

MULTIPLE WAVELENGTH PORTABLE SPECULAR REFLECTOMETER 15R-RGB



The Multiple Wavelength Portable Specular Reflectometer Model 15R-RGB builds on the functionality of the model 15R-USB. It is a portable Specular Reflectometer designed for reflectance measurements of highly specular flat or curved mirrors for solar power applications. The 15R-RGB is powered by internal rechargeable Nicad batteries that operate for over 15 hours on a charge. An operator can easily take reflectance readings at the rate of 2 to 6 per minute and record the readings to data sets stored in the instrument. A USB port is provided for maintaining and downloading data sets and upgrading the firmware.

The model 15R-RGB adds the capability to measure reflectance in five broad wavelength bands from blue to near IR using a white LED source and selectable filters. In the standard configuration, a filter wheel selects one of the detector response curves; red, green, blue, white or IR. Also selectable are five apertures with full acceptance angles of 4.6, 7, 15, 25 and 46 mrad, expanding the range of available angles.

These features make the Model 15R-RGB ideal for characterization and monitoring of quality control in the manufacture and maintenance of solar mirrors and thermal control surfaces.

- **BATTERY OPERATED**
- **REPEATABLE TO +/- .002 REFLECTANCE UNITS**
- **IDEAL FOR CHARACTERIZATION AND QUALITY CONTROL OF HIGHLY SPECULAR MIRRORS FOR CONCENTRATED SOLAR POWER APPLICATIONS**

INSTRUMENT DESCRIPTION

The instrument uses a White LED and collimating optics to produce a 10 mm diameter source beam. The reflected beam is focused through one of five thumbwheel selectable apertures. Standard full acceptance angles are 4.6, 7, 15, 25 and 46 milliradians.

Two adjustable support screws on the base of the instrument are used to align the reflected beam with the receiver optics. A third, central support screw has a stop position for measuring first surface reflectors and is adjusted according to thickness for second surface reflectors. The LED light source is electrically chopped and the reflected beam is measured synchronously to eliminate errors due to stray light. In addition, the light source is monitored with a reference detector to minimize thermal drift.

A gain adjustment allows direct readout of reflectance to three digits. A calibration standard is provided that installs in the base of the instrument.

To measure reflectance, the operator simply selects the filter and the aperture and then positions the 15R-RGB on the reflector surface. The support screws are then adjusted to produce the maximum reading on the liquid crystal display.

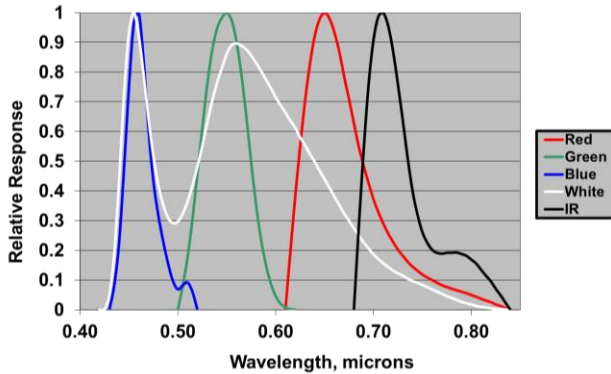


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SPECIFICATIONS

MEASUREMENT DESCRIPTION: The model 15R-RGB measures reflectance in five broad wavelength bands from blue to near IR using a white LED source and selectable filters. In the standard configuration, a filter wheel selects one of the detector response curves; red, green, blue, white or IR as shown below. Also selectable are five apertures with full acceptance angles of 4.6, 7, 15, 25 and 46 mrad.



LIGHT SOURCE: White LED source: Source size 0.005" for easier alignment on small receiving apertures.

OPTICS: The LED is mounted behind a small aperture which provides a near point source of light. This is collimated into a beam by a converging lens. An identical lens focuses the reflected beam into the collection aperture.

SPECTRAL RESPONSE MONITORING: 495 and 590 nm longpass filters provided to track spectral response.

GAIN ADJUST: Adaptive gain function switches to the proper reflectance value range for the different level outputs with each filter selection.

VIEWING OPTICS: The detector can be rotated out of the reflected beam and the reflected image viewed through an eyepiece in the top of the instrument.

ALIGNMENT SYSTEM: Three threaded supports provide for adjustment to bring the reflected beam into alignment with the receiving optics and to compensate for different thicknesses of second surface reflectors.

CALIBRATION STANDARD: A quick connect mirror reflectance standard is provided that magnetically mounts into the base of the instrument.

EXTERNAL PRECISION REFERENCE: For measurements using the 4.6 or 7 milliradian apertures a precision external mirror is required for calibration. The model 15R-EPS provides a highly specular first surface reference mirror with a magnetically mounted cover to protect the mirror when it is not in use. For calibration of the 15R reflectometer the supports for the instrument fit in detents near the corners of the mirror mount.

REPEATABILITY: +/- 0.002 reflectance units.

RESOLUTION: A 3 1/2 digit LCD display indicates reflectance directly to 0.1 percent reflectance. A gain adjust knob allows the user to calibrate the instrument against the mirror reflectance standard provided.

OPERATING TEMPERATURE: 32 to 122 F (0 to 50 C).

POWER: Rechargeable batteries provide 15 hours of continuous operation. A universal smart battery charger is provided; input power, 100-240 VAC, 50-60 Hz.

WEIGHT: 2 1/4 pounds (1.0 kg.)

PHYSICAL DIMENSIONS:

