Illuminance Spectrophotometer

CL-500A

For evaluation of high-class next-generation lamps such as LED illumination and EL illumination.

Now scotopic illuminance can also be measured.

Ideal for evaluating CRI (color rendering index)

Both instrument and included software have been upgraded to provide improved instrument operation and software display of MacAdam SDCM levels.

The first illuminance spectrophotometer that conforms to both DIN and JIS standards. Includes convenient, easy-to-use PC software.
**Use the CL-500A for CRI (color rendering index) evaluation!**

Handheld illuminance spectrophotometer conforms to both DIN and JIS standards.

The CL-500A conforms to DIN 5032 Part 7 Class B and JIS C 1609-1:2006 General Class AA, making it the first compact, lightweight, handheld illuminance spectrophotometer to conform to both DIN and JIS standards.

**Compact, lightweight, handheld**

The CL-500A weighs only 350g, making it easy to take along or to hold in your hand for measurements.

**All-in-one type. No PC needed.**

The CL-500A can be used by itself for measuring CRI or color temperature of lamps. In addition, the spectral irradiance waveform and peak wavelength can also be checked.

**Measurement of spectral irradiance (w/m²) at each wavelength.**

The spectral irradiance can be measured at 1-nm pitch from 360 to 780 nm, so the CL-500A can be used not only for measuring the color of light but also for measuring photosynthetic photon flux density (PPFD).

**Measures and displays both the general color-rendering index Ra as well as the special color-rendering indexes R1 to R15.**

The special color-rendering indexes R1 to R15 can be displayed, so the color-rendering index for a specific color such as for R9 (red) or R15 (skin color) can be easily measured and displayed.

**High-speed measurement possible**

Using the CL-500A’s SDK, high-speed measurements at 5 times/second can be taken.

*SDK, development kit*

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**Illuminance measurements (JIS AA Class) also possible**

Scotopic illuminance can also be measured.

Most conventional illuminance meters can only measure photopic illuminance, but the CL-500A can also measure *scotopic* (dark-adapted) illuminance both with the instrument alone and when used with the included software. Plus, the S/P ratio of scotopic illuminance and photopic illuminance can also be displayed.

**Convenient measurement functions**

1) Continuous measurement mode: For monitoring changes in illuminance levels or spectral power distribution.
2) Display of the average of multiple measurements: Useful for evaluation of projectors, etc.
3) Delayed-measurement function: The CL-500A can be set to wait for a specific time after the measurement button is pressed before starting measurements, so you can get out of the way before the measurement is taken to make sure that light reflected from you or your clothes do not affect measurements.
4) Display of data at specific wavelength: Allows monitoring of spectral irradiance at a specific wavelength.

**Main applications:**

- Measurement and evaluation of the illuminance, color temperature, and color-rendering index of indoor illumination sources such as LEDs, organic EL sources, fluorescent lamps, etc.
- Measurement and evaluation of the illuminance, color temperature, and color-rendering index of special illumination sources used for TV broadcasting stations, studios, stages, events, etc.
- Measurement of ambient lighting including sunlight.
- Measurement of the illumination and color temperature of various types of projectors.
- Measurement of the photosynthetic photon flux density (PPFD) of light sources used for agriculture.
- Standard instrument for illuminance meters or illuminance colorimeters.

**System Diagram Dimensions (Units: mm)**

**Illuminance Meter T-10A** Can measure PWM-controlled lighting and special color-rendering indexes (R1 to R15) of natural light is said to have a good (high) color-rendering property. The color-rendering index expresses the comparison between the light source being tested and objects viewed by it against how natural light makes them look, how closely the appearances match.

Colors are generally compared by arranging objects side-by-side and looking at them under natural light (sunlight).

For correct use and for your safety, be sure to read the instruction manual before using the instrument. Improper connection may cause a fire or condensation.
Compact, lightweight, handheld illuminance spectrophotometer CL-500A weighs only 350g, conforming to both DIN and JIS standards.

- Measures spectral irradiance and spectral radiance at 5 times/
- Using the software, high-speed measurement is possible.

The CL-500A is an all-in-one type, convenient, easy-to-use Excel® add-in software. It reads measurement data from the CL-500A directly into Excel®. Further processing of data can then be performed easily using the various functions of Excel®.

What is color-rendering property?
Colors are generally compared by arranging objects side-by-side and looking at them under natural light (sunlight).

When comparing how lamps such as fluorescent lamps, LEDs (light emitting diodes), etc. make objects look against how natural light makes them look, how closely the appearances match is called the “color-rendering property” of the lamp. A lamp that produces a hue similar to that of natural light is said to have a high (high) color-rendering property. The color-rendering index is an objective quantification of the color-rendering properties of a light source. The color-rendering index expresses the comparison between the light source being tested and a standard illuminant.

- Standard illuminant with the same color temperature as the light source being tested. (Light along the blackbody locus corresponds to sunlight.)
- Caucasian skin color
- Asian skin color
- Tree-leave
- Average
- Black body

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- Standard illuminant with the same color temperature as the light source being tested.

The CL-500A is equipped with LED binning function.

In addition to quantifying the color variations which are a major problem in the LED industry, the software is also equipped with function to enable easy binning.

MacAdam SDCM level display
CL-500A includes a template for expressing the chromaticity variation of illumination light sources such as LEDs or organic EL sources in terms of the MacAdam SDCM (Standard Deviation of Color Matching) step. This allows display of color differences that closely match visual judgment.

Spectral irradiance waveform display
Since peak wavelengths can be seen easily, classification and grading of light sources can be performed easily at high accuracy. In addition, numerical data at 1 nm can also be viewed in list form.

Multi-point measurement possible using multiple CL-500A units
Data Management Software CL-S10w can be used to control up to 10 CL-500A units for multi-point measurements. Using the SDK, this can be further expanded. Please contact our sales person for further information.

Informed color-rendering index display
Color-rendering indexes are shown visually for easy understanding. The shifts between a test light source and a standard light source can be seen at a glance, with bar graphs showing the general color-rendering index Ra (the average of special color-rendering indexes R1 to R8) and the special color-rendering indexes for a total of 15 colors (R1 to R15).

Equipped with LED binning function
In addition to quantifying the color variations which are a major problem in the LED industry, the software is also equipped with function to enable easy binning.

Konica Minolta’s Illuminance Measurement Trio

- Illuminance Spectrophotometer CL-500A
  Measures color-rendering properties as well as illumination. Displays spectral waveform using included CL-S10w software. Conforms to DIN and JIS standards.

- Chroma Meter CL-200A
  Measures color temperature. A de facto industry standard for color-temperature measurement. Can also perform illuminance measurements (JIS AA Class). Compact and lightweight with removable receptor connectable with extension cables.

- Illuminance Meter T-10A
  Can measure PWM-controlled lighting. Conforms to DIN Class B and JIS AA Class. Capable of accurately measuring next-generation lamps including PWM-controlled lighting. A miniature receptor T-10MA is also available for measuring illuminance in narrow spaces.

Konica Minolta Measurement Fundamentals

* Both CL-200A and CL-500A can measure PWM-controlled light.

Our top-of-the-line CS-2000 is used for measuring various types of high-definition displays, and received the 13th Advanced Display of the Year 2008 Grand Prize in the Display Testing Equipment Category.
Main Specifications of CL-500A

Model: Illuminance Spectrophotometer CL-500A

- Illuminance meter (Standard Illuminant A)
  - Repeatability (2σ): ±0.5% +1 digit
  - Display languages: English, Japanese, Simplified Chinese

- Operation temperature/humidity range:
  - -10 to 40°C, relative humidity of 85% or less (at 35°C) with no condensation

- Weight: 350 g

Other functions:
- Data memory: 100 data
- Automatic exposure time setting (high accuracy) mode: Approx. 0.2 sec. (when connected to computer)

Display languages:
- English, Japanese, Chinese (Simplified)

Main specifications of Data Management Software CL-S10w

- Type: Add-in for Excel® (Excel® is required to use this add-in.)
- Operating environment:
  - One of the following environments:
    - Windows® 7 Professional 32-bit or 64-bit + Excel® 2007 32-bit or Excel® 2010 32-bit
    - Windows® 8.1 Pro 32-bit + Excel® 2013 32-bit
    - Windows® 8.1 Pro 64-bit + Excel® 2013 32-bit, Excel® 2013 32-bit, or Excel® 2013 64-bit
    - Windows® 10 Pro 32-bit + Excel® 2013 32-bit or Excel® 2013 64-bit
    - Windows® 10 Pro 64-bit + Excel® 2013 32-bit or 64-bit, or Excel® 2016 32-bit or 64-bit
    - OS languages: English, Japanese, Simplified Chinese, Traditional Chinese
    - For details on system requirements for above versions of Windows® and/ or Excel®, refer to their respective specifications.

Compatible instruments:
- CL-500A, CL-200A, CL-200

Display items:
- Spectral irradiance (W/m²/nm); Illuminance; general color-rendering index Ra; correlated color temperature; etc.