# BYK-mac i COLOR

## Multi-angle color measurement

In order to control the lightness and / or color flop of an effect finish, the color needs to be measured under different viewing angles.

BYK-mac i COLOR spectrophotometer offers an attractive solution by measuring

- Traditional 5-angle color at 15°/25°/45°/75°/110°
- An additional angle at -15° "behind the gloss" for color travel of interference pigments

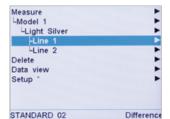## Ergonomic design and easy operation

The shape of the instrument is designed to ensure easy handling and true portability. With an intuitive menu quality control of metallic finishes has never been easier.

- Menu guided operation according to your own sampling procedure
- Designated buttons for standard and sample readings
- Scroll wheel to select menu functions
- Large color display – easy-to-read inside and outside
- Storage of up to 1000 readings in selectable memories
- 4 trigger pins on the bottom plate guarantee stable positioning even on curved surfaces



| Measure | ▶ |
| Model 1 | ▶ |
| Light Silver | ▶ |
| Line 1 | ▶ |
| Line 2 | ▶ |
| Delete | ▶ |
| Data view | ▶ |
| Setup ˄ | ▶ |
| STANDARD 02 | Difference |

| Hood | | | D65/10° | 3/3 |
|---|---|---|---|---|
| | ΔL p | Δa p | Δb p | ΔEpD |
| -15° | 0.05 | 0.11 | -0.03 | 0.12 |
| 15° | 0.05 | 0.08 | -0.06 | 0.11 |
| 25° | -0.14 | 0.05 | -0.11 | 0.19 |
| 45° | -0.22 | 0.02 | 0.13 | 0.26 |
| 75° | -0.13 | 0.15 | 0.32 | 0.38 |
| 110° | 0.12 | 0.18 | 0.34 | 0.40 |
| | | | ΔEt | 0.27 |
| Light Silver | | | Model 1 | |



## Reliable readings at any time

The BYK-mac i COLOR uses a light source with long term stability and patented illumination control which provide superior accuracy and low maintenance for many years.

- Stable, long-term calibration – needed only every three months
- Temperature independent measurement results between 10 - 40°C – without calibration
- Excellent agreement between instruments allowing usage of digital standards among the supply chain
- 10 year warranty on the light source – no lamp changes needed

## Quantification of Fluorescent Light

The BYK-mac i COLOR spectrophotometer is equipped with additional sensors to detect fluorescent light excited in the visible range. The Intensity Emission value quantifies the fluorescent light and can be used as a preliminary indicator for light fastness.

# Always ready

The instrument is operated with a rechargeable battery pack (Li-Ion). The docking station automatically charges the battery pack in the instrument as well as a spare pack located in the docking station.

Optionally the instrument can be operated with 4 standard mignon alkaline or rechargeable batteries.

The docking station also transfers the measured data to a PC. For professional analysis, documentation and data management smart-chart software is included.

In compliance with:

### Standards

| | |
|---|---|
| **ASTM** | D 2244, E 308, E 1164, E 2194 |
| **DIN** | 5033, 5036, 6174, 6175-2 |
| **DIN EN ISO** | 11664 |
| **SAE** | J 1545 |

## Ordering Information

| Cat. No. | Description |
|---|---|
| **7032** | BYK-mac i COLOR |
| **7033** | BYK-mac i COLOR Sensor |

**Comes complete with:**
Multi-angle spectrophotometer
Black calibration standard
White calibration standard with certificate
Color checking reference
Protective cap
Cleaning set for bottom plate
2 light protection covers
Seal replacement kit
smart-chart software (7032 only)
Docking station with USB cable for memory transfer
Instrument interface cable for online data transfer
2 rechargeable Li-ion battery packs
Battery holder; 4 x AA batteries
Short instructions; Operating manual on CD
Carrying case; Training

**Extended Warranty:** see pages about Technical Service

**System Requirements:**
Operating system: Windows 7 SP1 or 8.1
Microsoft® .NET Framework 4
Hardware: Core 2 Duo, 2.2 GHz; i7, 2.5 GHz recommended, or equivalent
Memory: 4 GB RAM, 8 GB recommended
Hard-disk capacity: min. 300 MB
Monitor resolution: 1280 x 1024 pixel or higher
Disk drive: CD-ROM or DVD drive
Interface: free USB-port

**Note:** smart-process is automatically included. If smart-lab is required instead, please specify at time of order.

## Technical Specifications

| | |
|---|---|
| **Measuring Geometry** | 45° illumination |
| | -15°, 15°, 25°, 45°, 75°, 110° aspecular viewing |
| **Measuring Area** | 23 mm diameter |
| **Spectral Range** | 400 - 700 nm, 10 nm resolution |
| **Measurement Range** | 0 to 600 % reflectance |
| **Repeatability** | 0.01 ΔE* (10 consecutive measurements on white) |
| **Reproducibility** | Grey BCRA tiles: avg. ΔE* < 0.10 |
| | Chromatic BCRA tiles: avg. ΔE* < 0.25 |
| **Color Scales** | ΔE*; ΔE CMC; ΔE 94; ΔE 2000; ΔE 99; ΔE DIN6175 |
| **Index** | Flop, Int-Em |
| **Illuminants** | A; C; D50; D65; F2; F7; F11; F12 |
| **Observer** | 2°; 10° |
| **Measuring Time** | < 4 seconds |
| **Memory** | 1000 standards / samples |
| **Display** | 2.7 in. TFT color LCD display |
| **Language** | English, German, French, Italian, Japanese, Spanish |
| **Power Supply** | Rechargeable battery pack or 4 mignon AA batteries |
| | (alkaline or rechargeable) |
| **Operating Temperature** | 10 to 42° C (50 to 110 ° F) |
| **Relative Humidity** | up to 85%, 35° C (95° F); non-condensing |
| **Dimensions** | 21.8 x 8.1 x 14.7 cm (8.6 x 3.2 x 5.8 in.) |
| **Weight** | approx. 1.3 kg (approx. 2.86 lbs) |

**Certified** Please refer to section Preventive Maintenance.

**BYK-mac i COLOR Training**

BYK-Gardner offers you more than just an instrument. We assist you in analyzing your color readings to enable you to use the BYK-mac i COLOR to save time and money, while at the same time improving quality. Therefore, the instrument comes with a one day training course including:

**1. Color Theory**
■ Parameters influencing color impression of effect finishes
■ Color differences for trouble shooting

**2. Operation and Software training *smart-process***
■ Standard management
■ Set-up an "organizer" to create a routine measurement procedure
■ Programming of the instrument with "organizer" and measurement of several samples
■ Data transfer to smart-chart software and saving in a database for routine QC
■ Data analysis using standard reports:
  – Test Report:
    Shows measurement data for a single test series – ideal for color harmony reviews
  – Scorecard (Management Summary Report):
    Quick overview how production is running over the selected time range
  – Trend Report:
    Typical process control chart showing the data over time or by individual.
■ Create your own reports in Excel®
  – Transfer data from the database to Excel®



**2. Operation and Software training *smart-lab***
■ Standard management
■ Measure standards and samples by single and average readings
■ Save, recall and delete measurements
■ Change illuminants, observers, color equations
■ Data analysis using standard reports:
  – Scatter graph per angle to show at one glance whether all parts are within specification
  – Color Travel to show how individual samples perform per measurement angle
  – Spectral curves for detailed analysis
■ Create your own reports in Excel®:
  – Transfer data from the database to Excel®

The training can be performed in one day or two half days. It is recommended to split the training into two half days:
Day 1: Theory and basic operation (set-up organizer, taking readings and saving in a database)

Day 2: 3-4 weeks later to ensure readings were taken and saved in a database. Data analysis and standard QC report can be explained using custom specific data.

| **Ordering Information** | | **Accessories** |
|---|---|---|
| **Cat. No.** | **Description** | |
| **7044** | Black Standard, BYK-mac i | To perform zero calibration |
| **6336** | Protective Cap, BYK-mac 23 mm | Snap on cover to protect optics and interior components |
| **6360** | Docking Station, BYK-mac | Incl. USB interface cable and charger 100 - 240 V self adapting |
| **6337** | USB Interface Cable | To connect the docking station to the PC, USB-A plug, 3 m length |
| **6413** | Online Cable, BYK-mac | To connect the instrument directly to the PC |
| **6359** | Battery Pack, BYK-mac | Rechargeable battery pack for automatic charge in docking station |
| **6364** | Cleaning Set, BYK-mac | To clean instrument aperture and pin covers from dust and grease |
| **6348** | Seal Set, BYK-mac | Including 3 light protection rubber seals and 8 rubber pin covers |
| **6414** | Light Protection Cover, BYK-mac | To measure very bright colors; 10 pieces included |
| **4831** | BYKWARE smart-process | Process QC software for BYK-mac i, cloud-runner and wave-scan |
| **4862** | BYKWARE smart-lab | Lab QC software for online color & effect control with BYK-mac i |

**Note:** For replacement of white and color standard, please contact your local service department.