sources (e.g. SRS8) the viewing direction does not matter as the area viewed increases at the same rate as the output in the view direction decreases. (The same effect makes the full moon appear as a flat disc).

Most display devices, however, are not lambertian and show a variation in output as a function of viewing direction which is much greater than that due to the cosine law.

In these cases, it is important to ensure that a constant (usually normal) view direction is used.

Spectral Radiant Intensity

This parameter only has significance for sources that are viewed from a sufficiently large distance compared with their maximum dimension that they appear as a single point of light with no discernible shape. The units are: W sr^{-1} nm^{-1}.

The most common example is LED indicators.

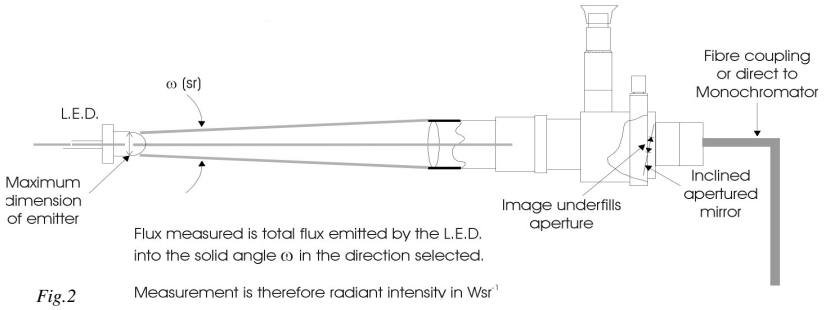

Fig.2

For this measurement we need to measure the flux emitted from the whole of the source into a known solid angle.

This can be achieved by selecting an aperture for the TEL301 such that the entire image of source passes through the aperture.

Calibration is carried out using a small lamp calibrated in spectral radiant intensity or by placing a small aperture of known area in front of the emitting window of the SRS8 spectral radiance standard. The spectral radiant intensity of the point source so formed is calculated by multiplying the spectral radiance area of the aperture.

It will be noted that in this measurement there are no compensating effects occurring as the lens-to-source distance is changed. It is essential therefore that calibration and measurement distance are either kept the same or that a correction is made according to the inverse square of the distance.