



KONICA MINOLTA

SPECTROPHOTOMETER **CM-2500c**

A breakthrough in 45 a:0 optics with
unprecedented accuracy & stability

18



- Innovative 45 a:0 geometry optics
- Most lightweight, compact and rugged in its class
- 360-740 nm wavelength range, 10 nm resolution
- Single-handed operation with "Navigation wheel"
- Free choice of power source : AC adapter or AA batteries

Compact, Lightweight, 45°a:0° Portable Spectrophotometer Offering High Measurement Stability

The CM-2500c is a 45°a:0° model that utilizes the same high accuracy, precision and portability as Konica Minolta's sphere-based CM-2600d and CM-2500d.

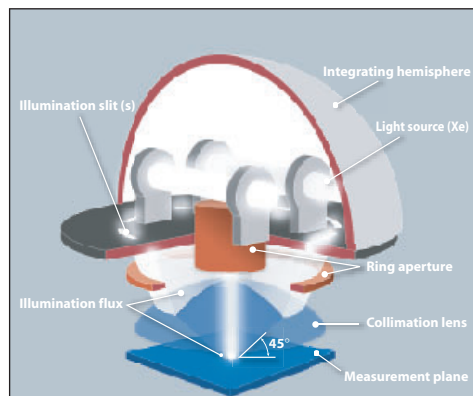
The CM-2500c is best suited for color measurement of samples such as automotive interior parts, coil coatings, plastics, paint, packaging, and raw materials. The 45°a:0° viewing optics correlate closely with visual perception of objects.

The innovative optical system ensures perfect annular illumination for best repeatability and stability.



The Innovative Optical System...

The optical design of the CM-2500c assures maximum reproducibility and stability of measurement during actual use. It also minimizes data fluctuation during repeated color measurements and improves the accuracy of the output.



The mixing box (integrating hemisphere) and the illumination slit create a ring-shaped light source, achieving more uniform illumination, and thus more ideal 45°a:0° geometry than conventional systems.

The additional collimation lens provides highly parallel illuminating and receiving light beams and thus uniformity within the area.

The large sample contact area offers close and stable contact, ensuring easy measurement of samples with curved surfaces such as automotive parts or soft samples.

Traditional 45°:0° spectrophotometers are subject to fluctuation in measured values for samples with uneven and eroded surfaces.

The CM-2500c achieves highest stability by adopting an innovative optical system.

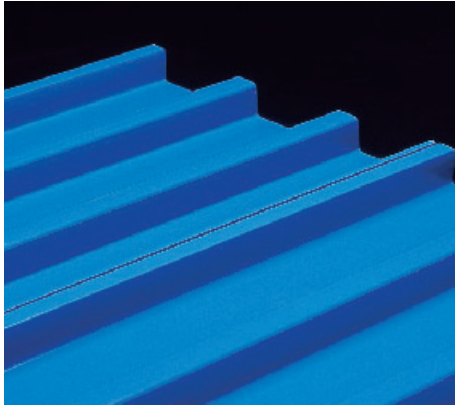
Fits your hand like a glove



...the Benefits are Yours

- Higher uniformity of illumination distribution (less uneven intensity in the illumination area)
- Perfect circle illumination area (not an ellipse)
- Ring-shaped illumination (no direction dependency)
- Improved reproducibility of measurements
- Less influence by changes in measuring position, instrument rotation sample position or sample angle

Weighing only 670 g (without batteries) and ergonomically designed, the CM-2500c is perfectly suited for any application in the laboratory, in the plant or in the field. Taking measurements horizontally or vertically is both easy and fatigue-free. The compact size and easy-to-align aperture allows you to measure samples of any shape or size.



The CM-2500c: A real multi-talent for special tasks

The CM-2500c is fully equipped with hardware and software features to cover a wide range of applications where 45°:0° geometry is either recommended or specified by applications such as automotive interior plastic and textile parts, solid paints (VDA ¹), Coil Coating (ECCA ²), high-visibility clothing (EN-471 ³), printing & packaging (TAPPI 1524 ⁴), Clay and Calcium Carbonate (TAPPI 646 ⁴) or road markings (ASTM D4956-4960 ⁵). The CM-2500c 45°:0° geometry conforms to the following norms: CIE No.15, ISO 7724/1, ASTM E179, DIN 5033 Part 7 and JIS Z 8722.

¹ Verband der Automobilindustrie, ² European Coil Coating Association, ³ European Standard, ⁴ Technical Association of Pulp and Paper Industry, ⁵ American Society for Testing and Materials



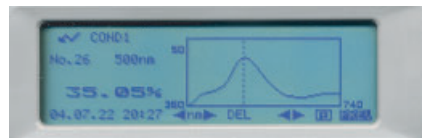
Pass /Fail Display



Color graph + data Display



Absolute + Color difference display



Spectral graph

Single-handed operation

Forget all you have heard about "easy operation" of any portable spectrophotometer so far! The new CM-2500c sets the standard for a simple and fast handling instrument. The exclusive "Navigation wheel" and the measuring button are placed right where your hand fits. The Navigation wheel "guides" you through all the menu operations with great ease. Use the wheel like a PC mouse, moving it forward or backward to select and pressing it down to click on the selection.

Comprehensive color Information Display

The large display is your "Information Center". Displaying data graphically or numerically, it shows you the facts about your colors at a glance. Whether you select simple Pass/Fail indications, colorimetric data with descriptive color difference or L*a*b* color plot with either box or elliptical tolerances or spectral graph – you're in control at any time. The internal software contains all necessary colorimetric equations and standard light sources to cover your tasks as well as numerous industry and application-specific indices.

The internal software communicates in six languages (English, German, French, Italian, Spanish and Japanese) and thus is prepared for your international color communication network. It even reminds you when it is time for a factory re-calibration to ensure traceability to ISO 9000 recommendations.

Color Data Software SpectraMagic™**NX** (optional)

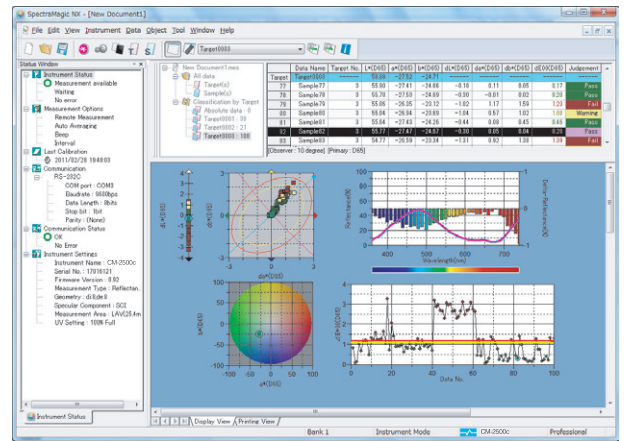
Supports Windows® Vista/7/8/8.1

In combination with the optional Color Data Software SpectraMagic™**NX**, the CM-2500c becomes a complete Quality Control and Color Management System. The software allows you to configure the graphic and numerical layout according to your needs, from ultra-simple Pass/Fail assessments to more sophisticated analysis with spectral, color and trend graphs. The unique Navigation function of SpectraMagic™**NX** is another useful feature to assure fast and easy use. To improve color communication with your customers and suppliers, SpectraMagic™**NX** allows you to insert digital pictures in printed reports—another unique feature.

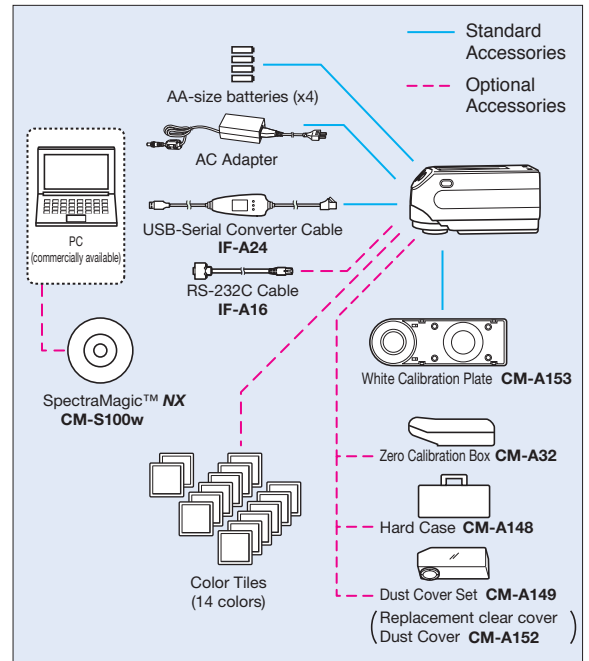
Specifications

| | |
|--|---|
| Illumination/viewing system | 45 a:0 method (45 ring-shaped illumination, vertical viewing) |
| Detector | Silicon photodiode array (dual 40 elements) |
| Spectral separation device | Diffraction grating |
| Wavelength range | 360 nm to 740 nm |
| Wavelength pitch | 10 nm |
| Half bandwidth | Approx. 10 nm |
| Reflectance range | 0 to 175%, resolution: 0.01% |
| Light source | 2 pulsed xenon lamps |
| Measurement time | Approx. 1.5 seconds |
| Minimum measurement interval | 4 seconds |
| Battery performance | Alkaline manganese: Approx. 1000 measurements, (at 23 C) |
| Measurement/illumination area | ø7 mm/ø11 mm |
| Repeatability | Colorimetric Value: Standard deviation within ΔE^*ab 0.05 (Measurement conditions: White calibration plate measured 30 times at 10-second intervals after white calibration was performed) |
| Inter-instrument agreement | Within ΔE^*ab 0.25 (Average for 12 BCRA Series II color tiles compared to values measured with master body; at 23 C) |
| Measurement mode | Single measurement/automatic averaging of multiple measurements (auto mode: 3, 5, 8 times/manual mode) |
| Interface | Output: RS-232C serial signals via RJ45 connector; USB 2.0 communication possible when using included USB-Serial Converter Cable IF-A24 |
| Observer | 2 or 10 Standard Observer |
| Illuminant | A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12 (simultaneous evaluation is possible using two light sources) |
| Display data | Spectral value/graph, colorimetric value, color difference value/graph, PASS/FAIL result, ASSESSMENTS (Except for Japanese mode) |
| Colorimetric data/indexes | L*a*b*, L*C*h, CMC(1:1), CMC(2:1), CIE94, Hunter Lab, Yxy, Munsell, XYZ, MI, WI (ASTM E313-73), WI (CIE), YI (ASTM E313-73/ASTM D1925), ISO Brightness (ISO 2470), Density status A/T, WI/Tint (CIE), CIE00 |
| Data memory | 1700 pieces of data * 700 pieces of data in the "defined in COND." mode. * Total of sample data and target data |
| Pass/Fail judgment | Tolerance for color difference (Both box and elliptical tolerances can be set) |
| Power | AA-size batteries (x4) or AC Adapter |
| Size (W x H x D) | 69 x 96 x 193 mm |
| Weight | Approx. 670 g (without batteries) |
| Operation temperature/humidity range (*1) | 5 C to 40 C, relative humidity 80% or less (at 35 C) with no condensation |
| Storage temperature/humidity range | 0 C to 45 C, relative humidity 80% or less (at 35 C) with no condensation |

*1 Operation temperature/humidity range of products for North America : 5 to 40 C, relative humidity 80% or less (at 31 C) with no condensation



System Diagram



• The specifications and appearance shown herein are subject to change without notice.



Certificate No : LRQ 0960094/A
Registration Date : March 3, 1995



Certificate No : JQA-E-80027
Registration Date : March 12, 1997

SAFETY PRECAUTIONS

For correct use and for your safety, be sure to read the instruction manual before using the instrument.



- Always connect the instrument to the specified power supply voltage. Improper connection may cause a fire or electric shock.
- Be sure to use the specified batteries. Using improper batteries may cause a fire or electric shock.

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