Настольные спектрофотометры CM, CR
Технические характеристики

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Bench-top Spectrophotometer CM-3700A

Konica Minolta's top of the range spectrophotometer for reflectance and transmittance color measurement. The best benchtop spectro for customers requiring absolute accuracy of liquid or solid samples. Ideally suited to applications like color matching or for specification of color to a global supply chain. The CM-3700A can also measure haze and has an adjustable cut-off uv filter for samples with OBAs.

Introduction

“State of the Art” spectrophotometer for maximum performance in colour measurement

The CM-3700A is the proof of Konica Minolta’s leadership in advanced optical technology with a true "State of the Art" instrument. In every detail and without compromise, the CM-3700A is designed for maximum performance and thus to act as reference instrument in a global colour management network. The CM-3700A allows colour measurement of solid, translucent and transparent samples in reflectance and transmittance.

The entire optical system is designed and manufactured without compromise, and exceed the requirements of international standards while offering superior level of inter-instrument agreement out of the production line.

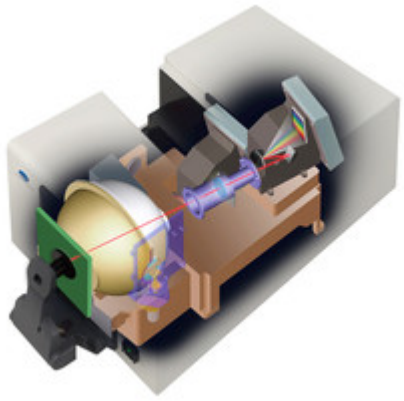
The superiority of the CM-3700A in terms of absolute accuracy and long term stability, especially on very dark or high chromaticity colours has been recognised by top ranking institutes and leading companies throughout the colour industry.

Features

Reference grade bench-top spectrophotometer for reflectance and transmittance colour measurements

The CM-3700A is the flagship model from Konica Minolta meeting highest expectations in absolute accuracy, short- and long-term stability and unsurpassed inter instrument agreement levels to act as reference instrument in a global colorimetric network. The two flat holographic gratings with silicon photodiode arrays, one each for the sample and feedback channel, together with the high power xenon flash ensures highest absolute accuracy and repeatability, especially on very dark and high chromaticity shades. The entire optical

system is mounted on a stainless steel casted chassis to avoid temperature drift.



Reflectance Measurements

The motorized gloss trap, controlled by the optional software, allow measurements of samples with (SCI) and without (SCE) surface conditions. Measurement area can be selected from Ø 25.4 mm, Ø 8 mm, and 3 x 5 mm to match the sample size.

For measurement of samples treated with optical brightness (OBA), the UV cut filter allows motorized adjustment of UV content for measurements of materials such as pulp, paper textiles and other materials containing OBA's.

Transmittance Measurements

To measure transparent or translucent solid samples such as plastic sheets or as well as transparent liquids, the large and accessible transmittance chamber offers high flexibility.

Specifications

Principal Specifications CM-3700A

Model	**Spectrophotometer CM-3700A**

Illuminating/viewing system	d:8° (diffused illumination; 8° viewing angle); switchable: di:8° SCI (specular component included) or de:8° SCE (specular component excluded; meets ISO and DIN standards for d:8° geometry; also meets CIE and ASTM standards for d:0° geometry. Transmittance: d:0° (diffuse illumination/0° viewing angle)
Detector	Silicon photodiode array with flat holographic grating
Wavelength range	360 nm to 740 nm
Wavelength pitch	10 nm
Half bandwidth	Approximately 14 nm average
Measurement range	0 to 175 % (Reflectance or transmittance); Output/display resolution: 0.01%
Photometric range	Pulsed xenon arc lamp
Measurement time	0.6 to 0.8 sec. (to start of data output)
Illumination/measurement areas	Reflectance: Changeable between LAV, MAV, and SAV LAV: Ø 28 mm illumination / Ø 25.4 mm measurement MAV: Ø 11 mm illumination / Ø 8 mm measurement SAV: 5 × 7 mm illumination / 3 × 5 mm measurement Transmittance: Approx. Ø 20 mm
Repeatability	When white calibration plate is measured 30 times at 10-sec. intervals after white calibration has been performed: ; Spectral reflectance: Standard deviation within 0.05% Chromaticity: Standard deviation within ΔE*ab 0.005 When black tile (BCRA Series II; reflectance: 1%) is measured 30 times at 10-sec. intervals after white calibration has been performed: Spectral reflectance: 380 to 740 nm: Standard deviation within 0.02% 360 and 370 nm: Standard deviation within 0.04% Chromaticity: Standard deviation within ΔE*ab 0.05

Inter-instrument agreement (LAV)	Mean ΔE*ab 0.08 (typical) Average for 12 BCRA Series II color tiles. Max ΔE*ab 0.3 (corresponds to ΔECMC 0.2) for any of 12 BCRA Series II color tiles compared to values measured with master body
Temperature drift	Spectral reflectance: Within ±0.10%/°C Color difference: Within ΔE*ab 0.05/°C
UV adjustment	Computer controlled; continuously variable
Specimen conditions for transmittance measurements	Sheet, plate, or liquid form up to a maximum thickness of approximately 50 mm and unlimited sample length
Interfaces	USB 1.1
Power	AC 100 to 240V 50/60Hz 25VA (using included AC adapter)
Operating temperature/humidity range	13 - 33°C, relative humidity 80% or less (at 33°C) with no condensation
Storage temperature/humidity range	0 - 40°C, relative humidity 80% or less (at 35°C) with no condensation
Dimensions (W × H × D)	271 × 274 × 500 mm (10-11/16 x 10-3/4 x 19-11/16 in.)
Weight	18 kg (39.7 lb.)
Standard accessories	White Calibration Plate; Target Mask (3 × 5 mm); Target Mask (Ø 8 mm); Target Mask (Ø 25.4 mm); Zero Calibration Box; AC Adapter; USB Cable (3 m); Accessory Case; Dust Cover
Optional accessories	ΔE*ab (CIE 1976), ΔE*94 (CIE 1994), ΔE00 (CIE 2000), ΔE (Hunter), CMC (l: c)

Specifications are subject to change without prior notice.

Optional accessories for CM-3700A

Transmittance Zero Calibration Plate CM-A100

The Transmission Zero Calibration Plate CM-A100 is required to block the light path for zero calibration in transmittance measurement mode. The black and mat coating of the plate absorbs also stray light within the transmission chamber of the instrument.

Item Order Code: 1864-712

Transmittance Specimen Holder CM-A96

For perfect and repeatable positioning of transparent plates, films or other transparent samples for transmittance measurements. Holds the Glass Cells CM-A97 (2 mm), CM-A98 (10 mm), CM-A99 (20 mm) and the disposal Plastic Cells CM-A CM-A130 (2 mm), CM-A131 (10 mm) and CM-A132 (20 mm) or the Flow Cell CM-A508 (10 mm)

Item Order Code: 1864-708

Glass Cell 2 mm CM-A97

Glass cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 2 mm and therefore perfect for liquids with high optical density.

Item Order Code: 1864-709

Glass Cell 10 mm CM-A98

Glass cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 10 mm and recommended for liquids with normal optical density.

Item Order Code: 1864-710

Glass Cell 20 mm CM-A99

Glass cell made of optical glass for high precision transmittance measurement of transparent liquids. The optical path is 20 mm and recommended for liquids with normal optical density.

Item Order Code: 1864-711

Plastic Cell 2 mm CM-A130

Disposal plastic cell with an optical path of 2 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with high density.

Item Order Code: 1870-715

Plastic Cell 10 mm CM-A131

Disposal plastic cell with an optical path of 10 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with normal density.

Item Order Code: 1870-716

Plastic Cell 20 mm CM-A132

Disposal plastic cell with an optical path of 20 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with lower density.

Item Order Code: 1870-717

Flow Cell CM-A508

For continuous transmittance measurement of transparent liquids. The optical path of the cell is 10 mm and can be used with a pressure up to 2 Bar. The cell fits the Sample Holder CM-A96.

Item Order Code: 9970-237

PET Pre-Form Holder CM-A520

The PET-Pre-Form Holder CM-A520 allows precise positioning of transparent Pre-forms in the transmission chamber of the instrument. The rail guide of the holder allows horizontal movements of the pre-form to define the area for the measurement.

Item Order Code: B027167

Black Glass Tile CM-A511

High-gloss black glass tile with high absorption that is perfect to be used as a background standard due to the extreme long term stability of the material.

Item Order Code: 9970-1109

Tube Holder CM-A517

This special holder allows easy positioning and measurement of tubes such as pencils or similar. The dimension of the Tube Holder is 50 x 50 mm and thus suitable for short and long samples. It can be used for samples with a diameter from 8 to 24 mm. To prevent drop down the tube holder is delivered with a self-adhesive plastic ferro plate.

Item Order Code: B027157

Bench-top Spectrophotometer CM-36dG

World’s first Colour-and-Gloss Bench-top spectrophotometer with versatile horizontal or top-port alignment. Innovative measurement technology and best price/performance ratio in the field of reflectance and transmission colour measurements.

Introduction

High-precision spectrophotometer with ISO compliant gloss sensor and stability check

The CM-36dG Spectrophotometer is a high-precision and high-reliability bench-top instrument capable of measuring colour either in reflectance or transmittance, ideally suited to a wide range of applications such as Plastics, Paints, Ceramics, Chemicals etc.

For the first time ever, Konica Minolta Sensing has integrated an ISO 2813 compliant 60° gloss sensor inside a benchtop spectrophotometer, to simultaneously measure Colour and Gloss. As both values are measured and reported together operator errors are reduced, the Quality Control workflow can be streamlined and equipment and maintenance costs saved.

The CM-36dG utilizes the patented and proven Numerical UV Control (NUVC), unsurpassed technology for UV adjustments when measuring samples that contain optical brighteners such as pulp, paper, textiles or chemicals.

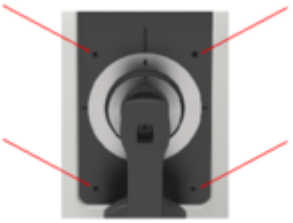
Several new features have been included to improve the user experience, status LEDs provide clear visual feedback, a camera preview system for sample positioning and reporting, and versatile port alignment allowing the device to be used horizontally or rotated 90° to measure e.g. powdery materials in “Top-port” style.

Konica Minolta’s patented technologies assure the highest accuracy and repeatability levels for this class of instrument. Konica Minolta’s renowned accuracy and stability is supported by our latest innovation “Wavelength Analysis and Adjustment” (WAA) to give customers the ability to check and adjust the CM-36dG during calibration, assuring that the instrument is in perfect condition.

Features

Efficient sample presentation

Four screw threads and linear guidelines in the front plate enable the operator to create custom jigs to accurately position samples – maximising the repeatability and speed of the measurement process.



Camera previewer for accurate sample positioning

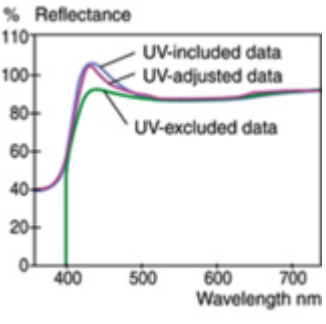
The integrated camera viewer provides a clear preview of the sample for precise targeting and control the area to be measured. The software can capture images of the area that is measured to provide detailed and concise reporting.

Reflectance and Transmittance measurements, horizontal or top-port

The CM-36dG can measure solid or liquid samples in reflectance or transmission mode, horizontally or upside down. This offers great flexibility for various samples ranging from opaque to translucent and transparent.
The large, open sided transmission chamber can be used to measure transparent or translucent samples of any size with ease. The transmission chamber lid features a lift-and-turn lock to prevent accidental opening of the device and locks the chamber when used upside down to measure e.g. powdery material in round cuvettes.

Numerical UV Control for Accurate Measurements of Fluorescent Materials

Accurate measurement of materials such as paper or cloth treated with optical brighteners (OBA) requires precise control of the UV component. The patented Numerical UV Control method (familiar to customers who used the CM-3600A) provides UV control by using proprietary calculations to combine the results from flashes of two xenon lamps: one with full UV energy, the other with UV energy removed by a UV-cutoff filter (either 400 nm or 420 nm). This method eliminates the need for lengthy filter position adjustment processes, and enables UV adjustment by Whiteness Index, Tint, Brightness, or UV profile.



Easy to read LED indicator panel with measurement button

The LED indicator panel displays current measurement settings at a glance. In addition, the measurement button in the panel allows to measure samples remotely.

Measurement Areas to match your samples

The CM-36dG offers four different apertures with Ø 4.0, 8.0, 16.0 and 25.4 mm to provide a suitable measurement size for any sample.

“Wavelength Analysis & Adjustment” – (WAA)

“Analyze - Adjust - Activate” - Konica Minolta’s patented technology checks and adjusts possible wavelength shift during each instrument calibration. This procedure assures unsurpassed long-term measurement stability and can keep measurements stable even for changes in temperature or environment conditions over time.

WAA allows the operator to easily distinguish whether the instrument itself is the cause of measurement differences, reducing troubleshooting time and providing improved certainty within supply chains.

Specifications

Benchtop Spectrophotometer CM-36dG		
Color	Illumination/ viewing system	Reflectance: di:8°, de:8° (diffused illumination, 8° viewing) Conforms to CIE No.15 (2004), ISO7724/1, ASTM E1164, DIN 5033 Teil7 and JIS Z 8722 Condition c standards.
		Transmittance: di:0°, de:0° (diffused illumination, 0-degree viewing) Conforms to CIE No.15 (2004), ASTM E-1164, DIN 5033 Teil 7 and JIS Z 8722 Condition g standards.
	Integrating sphere size	Ø152 mm
	Detector	Dual 40-element silicon photodiode array
	Spectral separation device	Planar diffraction grating
	Wavelength range	360-740 nm
	Wavelength pitch	10 nm
	Half bandwidth	Approx. 10 nm
	Measurement range	0-200%
		Resolution: 0.01%
	Light source	3 Pulsed Xenon lamps (NUVC)
	Illumination / Measurement area [mm]	LAV： Ø30.0 / Ø25.4 LMAV：Ø20.0 / Ø16.0 MAV： Ø11.0 / Ø8.0 SAV： Ø7.0 / Ø4.0 Trans：Ø24.0 / Ø17.0
	Measurement time	Approx. 3.5sec (SCI + SCE measurement), Approx. 4sec (SCI + SCE + gloss measurement)

Benchtop Spectrophotometer CM-36dG		
	Min. measurement interval	Approx. 4sec (SCI + SCE measurement), Approx. 4.5sec (SCI or SCE + gloss measurement)
	Repeatability	Colorimetric values: Std. dev. within ΔE^*_{ab} 0.02 Spectral reflectance: Std. dev. within 0.1% (When a white calibration plate measured 30 times at 10sec intervals after white calibration)
	IIA	Within ΔE^*_{ab} 0.12 (LAV/SCI) Average for 12 BCRA Series II color tiles compared to values measured with master body.
	UV control	NUVC[*1] (UV100 (Full UV), UV adjusted, UV0. With 400nm and 420nm UV cutoff filters)
Gloss	Measurement geometry	60° (complies to ISO 2813, ISO 7668 (MAV), ASTM D523-08, ASTM D2457-13, DIN 67530, JIS-Z8741 (MAV), JIS-K5600)
	Light source	White LED
	Detector	Silicon photo diode
	Measurement range	0-200 GU
		Resolution: 0.01 GU
	Measurement area [mm]	MAV (LAV/LMAV/MAV color measurement area): Ø10.0 x 8.0
		SAV (SAV color measurement area): Ø3.0
	Repeatability (MAV)	0-10 GU: within 0.1 GU
		10-100 GU: within 0.2 GU
		>100 GU: within 0.2% of indicated value (Standard deviation)
		(When measured 30 times at 10-second intervals)
	IIA (MAV)	0-10 GU: ±0.2 GU
		10-100 GU: ±0.5 GU
		(Compared to values measured with a master body under Konica Minolta standard conditions)
Sample preview		RGB Camera
Internal Performance Check[*2]		WAA (Wavelength Analysis & Adjustment) Technology
Interfacing		USB 2.0
Operation temperature / humidity range		13-33°C / rH 80% or less (at 33°C) with no condensation

Benchtop Spectrophotometer CM-36dG	
Storage temperature / humidity range	0-40°C / rH 80% or less (at 35°C) with no condensation
Size [mm]	248 x 250 x 498 mm
Weight [kg]	8.4 kg

*1 NUVC (Numerical UV Control) adjustment requires UV Adjustment Software (included with optional SpectraMagic NX Pro Ver. 3.2 or later).

*2 WAA license purchase required.

Specifications and appearance subject to change without notice.

Optional accessories

Transmittance Zero Calibration plate CM-A100

The Transmission Zero Calibration Plate CM-A100 is required to block the light path for zero calibration in transmittance measurement mode. The black and mat coating of the plate absorbs also stray light within the transmission chamber of the instrument.

Item Order Code: 1864-712

Transmittance Specimen Holder CM-A96

For precise positioning of transparent plates, films or other transparent samples for transmittance measurements. Holds the Rectangular Cells CM-A97 (2 mm path), CM-A98 (10 mm path), CM-A99 (20 mm path) and the Rectangular Disposal Cells CM-A CM-A130 (2 mm path), CM-A131 (10 mm path) and CM-A132 (20 mm path) or the Flow Cell CM-A508 (10 mm path) always in perfect and repeatable position for precise transmittance measurements of liquids.

Item Order Code: 1864-708

Glass Cell 2 mm CM-A97

Glass cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 2 mm and therefore perfect for liquids with high optical density.

Item Order Code: 1864-709

Glass Cell 10 mm CM-A98

Glass cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 10 mm and recommended for liquids with normal optical density. Recommended also for reflectance measurements of opaque liquids in combination with Cell-Holder CM-A509.

Item Order Code: 1864-710

Glass Cell 20 mm CM-A99

Glass cell made of optical glass for high precision transmittance measurement of transparent liquids. The optical path is 20 mm and recommended for liquids with low optical density. Also suitable for reflectance measurements of opaque liquids, paste, powder or grains in combination with Cell-Holder CM-A509.

Item Order Code: 1864-711

Plastic Cell 2 mm CM-A130

Disposal plastic cell with an optical path of 2 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with high density.

Item Order Code: 1870-715

Plastic Cell 10 mm CM-A131

Disposal plastic cell with an optical path of 10 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with normal density. Also suitable for reflectance measurements of water based opaque liquids in combination with Cell-Holder CM-A509.

Item Order Code: 1870-716

Plastic Cell 20 mm CM-A132

Disposal plastic cell with an optical path of 20 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with lower density. Also suitable for reflectance measurements of water based opaque liquids or paste, none aggressive powders or grains in combination with Cell-Holder CM-A509.

Item Order Code: 1870-717

Opacity Tool

The Opacity Tool is equipped on one side with a white tile and on the opposite side with a black cavity and allows quick and precise opacity measurements of paper, films and similar materials. The Opacity Tool is attached instead of the standard sample holder, but thanks to the turnable sample holder the Opacity Tool can be used also for standard reflectance measurements.

Item Order Code: A3UJ-900

Flow Cell CM-A508

For continuous transmittance measurement of transparent liquids. The optical path of the cell is 10 mm and can be used with a pressure of the liquid up to 2 Bar. The cell fits the Sample Holder CM-A96. For the measurement of opaque liquids in reflectance the Flow Cell CM-A508 can be used in combination with the Cell Holder CM-A509.

Item Order Code: 9970-237

Black Glass Tile CM-A511

High gloss black glass tile with high absorption. Due to the extreme long term stability perfect to use as background standard.

Item Order Code: 9970-1109

PET Pre-Form Holder Vertical CM-A513

The PET-Pre-Form Holder CM-A513 allows a precise positioning of transparent PET Pre-forms in the transmission chamber of the instrument. The Snap-In mechanic allows a quick exchange of the pre-forms.

Item Order Code: 9970-218

Bench-top Spectrophotometer CM-36dGV

World’s first Color-and-Gloss Bench-top spectrophotometer with vertical alignment, unsurpassed technology and best price / performance ratio for reflectance and transmission colour measurements

Introduction

High-precision spectrophotometer with ISO compliant gloss sensor and stability check

The CM-36dGV Spectrophotometer is a high-precision and high-reliability bench-top instrument capable to measure colour either in reflectance or transmittance and thus offering a wide range of applications such as Plastics, Paints, Ceramics, Chemicals etc.

For the first time ever, Konica Minolta Sensing integrates an ISO 2813 compliant 60° gloss sensor inside a benchtop spectrophotometer, to simultaneously measure Color and Gloss values at the same spot at the same time. As both value sets are reported together, not only are manual errors reduced but also valuable working time as well as money for additional equipment saved.

The CM-36dGV utilizes the patented and proven Numerical UV Control (NUVC), the unsurpassed technology for UV adjustments when measuring samples containing optical brighteners such as pulp, paper, textiles or chemicals.

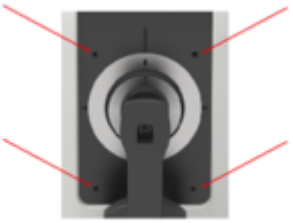
Several further features for your convenience, like status LEDs or camera preview for sample positioning and reporting complete the picture.

Konica Minolta’s patented technologies assure highest accuracy and repeatability levels unseen before in this price class. These technologies combined with superior reliability due to our latest innovative feature “Wavelength Analysis and Adjustment” give our customers the possibility to check and adjust the CM-36dGV during calibration, to always assure the instrument is in perfect condition.

Features

Efficient sample presentation

Four screw threads and linear guidelines in the front plate enable the operator to create custom jigs to accurately position samples – maximising the repeatability and speed of the measurement process.



Camera previewer for accurate sample positioning

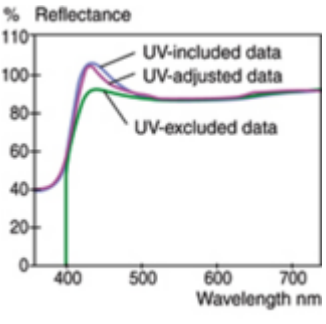
The integrated camera viewer provides a clear preview of the sample for precise targeting and control the area to be measured. The software can capture images of the area that is measured to provide detailed and concise reporting.

Reflectance and Transmittance measurements, horizontal or top-port

The CM-36dGV can measure solid or liquid samples in reflectance or transmission mode, horizontally or upside down. This offers great flexibility for various samples ranging from opaque to translucent and transparent.
The large, open sided transmission chamber can be used to measure transparent or translucent samples of any size with ease. The transmission chamber lid features a lift-and-turn lock to prevent accidental opening of the device and locks the chamber when used upside down to measure e.g. powdery material in round cuvettes.

Numerical UV Control for Accurate Measurements of Fluorescent Materials

Accurate measurement of materials such as paper or cloth treated with optical brighteners (OBA) requires precise control of the UV component. The patented Numerical UV Control method (familiar to customers who used the CM-3600A) provides UV control by using proprietary calculations to combine the results from flashes of two xenon lamps: one with full UV energy, the other with UV energy removed by a UV-cutoff filter (either 400 nm or 420 nm). This method eliminates the need for lengthy filter position adjustment processes, and enables UV adjustment by Whiteness Index, Tint, Brightness, or UV profile.



Easy to read LED indicator panel with measurement button

The LED indicator panel displays current measurement settings at a glance. In addition, the measurement button in the panel allows to measure samples remotely.

Measurement Areas to match your samples

The CM-36dGV offers four different apertures with Ø 4.0, 8.0, 16.0 and 25.4 mm to provide a suitable measurement size for any sample.

“Wavelength Analysis & Adjustment” – (WAA)

“Analyze - Adjust - Activate” - Konica Minolta’s patented technology checks and adjusts possible wavelength shift during each instrument calibration. This procedure assures unsurpassed long-term measurement stability and can keep measurements stable even for changes in temperature or environment conditions over time.

WAA allows the operator to easily distinguish whether the instrument itself is the cause of measurement differences, reducing troubleshooting time and providing improved certainty within supply chains.

Specifications

Benchtop Spectrophotometers CM-36dGV		
Color	Illumination/ viewing system	Reflectance: di:8°, de:8° (diffused illumination, 8° viewing) Conforms to CIE No.15 (2004), ISO7724/1, ASTM E1164, DIN 5033 Teil7 and JIS Z 8722 Condition c standards.
		Transmittance: di:0°, de:0° (diffused illumination, 0-degree viewing) Conforms to CIE No.15 (2004), ASTM E-1164, DIN 5033 Teil 7 and JIS Z 8722 Condition g standards.
	Integrating sphere size	Ø152 mm
	Detector	Dual 40-element silicon photodiode array
	Spectral separation device	Planar diffraction grating
	Wavelength range	360-740 nm
	Wavelength pitch	10 nm
	Half bandwidth	Approx. 10 nm
	Measurement range	0-200%
		Resolution: 0.01%
	Light source	3 Pulsed Xenon lamps (NUVC)
	Illumination / Measurement area [mm]	LAV： Ø30.0 / Ø25.4 LMAV：Ø20.0 / Ø16.0 MAV： Ø11.0 / Ø8.0 SAV： Ø7.0 / Ø4.0 Trans：Ø24.0 / Ø17.0
	Measurement time	Approx. 3.5sec (SCI + SCE measurement), Approx. 4sec (SCI + SCE + gloss measurement)

Benchtop Spectrophotometers CM-36dGV		
	Min. measurement interval	Approx. 4sec (SCI + SCE measurement), Approx. 4.5sec (SCI or SCE + gloss measurement)
	Repeatability	Colorimetric values: Std. dev. within ΔE^*_{ab} 0.02 Spectral reflectance: Std. dev. within 0.1% (When a white calibration plate measured 30 times at 10sec intervals after white calibration)
	IIA	Within ΔE^*_{ab} 0.12 (LAV/SCI) Average for 12 BCRA Series II color tiles compared to values measured with master body.
	UV control	NUVC[*1] (UV100 (Full UV), UV adjusted, UV0. With 400nm and 420nm UV cutoff filters)
Gloss	Measurement geometry	60° (complies to ISO 2813, ISO 7668 (MAV), ASTM D523-08, ASTM D2457-13, DIN 67530, JIS-Z8741 (MAV), JIS-K5600)
	Light source	White LED
	Detector	Silicon photo diode
	Measurement range	0-200 GU
		Resolution: 0.01 GU
	Measurement area [mm]	MAV (LAV/LMAV/MAV color measurement area): Ø10.0 x 8.0
		SAV (SAV color measurement area): Ø3.0
	Repeatability (MAV)	0-10 GU: within 0.1 GU
		10-100 GU: within 0.2 GU
		>100 GU: within 0.2% of indicated value (Standard deviation)
		(When measured 30 times at 10-second intervals)
	IIA (MAV)	0-10 GU: ±0.2 GU
		10-100 GU: ±0.5 GU
		(Compared to values measured with a master body under Konica Minolta standard conditions)
Sample preview		RGB Camera
Internal Performance Check[*2]		WAA (Wavelength Analysis & Adjustment) Technology
Interfacing		USB 2.0
Operation temperature / humidity range		13-33°C / rH 80% or less (at 33°C) with no condensation

Benchtop Spectrophotometers CM-36dGV	
Storage temperature / humidity range	0-40°C / rH 80% or less (at 35°C) with no condensation
Size [mm]	Approx. 300 x 677 x 315 mm
Weight [kg]	Approx. 14.0 kg

*1 NUVC (Numerical UV Control) adjustment requires UV Adjustment Software (included with optional SpectraMagic NX Pro Ver. 3.2 or later).

*2 WAA license purchase required.

Specifications and appearance subject to change without notice.

Optional accessories

Transmittance Zero Calibration plate CM-A100

The Transmission Zero Calibration Plate CM-A100 is required to block the light path for zero calibration in transmittance measurement mode. The black and mat coating of the plate absorbs also stray light within the transmission chamber of the instrument.

Item Order Code: 1864-712

Transmittance Specimen Holder CM-A96

For precise positioning of transparent plates, films or other transparent samples for transmittance measurements. Holds the Rectangular Cells CM-A97 (2 mm path), CM-A98 (10 mm path), CM-A99 (20 mm path) and the Rectangular Disposal Cells CM-A CM-A130 (2 mm path), CM-A131 (10 mm path) and CM-A132 (20 mm path) or the Flow Cell CM-A508 (10 mm path) always in perfect and repeatable position for precise transmittance measurements of liquids.

Item Order Code: 1864-708

Opacity Tool

The Opacity Tool is equipped on one side with a white tile and on the opposite side with a black cavity and allows quick and precise opacity measurements of paper, films and similar materials. The Opacity Tool is attached instead of the standard sample holder, but thanks to the turnable sample holder the Opacity Tool can be used also for standard reflectance measurements.

Item Order Code: A3UJ-900

Black Glass Tile CM-A511

High gloss black glass tile with high absorption. Due to the extreme long term stability perfect to use as background standard.

Item Order Code: 9970-1109

PET Pre-Form Holder Vertical CM-A513

The PET-Pre-Form Holder CM-A513 allows a precise positioning of transparent PET Pre-forms in the transmission chamber of the instrument. The Snap-In mechanic allows a quick exchange of the pre-forms.

Item Order Code: 9970-218

Bench-top Spectrophotometer CM-36d

Affordable Bench-top spectrophotometer with flexible horizontal or top-port alignment, unsurpassed technology and best price / performance ratio for reflectance colour measurements

Introduction

High-precision spectrophotometer with stability check

The CM-36d Spectrophotometer is a high-precision and high-reliability bench-top instrument capable to measure colour in reflectance for a wide range of applications such as Plastics, Paints, Ceramics, Chemicals etc.

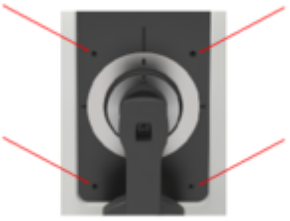
Several further features for your convenience, like status LEDs or camera preview for sample positioning and reporting or flexible port alignment (device can be used horizontally or turned in 90° to measure e.g. powdery materials in “Top-port” style) complete the picture.

Konica Minolta’s patented technologies assure highest accuracy and repeatability levels unseen before in this price class. These technologies combined with superior reliability due to our latest innovative feature “Wavelength Analysis and Adjustment” give our customers the possibility to check and adjust the CM-36d during calibration, to always assure the instrument is in perfect condition.

Features

Customize your own holder

Four screw holes and linear guidelines in the front plate enable usage of customizable fixtures to accurately position your samples – and always in a repeatable manner.



Camera previewer for accurate sample positioning

The integrated camera viewer provides a clear preview of the sample for perfect targeting and control the area to be measured. Capture images of the area measured for more accurate reporting.

Reflectance measurements, horizontal or top-port

The CM-36d can measure solid, powdery or liquid samples in reflectance or transmission mode, horizontally or upside down, thus offering great flexibility to measure all kind of samples.

Easy to read tilted LED indicator panel with measurement button

The tilted LED indicator panel shows you all your settings at a glance and what status your device is in. In addition, the measurement button in the panel can be used to measure samples remotely while holding them to the front plate.

Wavelength Analysis & Adjustment – “WAA”

“Analyze - Adjust - Activate” - Konica Minolta’s patented technology to check and adjust wavelength shift during each instrument calibration procedure assures unsurpassed long-term measurement stability and keep measurements stable even for changes in temperature or environment over time.
WAA lets you easily distinguish whether the instrument itself is the cause of a problem or not, without starting guesswork or faulty assumptions

Specifications

Benchtop Spectrophotometer CM-36d	
Illumination/viewing system	Reflectance: di:8°, de:8° (diffused illumination, 8° viewing) Conforms to CIE No.15 (2004), ISO7724/1, ASTM E1164, DIN 5033 Teil7 and JIS Z 8722 Condition c standards.
Integrating sphere size	Ø152 mm
Detector	Dual 40-element silicon photodiode array
Spectral separation device	Planar diffraction grating
Wavelength range	360-740 nm
Wavelength pitch	10 nm
Half bandwidth	Approx. 10 nm
Measurement range	0-200%
	Resolution: 0.01%
Light source	Pulsed Xenon lamp 1x
Illumination / Measurement area [mm]	LAV: Ø30.0 / Ø25.4 MAV: Ø11.0 / Ø8.0 SAV: Ø7.0 / Ø4.0
Measurement time	Approx. 3.5sec (SCI + SCE measurement)
Min. measurement interval	Approx. 4sec (SCI + SCE measurement)
Repeatability	Colorimetric values: Std. dev. within ΔE^*_{ab} 0.03 Spectral reflectance: Std. dev. within 0.1% (When a white calibration plate measured 30 times at 10sec

Benchtop Spectrophotometer CM-36d	
	intervals after white calibration)
IIA	Within ΔE^*_{ab} 0.15 (LAV/SCI) Average for 12 BCRA Series II color tiles compared to values measured with master body.
UV control	No adjustment function (UV100%)
Sample preview	RGB Camera
Internal Performance Check*	WAA (Wavelength Analysis & Adjustment) Technology
Interfacing	USB 2.0
Operation temperature / humidity range	13-33°C / rH 80% or less (at 33°C) with no condensation
Storage temperature / humidity range	0-40°C / rH 80% or less (at 35°C) with no condensation
Size [mm]	248 x 250 x 498 mm
Weight [kg]	8.3 kg

*WAA license purchase required.

Specifications and appearance subject to change without notice.

Optional accessories

Opacity Tool

The Opacity Tool is equipped on one side with a white tile and on the opposite side with a black cavity and allows quick and precise opacity measurements of paper, films and similar materials. The Opacity Tool is attached instead of the standard sample holder, but thanks to the turnable sample holder the Opacity Tool can be used also for standard reflectance measurements.

Item Order Code: A3UJ-900

Black Glass Tile CM-A511

High gloss black glass tile with high absorption. Due to the extreme long term stability perfect to use as background standard.

Item Order Code: 9970-1109

Benchtop Spectrophotometer CM-3630A

State-of-the art ISO-Standard compliant measuring device for the pulp & paper industry with unrivaled precision and stability in whiteness measurement

Introduction

Highly competitive markets, such as the paper, pulp and cellulose industry, require a commitment to top quality throughout.

With Konica Minolta's state-of-the-art Spectrophotometer CM-3630A and the dedicated Paper production control software PaperManager you can precisely monitor production at all times. Designed to keep an eye on the optical properties of pulp and paper during the complete production process, the ISO compliant CM-3630A measures brightness, opacity, fluorescence, color, whiteness and tint in full accordance with several international and national standards such as ISO, SCAN, DIN, TAPPI, CPPA and AFNOR.

To meet your needs, the touch-pad enabled PaperManager software has been developed in close cooperation with the paper, pulp and cellulose industry and will also run on tablet PCs for "standalone" usage.

Numerical UV-Control makes calibration and adjustments to whiteness and tint a fast and easy procedure. In fact, in just a few seconds your instrument is perfectly calibrated, much faster and with conventional instruments. Since everything's done numerically, and with the significant reduction in moving parts, it is almost maintenance free.

Features

The CM-3630A perfectly meets requirements for fast and accurate measurement of optical characteristics of paper during the manufacturing process.

The optical system, using a d:0° sphere geometry with 30mm measuring aperture, is in full compliance with all relevant international standards such as ISO, SCAN, DIN, TAPPI,CPPA and AFNOR.

Using the patented Numerical UV control (NUVC) it is a highly accurate and reliable bench top spectrophotometer in the production environment. Controlled via the optional software PaperManager the CM-3630A can give values for colour, tint, whiteness, yellowness, brightness, fluorescence, and opacity.

Furthermore, the Numerical UV-Control allows easy adjustment of the instrument's parameters to other instruments and thus, guarantees perfect data correlation.

Compatibility with CM-3630
The CM-3630A shares the same optical system with its predecessor, the CM-3630 (one of the reference instruments at RISE, Stockholm. This means that all users of the old CM-3630 can use their historical measurement data without transition problems.

Improved targeting by camera preview
Easy positioning in real time to target small samples with patterns or inhomogeneous surfaces.

Smaller measurement area possible
For your convenience, we added smaller apertures to analyze small-sized samples or printed samples with patterns; for the first time you can reliably compare data for smaller targets.

Windows tablet ready for standalone usage
Using the USB interface and side-fixtures, the CM3630A can be used together with the optional PaperManager Software to create a touchscreen-ready, standalone system with minimum footprint.

Optional accessories
To offer you a convenient workflow, additional jigs are available, to e.g. measure opacity or larger sheet material.

Specifications

Illumination/viewing system	Reflectance: d:0° (diffused illumination, 0-degree viewing) LAV measurements conform to ISO 2469, JIS P8148, DIN 53145-1 and DIN 53145-2 standards
Light-receiving element	Silicon photodiode array (dual 40 elements)
Spectral separation device	Diffraction grating
Wavelength range	360 nm to 740 nm
Wavelength pitch	10 nm
Reflectance range	0 to 200%; resolution: 0.01%
Light source	3 pulsed Xenon lamps
Measurement time	Within 1.5 seconds
Minimum interval between measurements	Within 2 sec (UV 100% measurement) Within 3 sec (UV 0%/UV adjusted measurement)

Measurement/illumination area	LAV: ø 30/34 mm MAV: ø 8/11 mm
Repeatability	Colorimetric values: Standard deviation within ΔE*ab 0.02 (White Calibration Plate) Spectral reflectance: Standard deviation within 0.1% (when a white calibration plate is measured 30 times at 10-second intervals after white calibration)
Inter-Instrument Agreement	Within ΔE*ab 0.2 (Based on average for 12 BCRA Series II color tiles; compared to values measured with a master body under Konica Minolta standard measurement conditions)
UV setting	100% / 0% / Adjusted 400 nm and 420 nm UV cutoff filters (NUVC: Instantaneous numerical adjustment of UV with no mechanical filter movement required)
Viewfinder	Using built-in camera; Software (not included) required.
Interface	USB 2.0 Full Speed
Power	Dedicated AC adapter
Dimensions (W × H × D)	300 × 612 × 315 mm
Weight	16 kg
Operating temperature / humidity range	13 - 33°C, relative humidity 80% or less (at 35°C) with no condensation

Specifications subject to change without prior notice.

Optional accessories

Opacity JIG CM-A134

The Opacity Jig CM-A134 is equipped on one side with a white tile and on the opposite side with a black cavity and allows quick and precise opacity measurements of paper, films and similar materials. The Opacity Jig can be simply attached and de-attached without tools, but thanks to the turn able sample holder the Opacity Jig can be used also for thin samples for reflectance measurements.

Item Order Code: 1869-714

Powder Attachment CM-A510

The Powder Attachment CM-A510 holds Petri dishes with a diameter of 40 or 45 mm and allows the measurement of powder and grains without a glass protection plate between specimen and measuring aperture. Also suitable for pressed tablets wit a diameter of 40 mm.

Item Order Code: 9970273

Black Glass Tile CM-A511

High gloss black glass tile with high absorption. Due to the extreme long term stability perfect to use as background standard.

Item Order Code: 9970-1109

Bench-top Spectrophotometer CM-5

An innovative Benchtop Spectrophotometer with user friendly features and a large onboard display. The CM-5 is a benchtop spectro with a top facing port meaning easy changes for solid samples and samples in petri dishes. It can also measure the color of liquid and transparent samples.

Introduction

The CM-5 is a very versatile bench-top spectrophotometer to measure the colour of solid, pasty granular and liquid samples either in reflectance or transmittance. The top-port concept, offering various aperture sizes, allows measurement of almost any kind of samples. The CM-5 is thus the perfect all-rounder laboratory instrument for applications such as Flavours & Fragrances, Foods, Chemicals, Pharmaceuticals and Plastics.

The CM-5 can work stand alone thanks to the large colour screen and extensive firmware offering all major colorimetric systems including industry specific indices to measure transparent liquids such as Gardner, Hazen/APHA, Iodine, European and US Pharmacopoeia. In combination with the optional software SpectraMagic NX, Haze and many more indices are available.

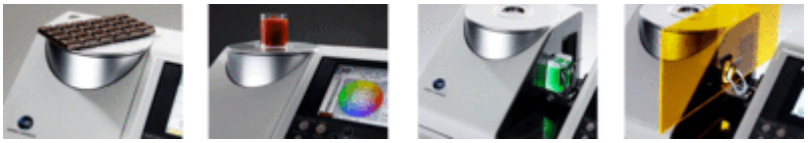
Very intuitive routine work is guaranteed by features such as automatic calibration, Operation Wizard and support in seven languages.

Features

Versatility for a wide range of Applications

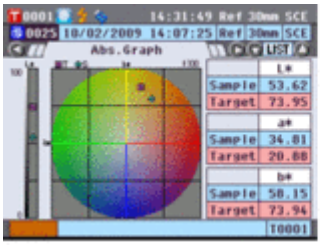
Thanks to the unique concept and a wide range of special accessories, the CM-5 can handle almost any kind of samples in solid, granule, pasty or liquid form.

Aperture size from 3 – 30 mm, different Petri-dishes, different cell paths and a large transmittance chamber offer a unique flexibility.



Large colour LCD

The large colour LCD is easy to read and can display measurement data numerically and graphically or even just as PASS/FAIL judgments.



Wizard for on-screen operation guidance

The wizard function show intuitive on-screen guidance for users for instrument set-up.

USB storage of settings and data

Individual user set-ups as well as target and measurement data can be easily stored on USB memory stick to allow multi-user capability.

Specifications

Principal Specifications CM-5

Model	Spectrophotometer CM-5	
Illumination/viewing system	Reflectance	di:8°, de:8° (diffuse illumination: 8° viewing) / SCI (specular component included) / SCE (specular component excluded) switchable Conforms to CIE No. 15, ISO 7724/1, ASTM E 1164, DIN 5033 Teil 7, and JIS Z 8722 (Condition c)
	Transmittance	di:180° (diffuse illumination: 180° viewing)
Integrating sphere size	Ø152 mm	

Detector	Dual 40-element silicon photodiode arrays	
Spectral separation device	Planar diffraction grating	
Wavelength range	360 nm to 740 nm	
Wavelength pitch	10 mm	
Half bandwidth	Approx. 10 nm	
Measurement range	0 to 175 % (Reflectance or transmittance); Output/display resolution: 0.01%	
Light source	Pulsed xenon lamp	
Measurement time	Approx. 1 s (to data display/output); Minimum measurement interval: Approx. 3 s	
Measurement/ illumination area	**Reflectance**	Changeable by changing mask and settings. LAV: Ø30 mm/Ø36 mm; MAV (optional): Ø8 mm/Ø11 mm; SAV (optional): Ø3 mm/Ø6 mm
	Transmittance	Ø20 mm
Repeatability	Spectral reflectance: Standard deviation within 0.1% (400 nm to 740 nm) Chromaticity value: Standard deviation within ΔE*ab 0.04 * When a white calibration plate is measured 30 times at 10-second intervals after white calibration	
Inter-instrument agreement	Within ΔE*ab 0.15 (Typical) (Based on 12 BCRA Series II colour tiles compared to values measured with a master body at 23°C)	
Transmittance chamber	No sides (unlimited sample length); Depth (maximum sample thickness): 60 mm Sample holder (optional) for holding sheet samples or containers of liquid samples can be installed/removed	
Display	5.7-inch TFT colour LCD	
Display languages	English, Japanese, German, French, Italian, Spanish, Simplified Chinese	
White calibration	Automatic white calibration (reflectance)/100% calibration (transmittance) using internal white calibration plate (Not available when using petri dish or transmittance cell)	
Interfaces	USB 1.1 (Connection to PC; USB memory stick); RS-232C standard (Connection to serial printer)	
Observer	2° Standard Observer or 10° Standard Observer	
Illuminant	A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12, ID50, ID65 (simultaneous evaluation with two light sources possible)	
Displayed data	Spectral values, spectral graph, colorimetric values, colour-difference values, colour-difference graph, pass/fail judgment, pseudo colour, colour assessment	
Colour space	L*a*b*, L*C*h, Hunter Lab, Yxy, XYZ, Munsell, and colour differences in these spaces (except for Munsell)	

Index	**Reflectance**	MI; WI (ASTM E 313-73, ASTM E 313-96); YI (ASTM E 313-73, ASTM E 313-96, ASTM D 1925); ISO Brightness, B (ASTM E 313-73)
	Transmittance	Gardner, Iodine, Hazen (APHA), European Pharmacopoeia, US Pharmacopeia
User index	User-defined index	
Color-difference equation	ΔE*ab (CIE 1976), ΔE*94 (CIE 1994), ΔE00 (CIE 2000), ΔE (Hunter), CMC (l: c)	
Pass/fail judgment	Tolerances can be set to colorimetric values (except Munsell), colour-difference values, or reflectance index values	
Storable data	Sample data: 4,000 measurements; Target colour data: 1,000 measurements	
USB memory stick storage	Storage of measurement data and target colour data. Storage/reading of measurement condition settings (Security-enabled USB memory sticks cannot be used.)	
Power	AC 100 to 240 V, 50/60 Hz (using exclusive AC adapter)	
Size	Slide cover closed: 385 (W) × 192 (H) × 261 (D) mm Slide cover open: 475 (W) × 192 (H) × 261 (D) mm	
Weight	Approx. 5.8 kg	
Operating temperature/ humidity range	13 to 33°C, relative humidity 80 % or less (at 35°C) with no condensation	
Storage temperature/ humidity range	0 to 40°C, relative humidity 80 % or less (at 35°C) with no condensation	

Specifications and appearance subject to change without notice.

Optional accessories for CM-5

CM-A198 Transmittance Specimen Holder

Cell holder attachment for commercial rectangular cells (Macro type) with 12.5 mm width. Suitable for cells with an optical path of 10, 20 or 50 mm.

Item Order Code: A168704

CM-A96 Transmittance Specimen Holder

For precise positioning of transparent plates, films or other transparent samples for transmittance measurements. Holds the Rectangular Cells CM-A97 (2 mm path), CM-A98 (10 mm path), CM-A99 (20 mm path) and the Rectangular

Disposal Cells CM-A CM-A130 (2 mm path), CM-A131 (10 mm path) and CM-A132 (20 mm path) or the Flow Cell CM-A508 (10 mm path) always in perfect and repeatable position for precise transmittance measurements of liquids.

Item Order Code: 1864-708

CM-A199 Transmittance Specimen Holder Attachment

Adapter to attach the Transmittance Specimen Holder CM-A96 in direction of the light receiving port.

Item Order Code: A168705

CM-A213 Transmittance Zero Calibration plate

The Transmission Zero Calibration Plate CM-A213 is required to block the light path for zero calibration in transmittance measurement mode. The black and mat coating of the plate absorbs also stray light within the transmission chamber of the instrument.

Item Order Code: A168717

CM-A97 Rectangular Cell 50 x 38, optical path 2 mm

Rectangular cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 2 mm and therefore perfect for liquids with high optical density.

Item Order Code: 1864-709

CM-A98 Rectangular Cell 50 x 38, optical path 10 mm

Rectangular cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 10 mm and recommended for liquids with normal optical density.

Item Order Code: 1864-710

CM-A99 Rectangular Cell 50 x 38, optical path 20 mm

Rectangular cell made of optical glass for high precision transmittance measurement of transparent liquids. The optical path is 20 mm and recommended for liquids with low optical density.

Item Order Code: 1864-711

CM-A130 Rectangular Disposal Cell 50 x 38, optical path 2 mm

Rectangular disposal cell made of PMMA with an optical path of 2 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with high density.

Item Order Code: 1870-715

CM-A131 Rectangular Disposal Cell 50 x 38, optical path 10 mm

Rectangular disposal cell made of PMMA with an optical path of 10 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with normal density.

Item Order Code: 1870-716

CM-A132 Rectangular Disposal Cell 50 x 38, optical path 20 mm

Rectangular disposal cell made of PMMA with an optical path of 20 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with low density.

Item Order Code: 1870-717

CM-A508 Flow Cell 50 x 38, optical path 10 mm

For continuous transmittance measurement of transparent liquids. The optical path of the cell is 10 mm and can be used with a pressure up to 0.8 Bar. The cell fits the Sample Holder CM-A96.

Item Order Code: 9970-237

CM-A195 Target Mask 3 mm

Target mask with 6 mm and 3 mm aperture for the measurement of small samples or to measure a limited area of the sample.

Item Order Code: A168-701

CM-A196 Target Mask 8 mm

Target mask with 11 mm and 8 mm aperture for the measurement of medium size samples or to measure a limited area of the sample.

Item Order Code: A168-702

CM-A202 Specimen Viewing Mirror

The mirror can be set in the transmission chamber and allows control of the position of the sample for reflectance measurements.

Item Order Code: A168-708

CM-A203 Target Mask for tube cells Ø 45 mm

Special Target Mask with a recess for precise positioning of the Tube Cells CM-A128, CM-30 and CM-50.

Item Order Code: A168-709

CM-A128 Tube Cell Ø 45 x 17 mm depth

The tube cell is made of optical glass with a diameter of 45 mm and provides a depth of 15 mm. The cell is suitable for reflectance measurements of opaque paste, powders, grains and granular materials. Fits to Target Mask CM-A203.

Item Order Code: 1870-712

CM-50 Tube Cell Ø 45 / 52 mm depth

The tube cell is made of optical glass with a diameter of 45 mm and provides a depth of 50 mm. The cell is suitable for reflectance measurements of opaque and slightly transparent paste, powders, grains and granular materials. Fits to Target Mask CM-A203.

Item Order Code: 1870-900

CR-A502 Tube Cell Ø 60 / 40 mm depth

The tube cell is made of optical glass with a diameter of 60 mm and provides a depth of 38 mm. The cell is suitable for reflectance measurements of opaque and very low transparent liquids, paste, powders, grains and granular materials. Due to the oversized diameter also suitable for specimens where edge loss effects occurs.

Item Order Code: 9970-220

CR-A506 Tube Cell Ø 60 / 60 mm depth

The tube cell is made of optical glass with a diameter of 60 mm and provides a depth of 58 mm. The cell is suitable for reflectance measurements of opaque and slightly transparent liquids, paste, powders, grains and granular materials. Due to the oversized diameter also suitable for specimens where edge loss effects occurs.

Item Order Code: B027166

CR-A504 Tube Cell Ø 34 / 35 mm depth

The tube cell is made of optical glass with a diameter of 34 mm and provides a depth of 33 mm. The cell is suitable for reflectance measurements of opaque and slightly transparent liquids, paste, powders, grains and granular materials. Due to the oversized diameter also suitable for specimens where edge loss effects occurs.

Item Order Code: 9970-216

CM-A210 White Calibration Plate

White tile for manual white calibration (instead performing the calibration with the build in white standard of the CM-5). The White Calibration Plate CM-A210 includes a CD with the spectral calibration values and a software to load the calibration data from a PC to the CM-5.

Item Order Code: A168-700

CM-A212 Calibration Glass Ø 45mm

Glass plate made of optical glass with the same optical properties as the bottom window of the Petri-Dish CM-A128. The Calibration Glass is recommended in case of manual tube cell calibration (instead performing the calibration with the build in white standard of the CM-5).

Item Order Code: A168-716

CM-A193 Accessory Case

For storage and protection of CM-5 accessories.

Item Order Code: A168-603

CM-A520 PET Pre-Form Holder

The PET-Pre-Form Holder CM-A520 allows a precise positioning of transparent Pre-forms in the transmission chamber of the instrument. The rail guide of the holder allows horizontal movements of the pre-form to define the area for the measurement.

Item Order Code: 9970-216

CM-A519 Retaining Ring (for CR-A506 Tube Cell Ø 60mm)

For precise and repeatable positioning of tube cells with 60 mm diameter.

Item Order Code: B027165

CM-A124 Zero Calibration Box

For precise zero calibration. The box prevents ambient light from entering the sensor during the calibration. Reduces the influence of light reflected by dust particle in air to a minimum.

Item Order Code: 1870-704

Thermo-Printer DPU-S245-01

Small and compact Thermo-Printer for immediately print out of measurement data.

Item Order Code: B027168

DPU-S245-01 Serial Connection Set

The set consist of the serial data cable with special plug for the data terminal of the printer body DPU-S245-01 and a 9-Pin Gender Changer to clamp the serial data cable of the printer with the serial data terminal of the instrument.

Item Order Code: B027169

CM-A58 Printer Cable

Serial Printer Cable with SUB-D9 plugs on both sides for connection between Thermo-Printer DPU-HS245 and instrument.

Item Order Code: 1854-730

Bench-top Colorimeter CR-5

A Benchtop colorimeter based on the CM-5, the CR-5 offers a fantastic price to performance ratio, particularly for QC measurements of liquids. Like the CM-5 the CR-5 can operate independently of a PC and features a color screen for enhanced usability.

Introduction

The CR-5 is a very versatile bench-top colorimeter to measure the colour of solid, pasty granular and liquid samples either in reflectance or transmittance. The top-port concept, offering various aperture sizes, allows measurement of almost any kind of samples. The CR-5 is thus the perfect all-rounder laboratory instrument for applications such as Flavours & Fragrances, Foods, Chemicals, Pharmaceuticals and Plastics.

The CR-5 can work stand alone thanks to the large colour screen and extensive firmware offering all major colorimetric systems including industry specific indices to measure transparent liquids such as Gardner, Hazen/APHA, Iodine, European and US Pharmacopoeia. In combination with the optional software SpectraMagic NX many more indices are available.

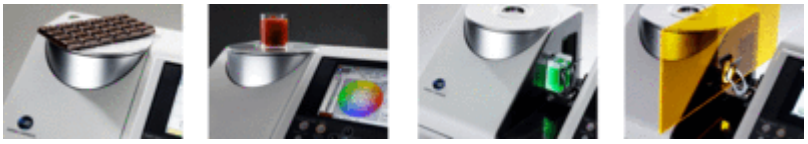
Very intuitive routine work is guaranteed by features such as automatic calibration, Operation Wizard and support in seven languages.

Features

Versatility for a wide range of Applications

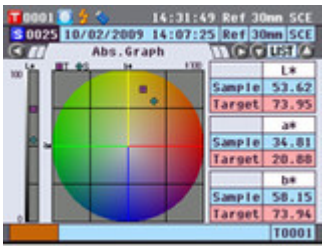
Thanks to the unique concept and a wide range of special accessories, the CR-5 can handle almost any kind of samples in solid, granule, pasty or liquid form.

Aperture size from 3 – 30 mm, different Petri-dishes, different cell paths and a large transmittance chamber offer a unique flexibility.



Large colour LCD

The large colour LCD is easy to read and can display measurement data numerically and graphically or even just as PASS/FAIL judgments in 6 languages.



Wizard for on-screen operation guidance

The wizard function show intuitive on-screen guidance for users for instrument set-up.

USB storage of settings and data

Individual user set-ups as well as target and measurement data can be easily stored on USB memory stick to allow multi-user capability.

Specifications

Principal Specifications CR-5

Model	**Spectrophotometer CR-5**	
Illumination/viewing system	**Reflectance**	de:8° SCE (diffuse illumination: 8° viewing, specular component excluded) Conforms to CIE No. 15, ISO 7724/1, ASTM E 1164, DIN 5033 Teil 7, and JIS Z 8722 (Condition c)
	Transmittance	di:180° (diffuse illumination:180° viewing)
Integrating sphere size	Ø 152mm	

Detector	Dual 40-element silicon photodiode arrays	
Spectral separation device	Planar diffraction grating	
Light source	Pulsed xenon lamp	
Measurement time	Approx. 1 s (to data display/output); Minimum measurement interval: Approx. 3 s	
Measurement/ illumination area	**Reflectance**	Changeable by changing mask and settings. LAV: Ø30 mm/Ø36 mm; MAV (optional): Ø8 mm/Ø11 mm; SAV (optional): Ø3 mm/Ø6 mm
	Transmittance	Ø20 mm
Repeatability	Chromaticity value: Standard deviation within ΔE*ab 0.04 * When a white calibration plate is measured 30 times at 10-second intervals after white calibration	
Inter-instrument agreement	Within ΔE*ab 0.15 (Typical) (Based on 12 BCRA Series II colour tiles compared to values measured with a master body at 23°C)	
Transmittance chamber	No sides (unlimited sample length); Depth (maximum sample thickness): 60 mm Sample holder (optional) for holding sheet samples or containers of liquid samples can be installed/removed	
Display	5.7-inch TFT colour LCD	
Display languages	English, Japanese, German, French, Italian, Spanish, Simplified Chinese	
White calibration	Automatic white calibration (reflectance)/100% calibration (transmittance) using internal white calibration plate (Not available when using petri dish or transmittance cell)	
Interfaces	USB 1.1 (Connection to PC; USB memory stick); RS-232C standard (Connection to serial printer)	
Observer	2° Standard Observer or 10° Standard Observer	
Illuminant	C, D65	
Displayed data	Colorimetric values, colour-difference values, colour-difference graph, pass/fail judgment, pseudo colour, colour assessment	
Colour space	L*a*b*, L*C*h, Hunter Lab, Yxy, XYZ, Munsell, and colour differences in these spaces (except for Munsell)	
Index	**Reflectance**	WI (ASTM E 313-73, ASTM E 313-96); YI (ASTM E 313-73, ASTM E 313-96, ASTM D 1925)
	Transmittance	Gardner, Iodine, Hazen (APHA), European Pharmacopoeia, US Pharmacopeia
Color-difference equation	ΔE*ab (CIE 1976), ΔE*94 (CIE 1994), ΔE00 (CIE 2000), ΔE (Hunter), CMC (l:c)	

Pass/fail judgment	Tolerances can be set to colorimetric values (except Munsell), colour-difference values
Storable data	Sample data: 4,000 measurements; Target colour data: 1,000 measurements
USB memory stick storage	Storage of measurement data and target colour data. Storage/reading of measurement condition settings (Security-enabled USB memory sticks cannot be used.)
Power	AC 100 to 240 V, 50/60 Hz (using exclusive AC adapter)
Size	Slide cover closed: 385 (W) × 192 (H) × 261 (D) mm Slide cover open: 475 (W) × 192 (H) × 261 (D) mm
Weight	Approx. 5.8 kg
Operating temperature/ humidity range	13 to 33°C, relative humidity 80 % or less (at 35°C) with no condensation
Storage temperature/ humidity range	0 to 40°C, relative humidity 80 % or less (at 35°C) with no condensation

Specifications and appearance subject to change without notice.

Optional accessories for CR-5

CM-A198 Transmittance Specimen Holder

Cell holder attachment for commercial rectangular cells (Macro type) with 12.5 mm width. Suitable for cells with an optical path of 10, 20 or 50 mm.

Item Order Code: A168704

CM-A96 Transmittance Specimen Holder

For precise positioning of transparent plates, films or other transparent samples for transmittance measurements. Holds the Rectangular Cells CM-A97 (2 mm path), CM-A98 (10 mm path), CM-A99 (20 mm path) and the Rectangular Disposal Cells CM-A CM-A130 (2 mm path), CM-A131 (10 mm path) and CM-A132 (20 mm path) or the Flow Cell CM-A508 (10 mm path) always in perfect and repeatable position for precise transmittance measurements of liquids.

Item Order Code: 1864-708

CM-A199 Transmittance Specimen Holder Attachment

Adapter to attach the Transmittance Specimen Holder CM-A96 in direction of the light receiving port.

Item Order Code: A168705

CM-A213 Transmittance Zero Calibration plate

The Transmission Zero Calibration Plate CM-A213 is required to block the light path for zero calibration in transmittance measurement mode. The black and mat coating of the plate absorbs also stray light within the transmission chamber of the instrument.

Item Order Code: A168717

CM-A97 Rectangular Cell 50 x 38, optical path 2 mm

Rectangular cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 2 mm and therefore perfect for liquids with high optical density.

Item Order Code: 1864-709

CM-A98 Rectangular Cell 50 x 38, optical path 10 mm

Rectangular cell made of optical glass for precise transmittance measurement of transparent liquids. The optical path is 10 mm and recommended for liquids with normal optical density.

Item Order Code: 1864-710

CM-A99 Rectangular Cell 50 x 38, optical path 20 mm

Rectangular cell made of optical glass for high precision transmittance measurement of transparent liquids. The optical path is 20 mm and recommended for liquids with low optical density.

Item Order Code: 1864-711

CM-A130 Rectangular Disposal Cell 50 x 38, optical path 2 mm

Rectangular disposal cell made of PMMA with an optical path of 2 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with high density.

Item Order Code: 1870-715

CM-A131 Rectangular Disposal Cell 50 x 38, optical path 10 mm

Rectangular disposal cell made of PMMA with an optical path of 10 mm. Suitable for transmittance measurements of water based transparent liquids.

Recommended for liquids with normal density.

Item Order Code: 1870-716

CM-A132 Rectangular Disposal Cell 50 x 38, optical path 20 mm

Rectangular disposal cell made of PMMA with an optical path of 20 mm. Suitable for transmittance measurements of water based transparent liquids. Recommended for liquids with low density.

Item Order Code: 1870-717

CM-A508 Flow Cell 50 x 38, optical path 10 mm

For continuous transmittance measurement of transparent liquids. The optical path of the cell is 10 mm and can be used with a pressure up to 0.8 Bar. The cell fits the Sample Holder CM-A96.

Item Order Code: 9970-237

CM-A195 Target Mask 3 mm

Target mask with 6 mm and 3 mm aperture for the measurement of small samples or to measure a limited area of the sample.

Item Order Code: A168-701

CM-A196 Target Mask 8 mm

Target mask with 11 mm and 8 mm aperture for the measurement of medium size samples or to measure a limited area of the sample.

Item Order Code: A168-702

CM-A202 Specimen Viewing Mirror

The mirror can be set in the transmission chamber and allows control of the position of the sample for reflectance measurements.

Item Order Code: A168-708

CM-A203 Target Mask for tube cells Ø 45 mm

Special Target Mask with a recess for precise positioning of the Tube Cells CM-A128, CM-30 and CM-50.

Item Order Code: A168-709

CM-A128 Tube Cell Ø 45 x 17 mm depth

The tube cell is made of optical glass with a diameter of 45 mm and provides a depth of 15 mm. The cell is suitable for reflectance measurements of opaque

paste, powders, grains and granular materials. Fits to Target Mask CM-A203.

Item Order Code: 1870-712

CM-50 Tube Cell Ø 45 / 52 mm depth

The tube cell is made of optical glass with a diameter of 45 mm and provides a depth of 50 mm. The cell is suitable for reflectance measurements of opaque and slightly transparent paste, powders, grains and granular materials. Fits to Target Mask CM-A203.

Item Order Code: 1870-900

CR-A502 Tube Cell Ø 60 / 40 mm depth

The tube cell is made of optical glass with a diameter of 60 mm and provides a depth of 38 mm. The cell is suitable for reflectance measurements of opaque and very low transparent liquids, paste, powders, grains and granular materials. Due to the oversized diameter also suitable for specimens where edge loss effects occurs.

Item Order Code: 9970-220

CR-A506 Tube Cell Ø 60 / 60 mm depth

The tube cell is made of optical glass with a diameter of 60 mm and provides a depth of 58 mm. The cell is suitable for reflectance measurements of opaque and slightly transparent liquids, paste, powders, grains and granular materials. Due to the oversized diameter also suitable for specimens where edge loss effects occurs.

Item Order Code: B027166

CR-A504 Tube Cell Ø 34 / 35 mm depth

The tube cell is made of optical glass with a diameter of 34 mm and provides a depth of 33 mm. The cell is suitable for reflectance measurements of opaque and slightly transparent liquids, paste, powders, grains and granular materials. Due to the oversized diameter also suitable for specimens where edge loss effects occurs.

Item Order Code: 9970-216

CM-A210 White Calibration Plate

White tile for manual white calibration (instead performing the calibration with the build in white standard of the CM-5). The White Calibration Plate CM-A210 includes a CD with the spectral calibration values and a software to load the calibration data from a PC to the CM-5.

Item Order Code: A168-700

CM-A212 Calibration Glass Ø 45mm

Glass plate made of optical glass with the same optical properties as the bottom window of the Petri-Dish CM-A128. The Calibration Glass is recommended in case of manual tube cell calibration (instead performing the calibration with the build in white standard of the CM-5).

Item Order Code: A168-716

CM-A193 Accessory Case

For storage and protection of CM-5 accessories.

Item Order Code: A168-603

CM-A520 PET Pre-Form Holder

The PET-Pre-Form Holder CM-A520 allows a precise positioning of transparent Pre-forms in the transmission chamber of the instrument. The rail guide of the holder allows horizontal movements of the pre-form to define the area for the measurement.

Item Order Code: 9970-216

CM-A519 Retaining Ring (for CR-A506 Tube Cell Ø 60mm)

For precise and repeatable positioning of tube cells with 60 mm diameter.

Item Order Code: B027165

CM-A124 Zero Calibration Box

For precise zero calibration. The box prevents ambient light from entering the sensor during the calibration. Reduces the influence of light reflected by dust particle in air to a minimum.

Item Order Code: 1870-704

Thermo-Printer DPU-S245-01

Small and compact Thermo-Printer for immediately print out of measurement data.

Item Order Code: B027168

DPU-S245-01 Serial Connection Set

The set consist of the serial data cable with special plug for the data terminal of the printer body DPU-S245-01 and a 9-Pin Gender Changer to clamp the serial data cable of the printer with the serial data terminal of the instrument.

Item Order Code: B027169

CM-A58 Printer Cable

Serial Printer Cable with SUB-D9 plugs on both sides for connection between Thermo-Printer DPU-HS245 and instrument.

Item Order Code: 1854-730

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