



*Make every customer more satisfied*

# SPIC-200 Spectral Irradiance Colorimeter



**EVERFINE Corporation**

( Stock code:300306 )

## 국제 특허 획득

### *Intenational Patents Issued*

(US7978324B2, ZL200510050854.1, 201320454495.6.....)

## Mobile 시대의 Spectrum 측정

### *Spectral measurement in mobile era*

SPIC-200은 US7978324B2..외 EVERFINE에서 취득한 국제 특허를 적용하여 개발된 제품으로, 모든 측정항목 및 Data에 있어 국제규격에 부합하는 제품입니다.또한, Spectrum 측정이 가능한 휴대용 분광조도계에 있어 혁신적인 제품으로써, Compact한 사이즈와 SBCT, Wifi-solution 등 HIGH-END 기술이 적용되었습니다.DATA 측정 및 측정된 DATA의 분석은 SPIC-200에 적용된 터치스크린을 통하여 직관적으로 쉽고 빠르게 측정 및 확인이 가능합니다.편리한 이동성과 고성능의 SPIC-200은 다양한 분야에서 적용이 가능합니다.조명분야(실외,실내조명의 현장테스트), 도로조명 Multi-point측정, 조명제품생산라인의 검사기적용, R&D LAB, QA분야(IQC,OQC), 빔공해 관련분야 등 다양한 어플리케이션에 적용이 가능합니다.

SPIC-200 adopts the international patents, and leads the mobile era for spectral measurement. It has compact size and high-end configuration. The measurement and analysis could be completed synchronously by only one touch. Its portability and versatile functions make it widely applied in on-site test, such as building, plants growing, commercial and indoor lighting. Also, it can be used in the R&D and inspection laboratories, production lines for lighting products.

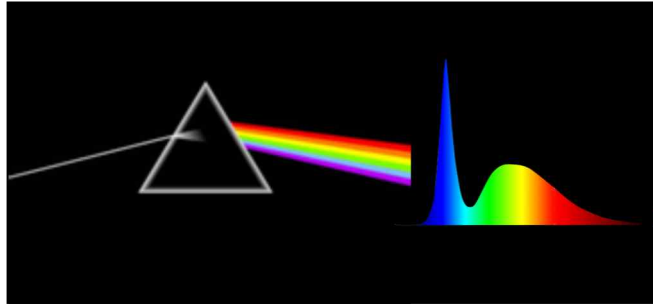
#### 측정 항목 Measurement items

- The relative spectral power distribution (Pλ)
- Illuminance (E)
- Luminous flux (Φ)
- Color rendering index (CRI)
- Correlated color temperature (CCT)
- Chromaticity in CIE 1931, 1960 and 1976
- Standard Deviation of Color Matching (SDCM)
- IES EVE illuminance
- Radiant power
- .....

**지금은 광 계측에 있어서 분광측정방식의 시대입니다.**  
*It's the times of spectrum for optical metrology*

SPIC-200은 조명의 진실을 밝혀줄 광학 측정, 방사 측정, 색 측정에 대한 모든 것을 얻을 수 있는, 스펙트럼 측정을 열어가고 있습니다.

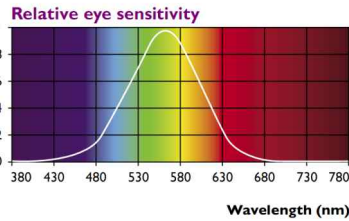
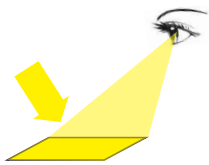
SPIC-200 initiates spectral measurement, which tells the truth of light, to get all the photometric, radiometric and colorimetric quantities.



**조도와 광속 평가**  
**Evaluate the illuminance and flux**

$$E_v = 683 \int E(\lambda)V(\lambda)d\lambda$$

Available quantities:  $E_v, \Phi_v, I_v, \dots$



illuminance on working surface



500lx



200lx

**색도 표현**  
**Describe the chromaticity**

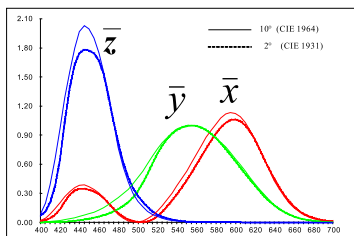
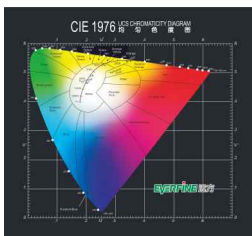
$$X = k \int E(\lambda)\bar{x}(\lambda)d\lambda$$

$$Y = k \int E(\lambda)\bar{y}(\lambda)d\lambda$$

$$Z = k \int E(\lambda)\bar{z}(\lambda)d\lambda$$

$$x = \frac{X}{X+Y+Z} \quad y = \frac{Y}{X+Y+Z}$$

Available quantities:  $(x,y), (u',v'), duv, CCT, \dots$



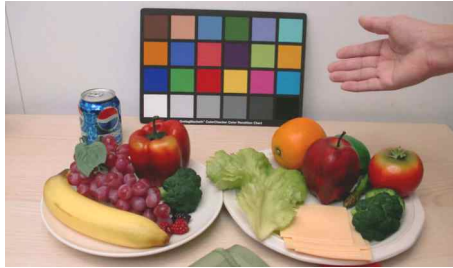
4000 Kelvin



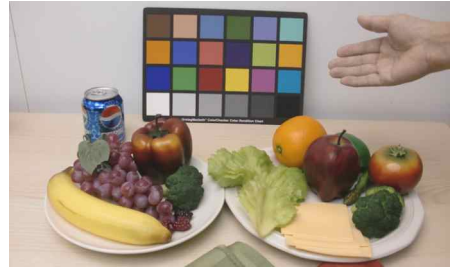
2200 Kelvin

▶▶ 광원의 연색 지수에 대한 분석 그 이상의  
**Further analyze the color rendering of light sources**

R9은 LED에 있어서 중요한 지표입니다. R9이 증가함에 따라 물체는 더욱 Colorful하게 인지됩니다.  
 R9 is an important index for LEDs. The objects are perceived more colorful with the increase of R9.



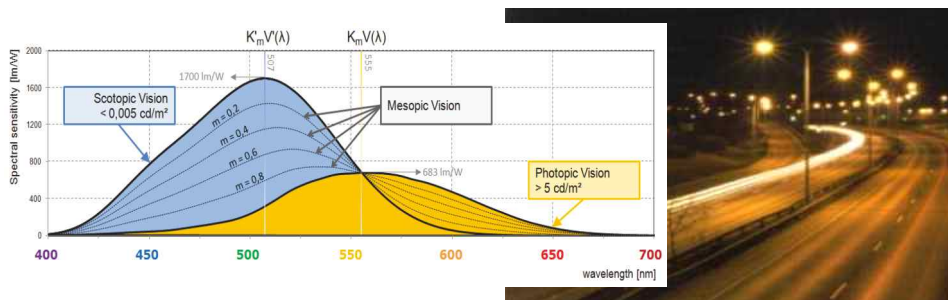
Ra:72; R9>0



Ra:82; R9:-90

▶▶ Photopic, Scotopic, Mesopic의 광학 특성 측정, S/P ratio 측정, 도로/실내등의 광학 디자인 요소 측정(IES EVE제도)

To make photopic, scotopic and mesopic photometry measurements and obtain S/P ratio, so as to assist road and indoor lighting designs & researches etc.



S/P ratio를 자동으로 계산하고 Mesopic 수치를 즉각적으로 얻을 수 있습니다.  
 Automatically calculate the S/P ratio, and acquire the mesopic quantities immediately

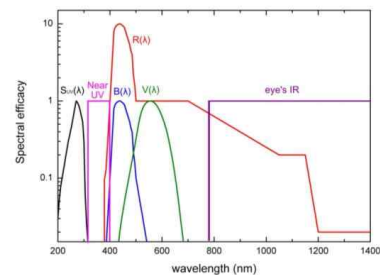
▶▶ UV/IR 측정을 통해 방사선 안전을 평가합니다.  
**Appraise the radiation safety via the UV and IR measurements**



전시품과 그림에 대한 위해 요소를 피하기 위해  
 Avoid hazard to the exhibition and paintings



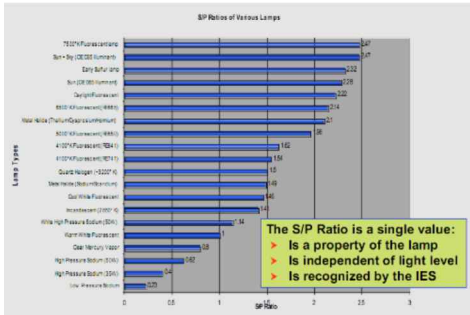
사람의 눈과 피부에 대한 위해 요소를 피하기 위해  
 Avoid hazard to human eye and skin



분광 중량 기능과 관련 광 생물학적 위해 요소에 대한  
 Spectral weighting functions related to photobiological hazards



**실내 조명 디자인: IES EVE 조도를 얻기 위한 S/P ratio 측정**  
**Indoor lighting design: obtain the S/P ratio to get IES EVE illuminance**



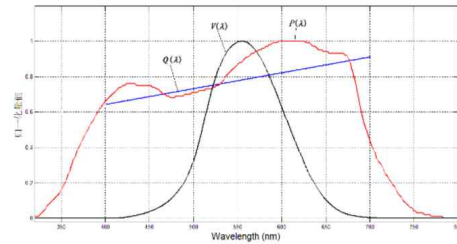
S/P=1.4, E(EVE)=400 lx    S/P=2.0, E(EVE)=300 lx



**Phytometric 측정: 식물을 잘 자라게 할 중요 특성을 측정**  
**Phytometric measurement: obtain the key properties of light that make plants grow well**



- Useful spectrum
- 식물 잎 표면의 광양자의 총 수(광량/밀도)  
Total number of photons on the surface of leaves (Light quantity/intensity)
- 시간에 따른 조도의 변화(낮의 길이)  
The illuminance variation with time (Day length)
- 빛의 균일성  
Light uniformity



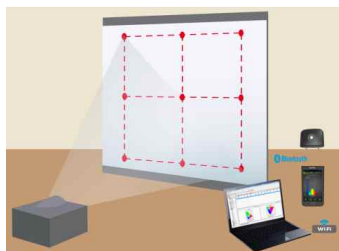
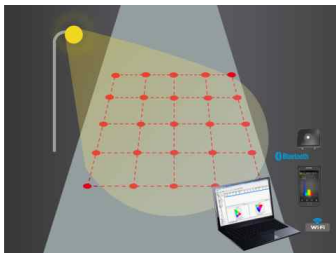
CIE photopic spectral luminous efficiency  $V(\lambda)$   
 McCree's average relative quantum efficiency curve  $P(\lambda)$   
 The normalized ideal response curve for quantum system  $Q(\lambda)$

## 더욱 Intelligent한 측정 More Intelligent Measurement

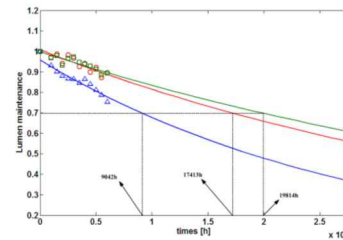
최근의 규격과 고객의 필요에 따라 소프트웨어는 주문제작이 가능합니다.  
 Expect for the general quantities, the software can be customized according to the latest standards and customers' requirements to export the professional analysis once the test is done.



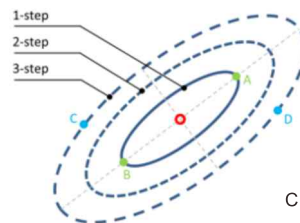
**On-site lighting measurement: analysis the averaged quantities and the non-uniformity of multiple points.**



**Lighting products: Investigation of LED lumen depreciation and color shift**



Lifetime estimation



Color shift characterization

## High-end 구성으로 측정을 개선하였습니다 High end configuration improves measurement experience



넓은 범위에 대한 높은 측정 정확도  
High measurement accuracy in wide range

### International patents issued

- SPIC-200(Type B & BW)는 측정 범위를 넓혀주고 정확도를 향상하도록 해 주는 SBCT 국제 특허 기술을 채용하고 있습니다.

SPIC-200 (Type B & BW) adopts the international patent technology SBCT, to widen the measurement range and improve accuracy.

### Photometric range: 0.1lx~200klx

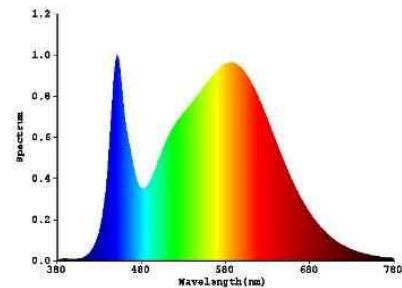
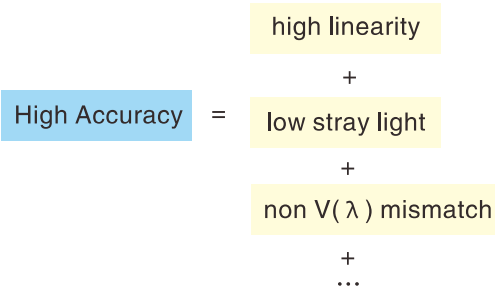
SBCT: Spectrometer & Broadband-radiometer/photometer Combined Technique.  
광학 특성, 방사 특성에 대한 측정 방법 중 세계에서 가장 정확한 방법으로 인정됨.  
SBCT: Spectrometer & Broadband-radiometer/photometer Combined Technique, is recognized as the most accuract method for photometric/radiometric measurement worldwide.

photometric sensor



spectral sensor

- 분산 행렬 기술에 기초한 특허 미광 교정은 미광 제어 능력을 1~2 순위 향상시킴.  
The patent stray light correction based on variation matrix technology improves the stray light control ability to 1~2 orders.

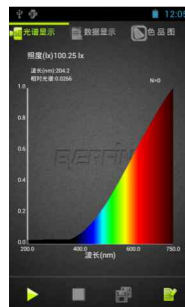


Millisecond 단위의 측정과 읽기 속도  
Up to milliseconds measure & read speed

모든 스펙트럼, 방사 특성, 광학 특성, 색도 특성 수치는 수 millisecond 안에 측정되고 읽혀질 수 있습니다.

All the spectrum, radiometric, photometric and colorimetric quantities can be measured and read within milliseconds.

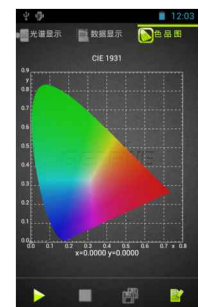
- Excel, JPG, 기타 다른 형식으로 데이터 출력  
Data output in Excel, JPG and other formats
- 다양한 언어로 디스플레이  
Displayed in multi languages
- 교정 성적서 발행  
Comes with accredited calibration certificate



Spectral Measurement



Measurement Data



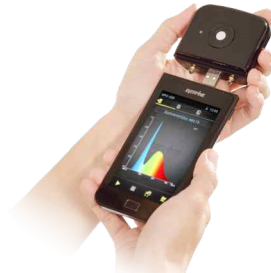
Chromaticity Coordinates in The Chart



**휴대가 간편하고 다양한 컬러로 디스플레이 됩니다.  
Handheld and colorful vision**



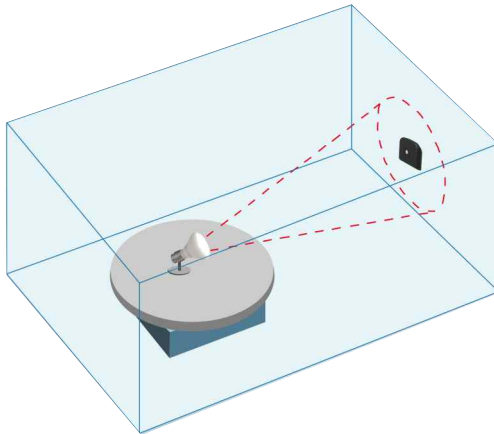
- 4.3인치 LCD 패널  
4.3" LCD panel
- One-touch 작동  
One-touch operation
- 실시간 리딩  
Real time reading



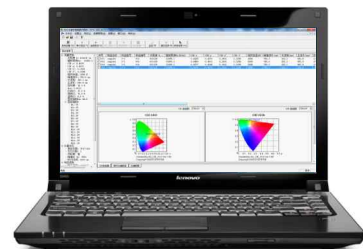
**보다 유연한 어플리케이션을 위한 분리 가능한 디텍터  
Detachable detector for flexible applications**

분리 가능한 디텍터는 더욱 편리하고 각도 제한이 없는 샘플링을 실현합니다.

The detachable detector makes the sampling more convenient and angle-unlimited. The users holding the main unit can avoid exposure of the measured lights with hazard radiation.



**SD card and WIFI application with phone and computer**



측정 데이터는 읽어 오기와 편집이 가능합니다.

The measured data could be read and edited in real time with high speed WIFI application.

# Typical Applications

## 현장 조명 측정 On-site lighting measurements



도로/터널 조명  
Road and tunnel lighting



주택가 조명  
Residential lighting



리테일 조명  
Retail lighting



스타디움 조명  
Stadium lighting



OLED 조명  
OLED lighting



식물 재배를 위한 균일한 조명  
Uniform lighting for plants growing

## 의 색 품질 Color quality inspection

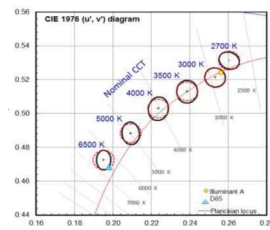


LED lamps and luminaires

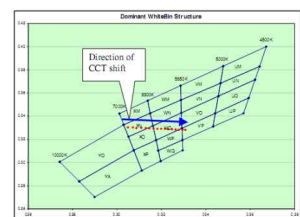


LED/OLED 디스플레이  
LED/OLED displays

### 의 색 품질 Color quality



맥아담 타원과 CIE u'v' 서클  
Macadam ellipse and CIE u'v' circle



LED 사각형  
LED rectangle





### Technical Specifications

Model	SPIC-200 A	SPIC-200 B
Spectral range (nm)	380 ~ 760	380 ~ 780
SBCT	No	Yes
Cosine Recept Area	Φ8	Φ8+Φ3.5
Optical sensor	CCD (256 pixels)	CCD (256 pixels) & Si
Wavelength accuracy	± 0.5nm	
Illuminance accuracy	± 3% reading+1 digit	
Stray light	< 0.3%	
Integration time	5 ms – 60000 ms	
Illuminance range	10 lux ~ 200 klux	0.1 lux ~ 200 klux
CCT range	1000 K~100000 K	
Accuracy of chromaticity coordinates	± 0.001 (Relative to the standard light source whose stability is better than ± 0.0001 and NIM traceable calibrated value)	
CRI	Ra; Ri (i=1 ~ 15) (Calculate R15 particularly)	
Battery	Rechargeable Li-ion Battery, 4 hours continuing operation.	
Data Storing	4G SD Card (Users can extend according to the practical situation)	
Weight (With battery)	200 g	

## More Luminance Meters & Illuminance Meters



SIRC-2000  
Spectral Image Radiance Colorimeter



Z-10  
Illuminance Meter



CX-2  
Imaging Luminance Meter



PHOTO-2000EZ  
Full/half-cylindrical Illuminance Meter



SRC-600  
Spectral Radiance Meter



U-20  
Pocket UV Radiometer

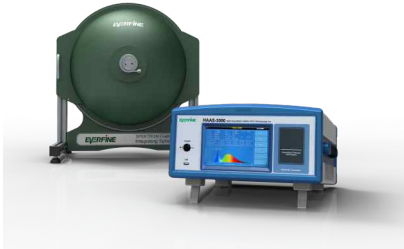


BM-9  
Luminance Colorimeter



EZ-3000  
Portable Spectroradiometric Analyzing System

**More Products Manufactured  
by EVERFINE**



Spectroradiometers



Goniophotometers



LED Thermal Resistance Structure Analyzer



Aging-Life Test System for LEDs & LED luminaires



Optical radiation safety test system



Automatic Aging-Test Production Line for LEDs



EMC tester



LED driver tester and digital power meter



[www.everfine.net](http://www.everfine.net)

## EVERFINE Corporation

### Headquarter

Add: #669 Binkang Road, National High-tech Park, Hangzhou, China

Tel: +86 571 86698333 (30 line)

Fax: +86 571 86696433

E-Mail: [global@everfine.net](mailto:global@everfine.net)

### Korea Distributor

Tel: 서성현(010-8972-9209) E-mail: [sales@impi.co.kr](mailto:sales@impi.co.kr)

### Taiwan branch

Tel: +886 937571973 E-Mail: [taiwan@everfine.net](mailto:taiwan@everfine.net)

### Europe

E-Mail: [europe@everfine.net](mailto:europe@everfine.net)

### America

E-Mail: [america@everfine.net](mailto:america@everfine.net)

### Asia

E-Mail: [asia@everfine.net](mailto:asia@everfine.net)

### India

E-Mail: [india@everfine.net](mailto:india@everfine.net)

Copyright 2014 By EVERFINE. All rights reserved. Version 14.1  
SUBJECT TO CHANGE WITHOUT NOTICE

#### Notices:

The information in this document is strictly prohibited to be used in any form (including copy, fabricate and distribution) without prior permission from EVERFINE.