eoptis Sharper vision, better results.

CLM-194 – Portable Digital Colorimeter Datasheet

CLM-194

Portable Digital Colorimeter

Portable instrument for measuring the color of solid materials

The CLM-194 portable digital colorimeter is a professional laboratory device designed to measure the color of a wide range of production materials. Each unit is individually calibrated and temperature compensated to ensure accuracy and reliability.

The instrument is supplied with free application software, which EOPTIS plans to continuously enhance over time by integrating new features based on specific clients' needs. Once developed, these features will be available to all users.

CLM-194

Portable Digital Colorimeter

Accurate, objective, daily monitoring of production

- Practical color quality control;
- Immediate, objective, and highly repeatable measurements;
- Sensitivity up to 60x greater than the human eye;
- Classification of measured products into batches;
- Reconstruction of the color to be produced.

CLM-194

Portable Digital Colorimeter

Verify the color of raw materails and finished goods

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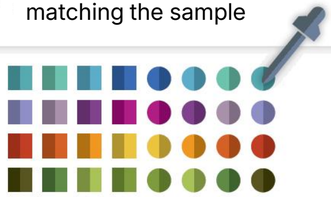
Measure the quality of your COLOR

Compare a color with a standard or custom database

Find the best color matching the sample



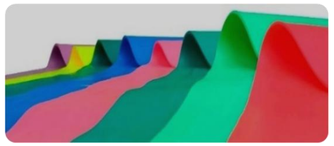
Attest your work quality with a report

Digital handheld colorimeter with high reliability and long term stability at an extremely competitive price

Conceived, developed and manufactured in ITALY

CLM-194

Type of materials


Rubbers


Textiles

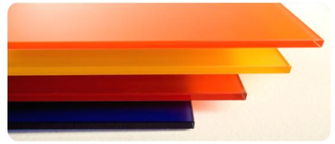

Ceramic parts


Cosmetic packagings


Fabrics


Automotive plastic parts


Locks of hair


Glasses


Ceramic tiles


Home appliances


Multi-material technical articles

Footwear

Other applicable materials include:

- Wood,
- Leather,
- non-woven fabrics,
- pharmaceuticals,
- baked goods.

CLM-194

Technical specifications

Color sensor	Based on the spectral value of the standard CIE 1931 color-matching functions (DIN ISO 13655 and DIN 5033)
Light source	Integrated white LEDs
Target type	Reflective (matte or glossy)
Working distance	Contact
Measurement geometry	(45°c:0°) according to CIE15:2004, ASTM E1164
Repeatability	0.03 ΔE*ab typ (30 measurements at 5s on white reference)
Illuminants	D65, D55, D50, A, C, FL2, FL7, FL11
Observers	CIE-1931 2° e CIE-1964 10°
Measurement area	∅ 10mm (standard); ∅ 8mm and ∅ 6mm available
Dimensions	approx. 225 mm (L) × 84 mm (W) × 99 mm (H)
Power	USB self-powered
Weight	710 g

CLM-194

Functional specifications

Color coordinates	CIE L*a*b, CIE XYZ, CIE L*u*v, CIE L*C*h, Yxy, sRGB, Yellowness Index, Color name.
Color differences	DeltaE*ab, dL* da* db* dC*, dX dY dZ, dL* du* dv* du*v*, dL* dC* dh, dY dx dy dxy, dR dG dB, dy
Acquisition mode	Button- or Software-triggered. Single or multiple readings.
Recipe management	Ability to save parameter setups as “projects”
Report generation	Customizable reports with company logo, for analysis and history, in .pdf and .xml formats (Excel-compatible)
Database creation	Storage of measurement sequences and reference sequences
Advanced functions	Multiple measurement Average calculation of a set of measures or references Continuous measurement Creation of custom color spaces from specific formulas

Eyepieces

Flat-head eyepieces

10mm 8mm 6mm

Oculari con testa conica

10mm 8mm 6mm

Eyepieces

The customer can choose from six available standard eyepieces:

- **Flat-head eyepieces**
  Suitable for measuring on flat surfaces
- **Conical-head eyepieces**
  Suitable for measurements on curved surfaces

Factory calibration and report documents

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Certificate of traceable calibration

Certificate No.	24290023 - 2530
Calibration Item	CLM-196 Benchtop Colorimeter
Serial Number	24290023

This certificate is provided for the Tristimulus Colorimeter listed above to confirm that said colorimeter has been calibrated against Eoptis' calibration standard tiles, which are traceable to the Research Institutes of Sweden AB (RISE), following the calibration procedure described hereafter by qualified and trained person(s) of Eoptis.

Calibration Procedure

The calibration procedure is based on 24 ceramic tiles by Mount Baker Research L.L.C.. These tiles, adopted by Eoptis as calibration standard, have been calibrated by means of a Konica-Minolta CM-508C spectrophotometer under (45°/0°) geometry. The last calibration process is dated June 5th , 2023.

The procedure adopted for tiles calibration [1] relies on a kit of 12 colored tiles from CCS series II coded as MU94, a ceramic white reference tile coded as MW94 and a black reference tile coded as MY94. The Spectral Radiance Factors (SRF) were measured and are traceable to the Research Institutes of Sweden AB (RISE). The estimated 2σ (95% confidence level) absolute accuracy of the certified Spectral Radiance Factors of the 24 ceramic tiles is 99.2% ± 0.3%.

Tristimulus Values computed from SRF under defined Standard Illuminant and Observer pairs have been used to match the raw data of the Colorimeter by means of an Eoptis' proprietary algorithm. Raw data for the 24 tiles have been acquired by the Colorimeter under calibration by averaging the data from a sequence of 4 consecutive acquisitions with 5 second delay interval. Measurement aperture of the Colorimeter is placed at the center of the tile to within ±0.5mm accuracy.

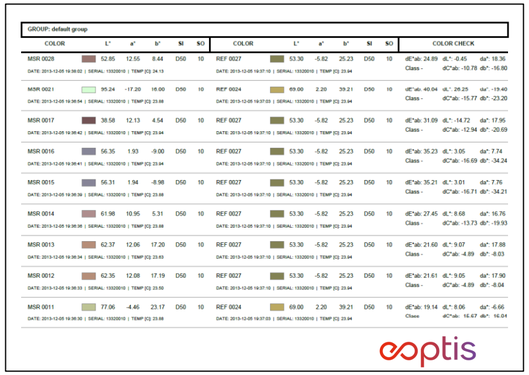
After calibration, by means of the same procedure described above, the Tristimulus values for the C.I.E.L*a*b* color space of the tiles have been acquired by the colorimeter and compared with the certified values to assess the system performance. Repeatability is also tested, based on 30 replicate measurements of the White Reference Standard supplied with the Colorimeter (matching serial number) at 5 second intervals without replacement or recalibration. Mean value has been set as reference to compare deviations. Results are listed in the following performance report for D65 Illuminant, 2° Observer.

Place and date of Calibration: Trento - July, 24th 2025
Recommended calibration interval: 1 year

Certified by
Luca Clementel - Technical Manager

References

[1] CENTROCOT – Accredited Calibration Laboratory - Certificate of Traceable Calibration LAT 226 N.23RA07746



GROUP: default group

COLOR	L*	a*	b*	SI	SO	COLOR	L*	a*	b*	SI	SO	COLOR CHECK
MSR 0028	52.85	12.55	8.44	D50	10	REF 0027	53.30	-5.82	25.23	D50	10	dE*ab: 24.89 dL*: -0.45 da*: 18.36 Class - dC*ab: -10.78 db*: -16.80
MSR 0021	95.24	-17.20	16.00	D50	10	REF 0024	69.00	2.20	39.21	D50	10	dE*ab: 40.04 dL*: 26.25 da*: -19.40 Class - dC*ab: -15.77 db*: -23.20
MSR 0017	38.58	12.13	4.54	D50	10	REF 0027	53.30	-5.82	25.23	D50	10	dE*ab: 31.09 dL*: -14.72 da*: 17.95 Class - dC*ab: -12.94 db*: -20.69
MSR 0016	56.35	1.93	-9.00	D50	10	REF 0027	53.30	-5.82	25.23	D50	10	dE*ab: 35.23 dL*: 3.05 da*: 7.74 Class - dC*ab: -16.69 db*: -34.24
MSR 0015	56.31	1.94	-8.98	D50	10	REF 0027	53.30	-5.82	25.23	D50	10	dE*ab: 35.21 dL*: 3.01 da*: 7.76 Class - dC*ab: -16.71 db*: -34.21
MSR 0014	61.98	10.95	5.31	D50	10	REF 0027	53.30	-5.82	25.23	D50	10	dE*ab: 27.45 dL*: 8.68 da*: 16.76 Class - dC*ab: -13.73 db*: -19.93
MSR 0013	62.37	12.06	17.20	D50	10	REF 0027	53.30	-5.82	25.23	D50	10	dE*ab: 21.60 dL*: 9.07 da*: 17.88 Class - dC*ab: -4.89 db*: -8.03
MSR 0012	62.35	12.08	17.19	D50	10	REF 0027	53.30	-5.82	25.23	D50	10	dE*ab: 21.61 dL*: 9.05 da*: 17.90 Class - dC*ab: -4.89 db*: -8.04
MSR 0011	77.06	-4.46	23.17	D50	10	REF 0024	69.00	2.20	39.21	D50	10	dE*ab: 19.14 dL*: 8.06 da*: -6.66 Class - dC*ab: -16.47 db*: -16.04

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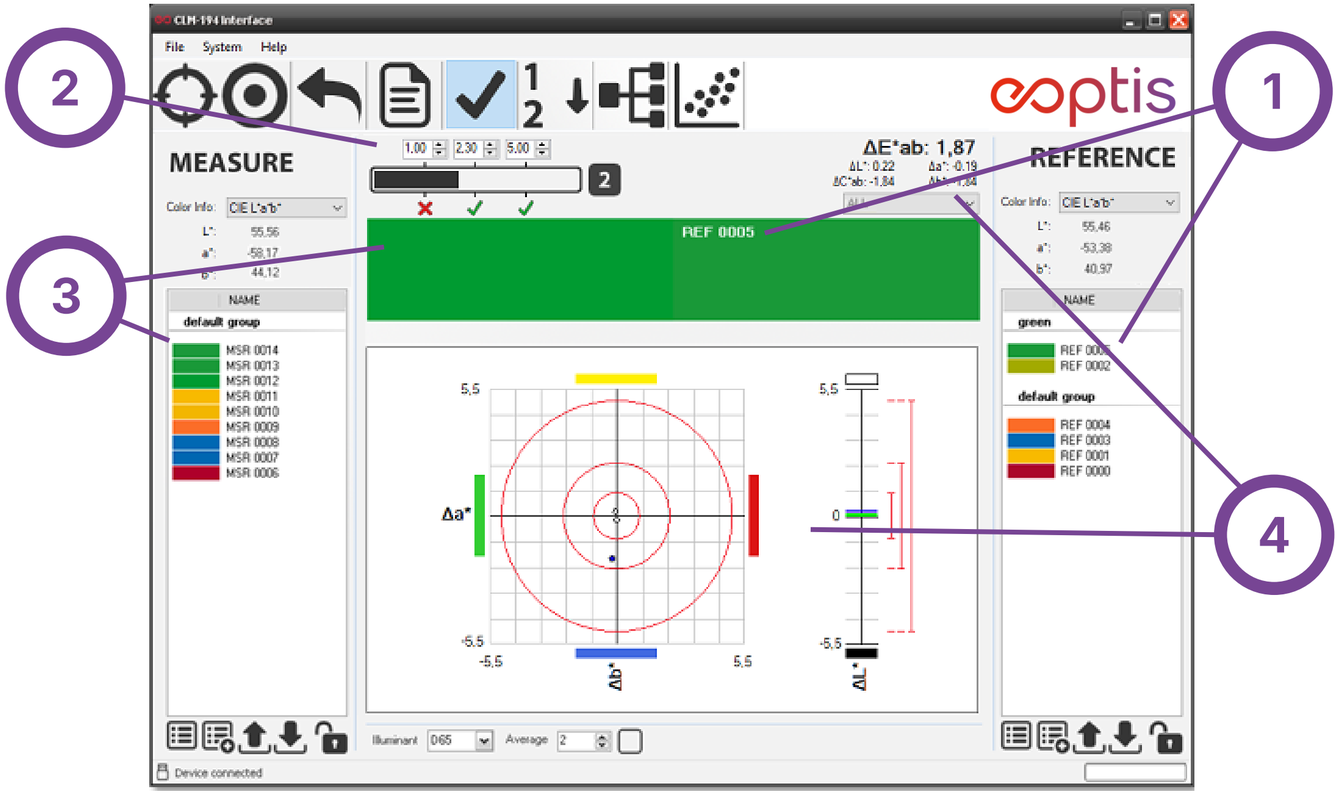
Factory calibration

Each device leaves our laboratories only after undergoing a complete calibration process. Thanks to our proprietary algorithms and procedures, we guarantee absolute accuracy and highly repeatable color measurements. The reliability and stability of these measurements are ensured for 12 months.

Report documents

Measurement results can be exported in PDF format, with the option to include the company logo, or in editable XML format for further analysis and processing.

«CLM19X Interface» application software



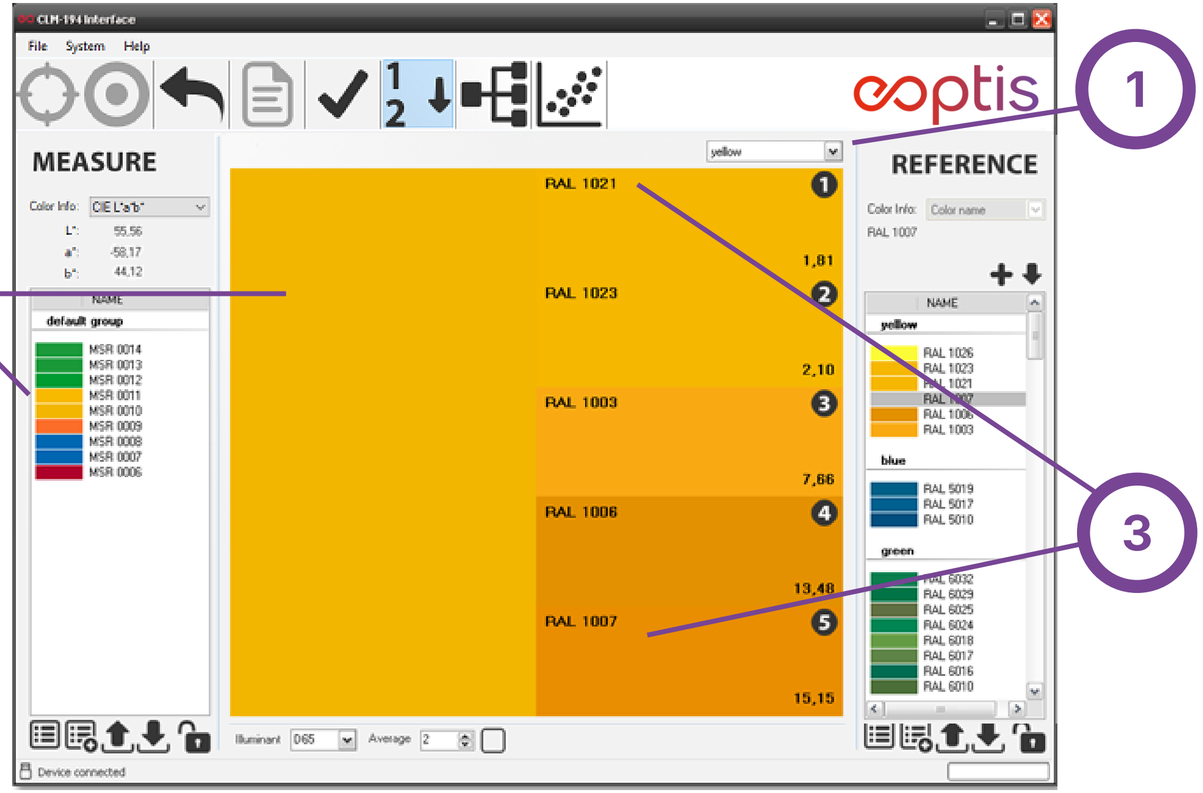
"Check Color Difference" feature

This function is used to determine the difference between two samples.

Procedure

1. Select a reference from a database or measure a reference sample
2. Set the tolerance thresholds
3. Measure the sample of interest
4. Check the difference using the graph and the tolerance level.

«CLM19X Interface» application software



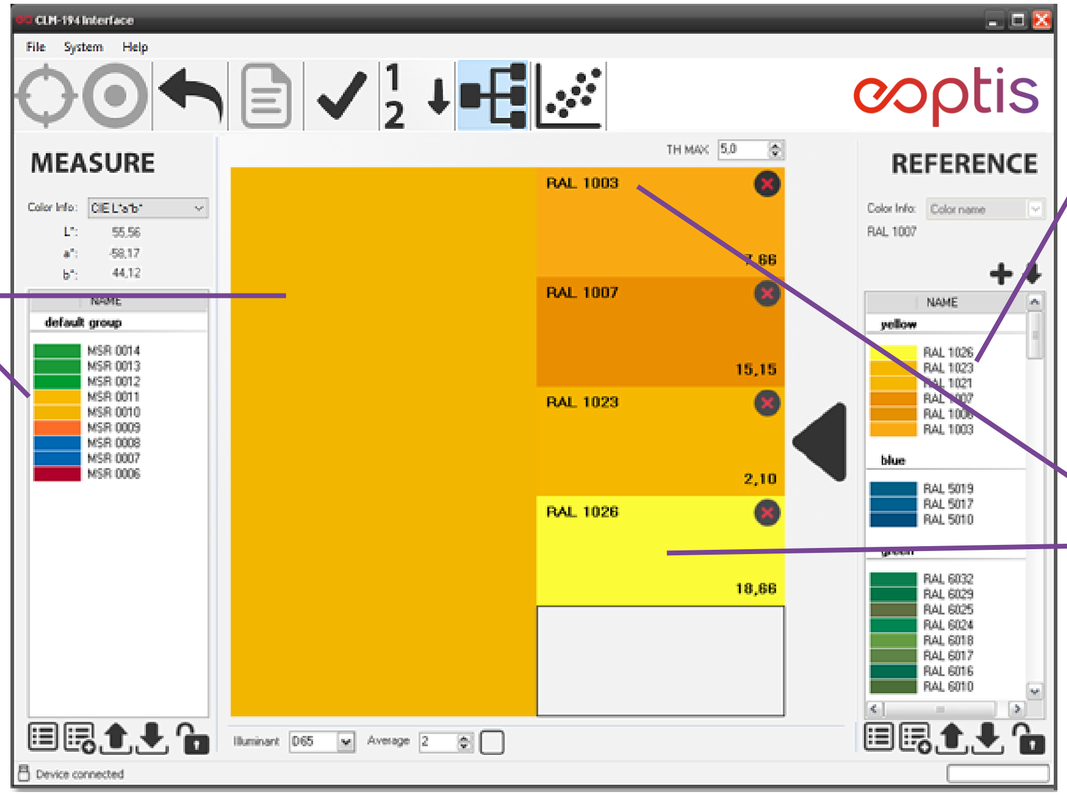
«Color matching» feature

This function is used to identify which color in the database is closest to the sample of interest.

Procedure

1. Select the database to reference
2. Measure the sample of interest
3. Review the five best matches, ranked from most similar to least similar.

«CLM19X Interface» application software



«Color classification» feature

This function is used to group measurements into homogeneous color categories.

Procedure

1. Select up to 5 colors from the reference acquisitions. Each of the 5 colors defines a class
2. Measure the sample of interest.
3. Verify which class the measured sample belongs to.

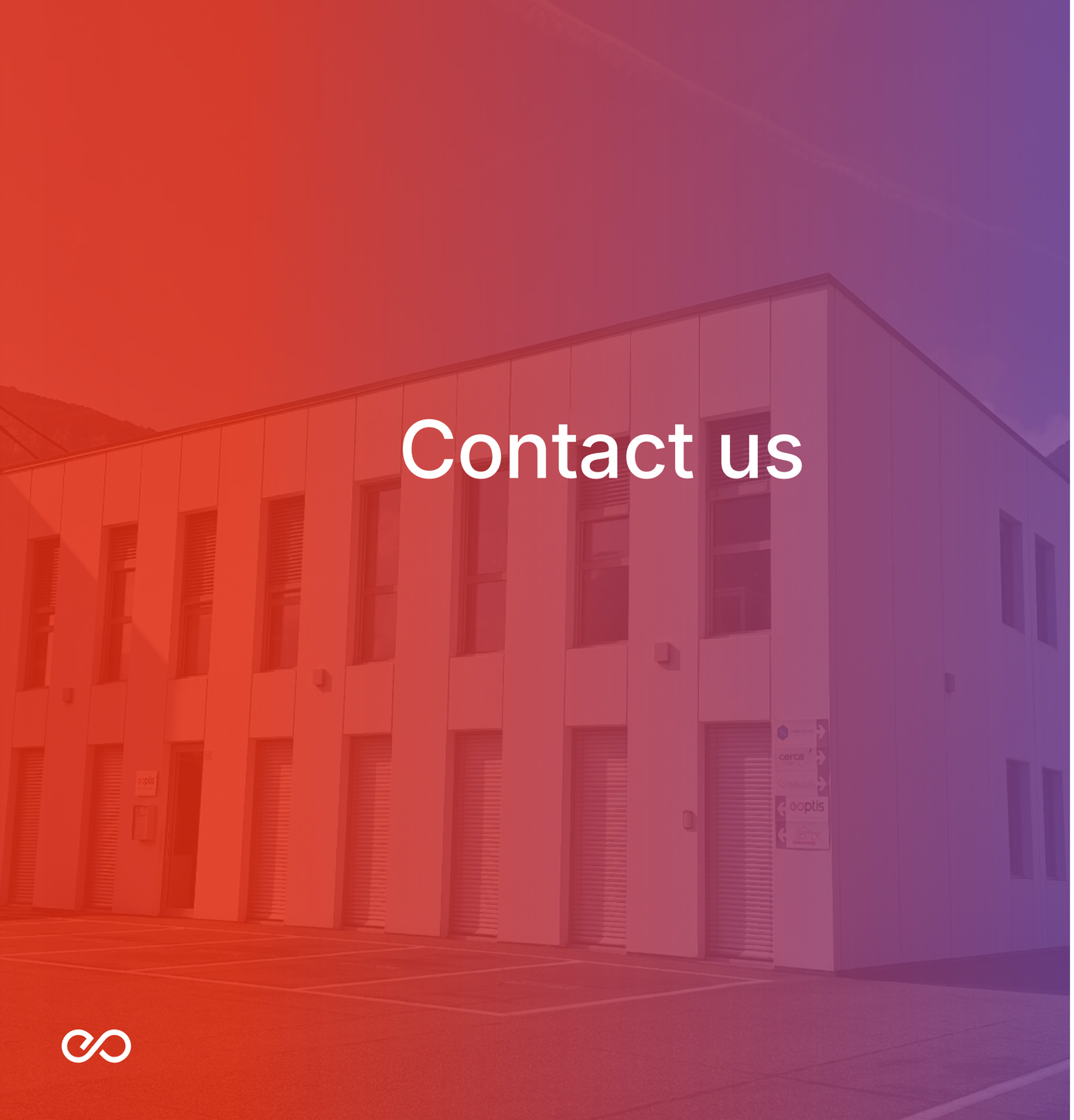
Standard equipment and accessories

Standard equipment

- CLM-194 Portable Digital Colorimeter
- “CLM19X Interface” Application Software
- Calibration Certificate with RISE Traceability
- White Calibration Target
- Rigid, waterproof carrying case with molded interior.

Accessories

- Additional eyepieces, interchangeable via instrument software configuration.
- Desktop cradle.



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better results.