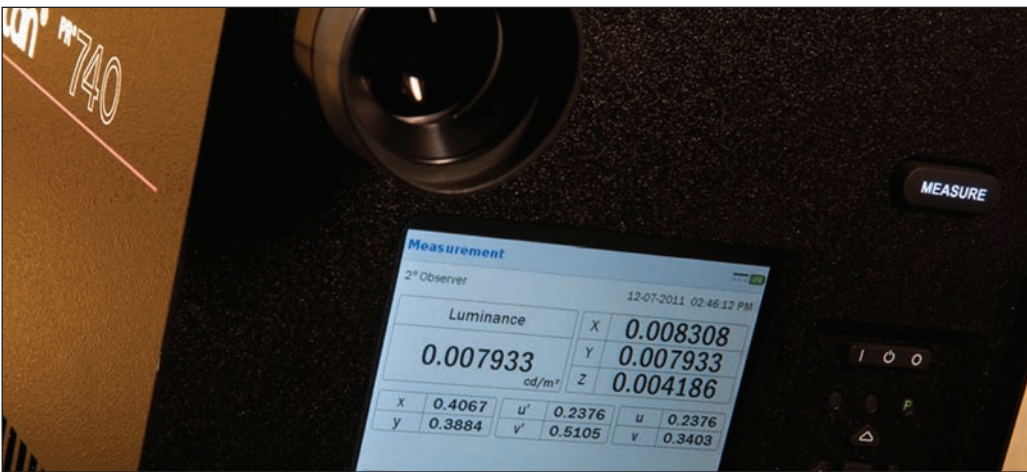




PR-730 / PR-735 and PR-740 / PR-745 SpectraScan® Spectroradiometers



Introduction

We have taken our decades of experience and built it into the ultimate spectral measurement instruments—the cooled detector PR-730/735 and PR-740/745 SpectraScan Spectroradiometers. Both the PR-730 and PR-740 cover the visible spectrum, sampling from 380 to 780 nm, while the PR-735 and PR-745 measure from 380 to 1080 nm—ideal for near IR testing.

Both instruments:

- Exhibit virtually no polarization error or stray light.
- Can be equipped with up to 8 measuring apertures.
- Can be equipped with twice as many detectors as other instruments in their class.
- Communicate over USB, RS232 and Bluetooth (wireless) interfaces.
- Provide a full-color touch screen display and SD card measurement storage for menu navigation and measured data presentation.

The PR-740/745 has the two most wanted attributes of any light measuring instrument—superior sensitivity and speed. While possessing the same capabilities as the PR-730/735, it is 20 times more sensitive and approximately 250 times faster than the PR-730/735. When ultra-low light capability is not necessary, the PR-730 measures up to 215 times higher than the PR-740 without additional ND filters.

With an ever increasing number of units to test, and ever decreasing levels that need to be measured, the PR-740/745 speed and sensitivity capabilities can provide a cost effective solution to speeding up the QC phase of the manufacturing process.

Features

Bluetooth wireless communication frees you from being tethered to a PC.

The PR-730/740 can be configured to trigger a source, such as a strobe or flash.

When a traditional RS232 interface is required, the PR-730/740 can be equipped accordingly.

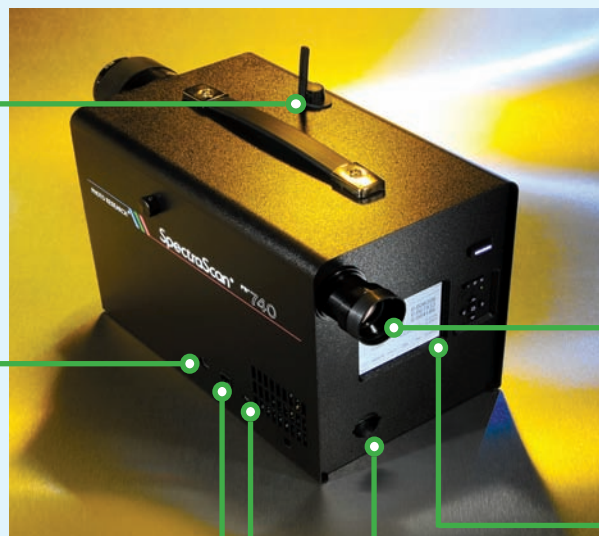
The standard USB interface makes connecting to any PC a snap.

Need portability? An internal, long lasting Li-ion battery is available.

Pritchard through the lens optics means 100% target alignment accuracy.

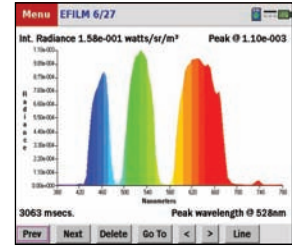
The hi-res, full color touch screen display provides effortless menu navigation and enhanced data display including the SPD of the measured sample.

Automatically save thousands and thousands of measurements on a Secure Digital (SD) card.



Features

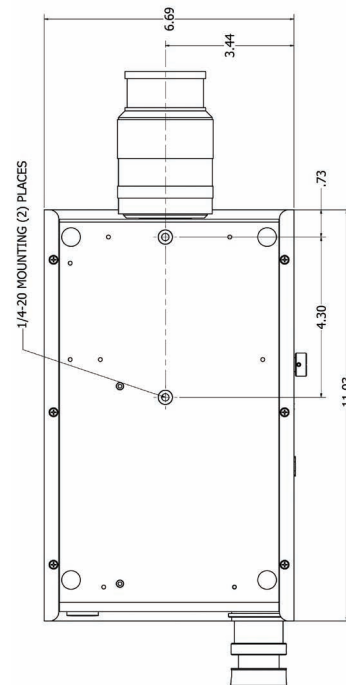
A new feature to the SpectraScan line—variable spectral bandwidth—is available on both the PR-730 and PR-740. One of 3 bandwidth settings (2, 4 or 8 nm for the PR-730 / 740—4, 8 or 14 nm for the PR-735 / 745) can be selected automatically.



The patented AutoSync[®] feature insures accurate results regardless of the refresh or backlight characteristics of the device under test by optimizing the measurement to the temporal characteristics of the device.



When you need to take the SpectraScan out in the field, an optional Li-ion battery is available that provides more than 8 hours of continuous use. The PR-730 / 740 are the only instruments in their class that offers this flexibility.



Bottom View

Accessories



A wide variety of lenses and ND filters

A full range of optical accessories are available for the PR-730/740 or PR-735/745 to extend the measurement capabilities beyond radiance and luminance and to enhance the dynamic range of the instruments.

These accessories enable measurements of:

- Radiance and Luminance—MS-75, accessory lenses—see lens chart at end of brochure, FP-730 and LA-730
- Radiant and Luminous Flux —IS-730 Integrating sphere—designed especially for LED's.
- Radiant and Luminous Intensity -LR-127 LED Analyzer and LR-730 LED Receptor (not shown)
- Irradiance and Illuminance—CR-730 Cosine Receptor, ICC-730 Integrating Sphere and RS-3 Reflectance Standard
- Reflectance—RS-3 and SRS-3 Reflectance Standard



MS-75 Objective Lens

Radiance and Luminance—The majority of radiance ($w/sr/m^2$) and luminance (fL or cd/m^2) measurements are performed using the wide range of objective lens including the standard MS-75, a 75 mm lens focusable from 14" to infinity, a 7.5 mm wide angle lens, a series of close-up lenses with a 0.5X to a 5X magnification factor, a 2, 4 or 10 foot fiber probe (FP-730) with a 0.125" measuring diameter and a direct contact luminance adaptor (LA-730) that includes an ambient light shield.



IS-730 Integrating Sphere

Radiant Flux and Luminous Flux—For determining total radiant (watts) or luminous (lumens) flux of LED's or other small light sources, select the 3" diameter IS-730 integrating sphere provides a convenient and easy to use solution. A wide variety of dual lead LED's or miniature lamps can be sampled. The mounting fixture includes the ability to compensate for the length of the sample to insure correct orientation.



LR-127 LED Analyzer

Radiant and Luminous Intensity—Two accessories, the LR-127 and the LR-730, are designed to directly provide results in radiant (w/sr) or luminous (lumens/ sr or candelas) intensity for LED's or other small lamps. The LR-127 was developed to test LED's to the CIE 127 Technical Report for both Far (A) and Near (B) conditions utilizing the same setup for both tests—simply change from Condition A to Condition B by repositioning a slide.



CR-730 Cosine Receptor

Irradiance and Illuminance—For irradiance (w/m^2) or illuminance (fc or lux) incidence measurements, the CR-730 and or the ICC-730 can be added to the suite of accessories. The CR-730 is a true cosine corrected diffuser that rotates 360° about the optical axis making it possible, for example, to test overhead luminaires with the instrument resting on a bench top. The ICC-730 is a 3" integrating sphere with a 1" measuring port that is fully baffled and designed for measuring the integrated incidence of samples.

Accessories

Reflectance—If you need to conduct reflectance tests, or as another means of measuring light incident on a plane (irradiance / illuminance), the RS-3 and SRS-3 reflectance standards are available. The 2" diameter is highly lambertian and exhibits superior reflectivity (98—100% throughout the visible spectrum) and is constructed of durable polytetrafluoroethylene (PTFE). It is encased in a black anodized aluminum housing with a protective cover and features an SAE 1/4-20 thread.



RS-3 Reflectance Standard

Filters —To extend the dynamic range of the SpectraScan, a wide range of neutral density filters (10X—10,000X attenuation) are available.

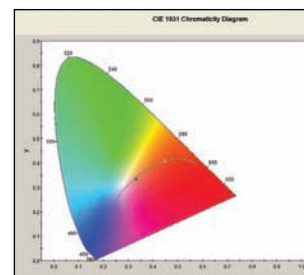


Neutral Density Filter

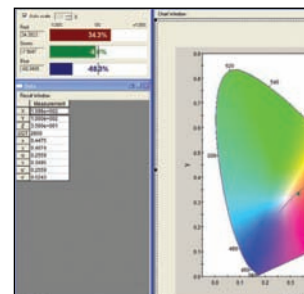
Software

Remote Mode is a standard feature and makes it possible to control the instrument from a custom application as easy as sending and receiving text characters over any of the available interfaces. If programming with an SDK is preferable to an ASCII based communication protocol, it is available as an option.

SpectraWin 2[®] is a full featured Windows based software that makes measurements, graphically displays results and has powerful data manipulation capabilities. It is compatible with XP, Vista or Windows 7 (32 or 64 bit). Measurement results include luminance (or illuminance, Lumens, candelas), CIE chromaticity (1931, 1960 and 1976 color spaces), CIE, CCT. An extensive data manipulation tool kit is standard with SpectraWin 2..



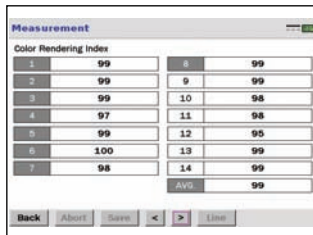
An RGB Display Cal Module for SpectraWin 2 provides a spectrally based interactive solution for automating the process of calibrating display or digital projector white points. Calibration is performed based on another (learned) display, or user entered specifications (luminance and chromaticity).



User Self Calibration Software is available if you wish to calibrate your instrument in-house. This capability can be a cost-saver especially where multiple instruments at the same location are involved, and more importantly insures that the instruments you rely on to help insure the quality of your product is always properly calibrated and traceable to NIST. Please contact Photo Research regarding standards required for calibrating the SpectraScan.

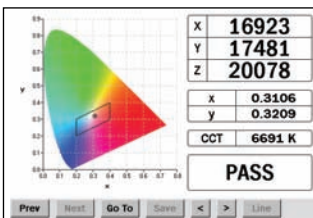
Measurement Capabilities

- Luminance—Footlamberts (fL) and cd/m^2
- Chromaticity—CIE 1931 x, y —1960 u, v
- Correlated Color Temperature (CCT) in Kelvins
- Dominant Wavelength—0.1 nm resolution
- Spectral Power Distribution (SPD) graph
- Display White Point calibration
- $L^*a^*b^*$, $L^*u^*v^*$ and ΔE^*
- Peak WL and Integrated Radiance



Color Rendering Index			
1	99	8	99
2	99	9	99
3	99	10	98
4	97	11	98
5	99	12	95
6	100	13	99
7	98	14	99
		Avg	99

As lighting technologies move from traditional incandescent, HID / HMI and fluorescent lamps to LED replacements, an important tool to help determine the color rendering capability of the lamp is the CIE Color Rendering Index (CRI). This is especially important when multiple lighting technologies are utilized in the same environment. An on-board CRI measurement mode that calculates all 14 CRI indices and the average CRI (using indices 1–8) based on user specified parameter is available for the SpectraScan.



The SpectraScan can be used as a color GO / NO Gauge with the CIE Pass / Fail Region feature. You can define an ellipse (circle), rectangle (square) or polygon (up to 10 sides). Following a measurement, if the measured color point falls within the specified region, PASS is displayed if not, FAIL. This is an ideal tool for repetitive production QC testing or device color uniformity.

Applications



Aerospace—Aerospace displays, regardless of the model, present unique challenges in that required capabilities range from very low (0.1 fL) to very high (10,000 fL) photometric levels of small areas. The SpectraScan, especially the PR-740, meets these challenges by providing multiple apertures, variable bandwidth and excellent sensitivity.



Displays / HDTV's—Photo Research SpectraScans have been providing solutions to the computer display and TV markets for decades. It is now possible to easily address one of the toughest tasks, spectral contrast measurements, without having to rely on a second instrument.



Automotive—SpectraScans have been used in the automotive industry world wide since their inception. Auto makers and their suppliers favor them because unlike other models, they are able to meet requirements very similar to aerospace applications—low level measurements of small areas.



R & D—The SpectraScan, because of its cooled detector, multiple apertures, variable bandwidth, extreme low light level and wide dynamic range capabilities and the ability to address a myriad of measurement applications is an ideal choice for research and development projects.



Components—The SpectraScan is not just a luminance meter. Its wide range of accessories can address virtually any light measurement application. For example, the LR-127 LED Analyzer is designed to measure discrete LED's for conformity to the CIE 127 Technical Report—Measurement of LED's. An integrating sphere can be added to provide total radiant or luminous flux capability.

Specifications

	PR-730	PR-740	PR-735	PR-745
Wavelength Range	380–780 nm		380–1080 nm	
Detector Elements	512 Cooled Detectors			
Spectral Bandwidth <i>Call factory for details</i>	Opt. 1—Call factory or visit www.photoresearch.com for details Opt. 2—Automatically Switchable—2, 4 and 8 nm		Opt. 1—Call factory or visit www.photoresearch.com for details Opt. 2—Automatically Switchable—4, 8 and 14 nm	
Exposure Time Range	12 ms—5 min	7 ms—2 min	12 ms—5 min	7 ms—2 min
Approximate Measurement Time @ 1.00 fL (3.34 cd/m ²) with 2° Aperture	75,000 ms	300 ms.	37,500 ms	150 ms
Wavelength Accuracy	< 0.4 nm		< 0.8 nm	
Spectral Resolution	1 nm		2 nm	
Digital Resolution	16 Bits			
Available Measuring Apertures (Select up to 8 per instrument)	2°, 1°, 1/2°, 1/4°, 1/8°, 0.2°, 0.1°, 0.1° x 1° (Hor. Slit), 0.1° x 2° (Ver. Slit), 0.5° x 1.5° (Hor. Slit)			
Standard Lens	MS-75—75 mm			
Luminance Sensitivity for Illum. A (2856K)* +	1.00E ⁻⁴ fL (3.43E ⁻³ cd/m ²) with 2° aperture	5.00E ⁻⁶ (1.71E ⁻⁵ cd/m ²) with 2° aperture	5.00E ⁻⁵ fL (1.71E ⁻⁴ cd/m ²) with 2° aperture	2.50E ⁻⁶ (8.55 ⁻⁷ cd/m ²) with 2° aperture
Luminance Accuracy*	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 3.00E ⁻³ fL (1.03E ⁻² cd/m ²) with 2° aperture	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 1.50E ⁻⁴ fL (5.14E ⁻⁴ cd/m ²) with 2° aperture	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 1.50E ⁻³ fL (5.15E ⁻³ cd/m ²) with 2° aperture	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 7.50E ⁻⁵ fL (2.57E ⁻⁴ cd/m ²) with 2° aperture
Luminance Repeatability*	≤1% at 3.00E ⁻³ fL (1.03E ⁻² cd/m ²) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)	≤1% at 1.50E ⁻⁴ fL (5.14E ⁻⁴ cd/m ²) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)	≤1% at 1.50E ⁻³ fL (5.15E ⁻³ cd/m ²) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)	≤1% at 7.5E ⁻⁵ fL (2.57E ⁻⁴ cd/m ²) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)
Color Accuracy*	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 3.00E ⁻³ fL (1.03E ⁻² cd/m ²) with 2° aperture	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 1.50E ⁻⁴ fL (5.14E ⁻⁴ cd/m ²) with 2° aperture	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 1.50E ⁻³ fL (5.15E ⁻³ cd/m ²) with 2° aperture	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 7.5E ⁻⁵ fL (2.57E ⁻⁴ cd/m ²) with 2° aperture
Color Repeatability*	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 3.00E ⁻³ fL (1.03E ⁻² cd/m ²) with 2° aperture	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 1.50E ⁻⁴ fL (5.14E ⁻⁴ cd/m ²) with 2° aperture	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 1.50E ⁻³ fL (5.15E ⁻³ cd/m ²) with 2° aperture	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 7.5E ⁻⁵ fL (2.57E ⁻⁴ cd/m ²) with 2° aperture
Polarization Error	<0.2%			
Stray Light	<0.06%			
Storage	Secure Digital (SD) Card			
AutoSync Range	20 to 2000 Hz			
Interfaces	USB, Bluetooth, RS232			
Power Requirements	Rechargeable Li-ion battery or AC Adapter (90—240 VAC)			
Battery Life	>8 hours			
Weight	13.25 lbs. (6.01 kg)			
Dimensions	11.03 in. x 6.69 in. x 8.0 in. (28.0 cm x 17.0 cm x 20.3 cm)			
Temperature / Humidity	34° to 95° F (1° to 35° C) / 0–90% non-condensing			

* Luminance values are calculated using the 2° aperture, and 8 nm bandwidth for the PR-730 / 740 and 14 nm bandwidth for the PR-735 / 745.

* Minimum sensitivity values are at 10:1 signal-to-noise

Specifications subject to change without notice.

Aperture vs Measurement Spot Size (PR-730 & PR-740)

Access.	Distance	Aperture				
		2°*	1°	0.5°	0.250°	0.10°
MS-75 (355 mm to infinity)	355 mm	10.5 mm	5.25 mm	2.63 mm	1.315 mm	0.525 mm
	305 m	10.64 m	5.32 m	2.66 m	1.33 m	532 mm
SL-0.5X	94.1 to 137 mm	3.0 to 5.08 mm	1.5 to 2.54 mm	0.75 to 1.27 mm	0.375 to 0.635 mm	0.15 to 0.254 mm
SL-1X	46 to 66 mm	1.78 to 2.64 mm	0.890 to 1.32 mm	0.445 to 0.660 mm	0.226 to 0.330 mm	0.089 to 0.132 mm
MS-7.5	100 mm	35.0 mm	17.5 mm	8.75 mm	4.38 mm	1.75 mm
	30.5 m	10.64 m	5.32 m	2.66 m	1.33 m	532 mm
LA-730	Contact	13.2 mm	13.2 mm	13.2 mm	13.2 mm	13.2 mm
FP-730	Contact	3.17 mm	3.17 mm	3.17 mm	3.17 mm	3.17 mm

* Minimum distance with MS-75 and 2° aperture = 508 mm

PR-730 Luminance Range (in fL)*

Accessory	Aperture				
	2°	1°	0.5°	0.250°	0.10°
MS-75	1.00E ⁻⁴ – 1.40E ⁴	4.00E ⁻⁴ – 5.60E ⁴	1.60E ⁻³ – 2.24E ⁵	6.40E ⁻³ – 8.96E ⁵	4.00E ⁻² – 5.60E ⁶
SL-0.5X	1.00E ⁻⁴ – 1.40E ⁴	4.00E ⁻⁴ – 5.60E ⁴	1.60E ⁻³ – 2.24E ⁵	6.40E ⁻³ – 8.96E ⁵	4.00E ⁻² – 5.60E ⁶
SL-1X	1.00E ⁻⁴ – 1.40E ⁴	4.00E ⁻⁴ – 5.60E ⁴	1.60E ⁻³ – 2.24E ⁵	6.40E ⁻³ – 8.96E ⁵	4.00E ⁻² – 5.60E ⁶
MS-7.5	1.00E ⁻⁴ – 1.40E ⁴	4.00E ⁻⁴ – 5.60E ⁴	1.60E ⁻³ – 2.24E ⁵	6.40E ⁻³ – 8.96E ⁵	4.00E ⁻² – 5.60E ⁶
LA-730	1.00E ⁻⁴ – 1.40E ⁴	4.00E ⁻⁴ – 5.60E ⁴	1.60E ⁻³ – 2.24E ⁵	6.40E ⁻³ – 8.96E ⁵	4.00E ⁻² – 5.60E ⁷
FP-730	2.50E ⁻⁴ – 3.50E ⁴	1.00E ⁻³ – 1.40E ⁵	4.00E ⁻³ – 5.6E ⁵	1.60E ⁻² – 2.24E ⁶	1.00E ⁻¹ – 1.40E ⁶
CR-730 (fc)	2.00E ⁻⁴ – 2.80E ⁴	8.00E ⁻⁴ – 1.12E ⁵	3.20E ⁻³ – 4.48E ⁵	1.28E ⁻¹ – 1.79E ⁶	8.00E ⁻² – 1.12E ⁶

PR-740 Luminance Range (in fL)*

Accessory	Aperture				
	2°	1°	0.5°	0.250°	0.10°
MS-75	5.00E ⁻⁶ – 5.00E ¹	2.00E ⁻⁵ – 2.00E ²	8.00E ⁻⁵ – 8.00E ²	3.20E ⁻⁴ – 3.20E ³	2.00E ⁻³ – 2.00E ⁴
SL-0.5X	5.00E ⁻⁶ – 5.00E ¹	2.00E ⁻⁵ – 2.00E ²	8.00E ⁻⁵ – 8.00E ²	3.20E ⁻⁴ – 3.20E ³	2.00E ⁻³ – 2.00E ⁴
SL-1X	5.00E ⁻⁶ – 5.00E ¹	2.00E ⁻⁵ – 2.00E ²	8.00E ⁻⁵ – 8.00E ²	3.20E ⁻⁴ – 3.20E ³	2.00E ⁻³ – 2.00E ⁴
MS-7.5	5.00E ⁻⁶ – 5.00E ¹	2.00E ⁻⁵ – 2.00E ²	8.00E ⁻⁵ – 8.00E ²	3.20E ⁻⁴ – 3.20E ³	2.00E ⁻³ – 2.00E ⁴
LA-730	5.00E ⁻⁶ – 5.00E ¹	2.00E ⁻⁵ – 2.00E ²	8.00E ⁻⁵ – 8.00E ²	3.20E ⁻⁴ – 3.20E ³	2.00E ⁻³ – 2.00E ⁴
FP-730	1.25E ⁻⁵ – 1.25E ²	5.00E ⁻⁵ – 5.00E ²	2.00E ⁻⁴ – 2.00E ³	8.00E ⁻⁴ – 8.00E ³	5.00E ⁻³ – 5.00E ⁴
CR-730 (fc)	1.00E ⁻⁵ – 1.00E ²	4.00E ⁻⁵ – 4.00E ²	1.60E ⁻⁴ – 1.60E ³	6.40E ⁻⁴ – 6.40E ³	4.00E ⁻³ – 4.00E ⁴

*(minimum sensitivities at 10:1 signal-to-noise against an Illuminant A source)



9731 Topanga Canyon Place, Chatsworth, CA 91311-4135
 TEL: 818-725-9750 FAX: 818-725-9770
 sales.pr@photorresearch.com
 www.photorresearch.com

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