BYK-mac i with small aperture

Measurement of effect finishes on small or curved parts

Special effect finishes are used in many applications to create new color impressions pronouncing the design of a product. Objects like mobile phone housings, bicycles or window handles are very small or curved. They require a color instrument with small aperture and repeatable sample placement.
BYK-mac i with 12 mm aperture guarantees repeatable results even on such products.

Total color impression of effect finishes

- 5-angle color measurement for light/dark travel evaluation: 15° / 25° / 45° / 75° / 110°
- Additional color measurement behind the gloss for color flop analysis: -15°
- Sparkle and graininess measurement for flake characterization

Easy operation and efficient data analysis

The shape of the instrument is designed to ensure easy handling and true portability. Due to its intuitive menu quality control of small parts has never been easier.

- Menu guided operation according to your own sampling procedure
- Large color display – easy-to-read inside and outside
- Storage of up to 1000 readings in selectable memories
- Professional data documentation and analysis with smart-chart software

Accurate results and low maintenance

The BYK-mac i 12 mm uses a light source with long-term stability and a patented illumination control which provides superior accuracy and low maintenance.

- Stable, long-term calibration – needed only every three months
- Temperature independent measurement results between 10 - 40°C – without calibration
- 10 year warranty on LED light source – no lamp changes needed
- Excellent agreement between instruments allowing usage of digital standards among the supply chain
- Operated by a rechargeable battery pack – good for 1000 readings

Quantification of Fluorescent Light

The BYK-mac i 12 mm 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.

Reliable readings for various sample sizes

- 4 pin positioning for minimum sample size of 35 x 45 mm which can be varied by check zone depending on curvature

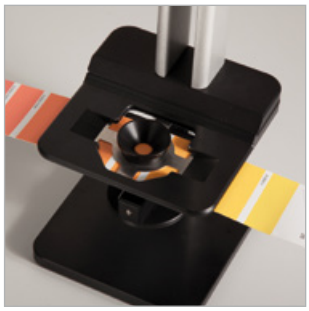
Optional sample holder for small parts

The holder is equipped with a mask to fit the aperture of the BYK-mac i 12 mm and a tilting handle to fix the instrument. Therefore, repeatable sample placement and reliable measurement results are guaranteed.

- Application specific presentation tools:
  - Flexible sample table
  - Sample pin
  - Positioning tool for centering sample
- Minimum sample size: ø 30 mm
- Maximum distance between measurement spot and back rail: 50 mm

Flexible sample table for measuring e.g. headlamp cleaning device covers

Sample pin for measuring e.g. distance sensor covers



Positioning tool to center sample

Ordering Information

Cat. No.	Description
6408	Sample Holder BYK-mac 12 mm

Comes complete with:
Sample holder
Flexible sample table
Sample pin
Positioning tool
Short Instructions

Technical Specifications

Dimensions	Weight
130 x 140 x 263 mm (5.1 x 5.2 x 10.4 in)	1.7 kg (3.75 lbs)

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
7030	BYK-mac i 23 mm
7034	BYK-mac i 12 mm
7031	BYK-mac i Sensor 23 mm
7035	BYK-mac i Sensor 12 mm

Comes complete with:
Multi-angle spectrophotometer
Black calibration standard
White calibration standard with certificate
Color and effect checking reference
Protective cap
Cleaning set for bottom plate
2 light protection covers
Seal replacement kit
smart-chart software (7030 and 7034 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 Area	
23 mm diameter	
12 mm diameter	
23 mm diameter	
12 mm diameter	
Color	
Measuring Geometry	45° illumination -15°, 15°, 25°, 45°, 75°, 110° aspecular viewing
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°
Effect	
Measurement Geometry	15° / 45° / 75° and diffused illumination perpendicular viewing
Effect Parameters	ΔS; ΔS_a; ΔS_i; ΔG
Repeatability	S_a / S_i: 5% or > 0.50 / G = ± 0.05
Reproducibility	S_a / S_i: 10% or > 1.00 / G = ± 0.15
Measuring Time	< 6 seconds
Memory	1000 standards / samples
Display	2.7 in. TFT color LCD display
Language	English, French, German, 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)

BYK-mac i Training

BYK-Gardner offers you more than just an instrument. We assist you in analyzing your color readings as well as sparkle and graininess data. As a result you will be able to use the BYK-mac i 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 and Effect Theory

- Parameters influencing total color impression of effect finishes
- Color and effect 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 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 & Effect Travel to show how individual samples perform per measurement angle
  - Effect graph to control whether sparkle and graininess values are within specification
  - 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.

Certified

Please refer to section Preventive Maintenance.

Ordering Information

Cat. No.	Description
7044	Black Standard, BYK-mac i
6336	Protective Cap, BYK-mac 23 mm
6399	Protectice Cap, BYK-mac 12 mm
6360	Docking Station, BYK-mac
6337	USB Interface Cable
6413	Online Cable, BYK-mac
6359	Battery Pack, BYK-mac
6364	Cleaning Set, BYK-mac
6348	Seal Set, BYK-mac
6414	Light Protection Cover, BYK-mac
4831	BYKWARE smart-process
4862	BYKWARE smart-lab

Accessories

To perform zero calibration
Snap on cover to protect optics and interior components
Snap on cover to protect optics and interior components
Incl. USB interface cable and charger 100 - 240 V self adapting (For BYK-mac with catalog number 6340 and 6345, please contact customer service for an upgrade package)
To connect the docking station to the PC, USB-A plug, 3 m length
To connect the instrument directly to the PC
Rechargeable battery pack for automatic charge in docking station
To clean instrument aperture and pin covers from dust and grease
Including 3 light protection rubber seals and 8 rubber pin covers
To measure very bright colors; 10 pieces included
Process QC software for BYK-mac i, cloud-runner and wave-scan
Lab QC software for online color & effect control with BYK-mac i

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