Measure what you see

spectro2profiler

Manual

A member of ALTANA

BYK

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1 Introduction

Dear customer,

thank you for having decided for a BYK-Gardner product. BYK-Gardner is committed to providing you with quality products and services. We offer complete system solutions to solve your problems in areas of color, appearance and physical properties. As the basis of our worldwide business, we strongly believe in total customer satisfaction. Therefore, in addition to our products, we offer VALUE-ADDED services:

- Technical Sales Force
- Technical & Application Support
- Application and Technical Seminars
- Repair & Certification Service

BYK-Gardner is part of the Altana Group and a direct subsidiary of BYK, the worldwide leader of additives for coatings and plastics. Together we offer complete and unique solutions for you, our customer.

Thank you for your trust and confidence. If there is anything we can do better to serve your needs, do not hesitate to let us know.

Your BYK-Gardner Team

www.byk-instruments.com

1.1 Intended Use

The **spectro2profiler** is designed to measure color, gloss, 2D reflectivity and 3D structure on different surfaces. Via the integrated camera the current spot on the surface can be viewed on the display – allowing exact positioning.

By placing the base plate of the measurement unit onto a surface and pressing either the **Operate** button on the side of the instrument or triggering the measurement on the display, the instrument measures the surface and processes, displays and stores the measured values.

The instrument can be connected via USB or WiFi to a computer in order to read or write data.

A resistive display allows additional functionalities.

1.2 For Your Safety

⚠ CAUTION

Familiarization with Safety Instructions is necessary

Absence of knowledge of safety instructions threatens your health and can damage the instrument. Read the safety instructions before you use the instrument the first time.

The safety instructions are part of the delivery content. You find the safety instructions in the dedicated booklet enclosed to the instrument carrying case.

⚠ CAUTION

Ergonomic Hazard due to Discomfort and Fatigue

Discomfort and fatigue during usage of the instrument could lead to ergonomic hazards. For example is a drop-down of the instrument conceivable.

Always use the instrument with the safety wrist strap and take regularly breaks during your work with instrument.

⚠ WARNING

Eye Damage caused by Illumination LEDs

Looking into the illumination LEDs during measurement could harm your eyes. Do not look into the measurement aperture when the instrument is turned on - even if you assume a fault with the instrument.

1.3 Declarations

1.3.1 EU Declaration of Conformity

We,

BYK-Gardner GmbH

Lausitzer Strasse 8

D-82538 Geretsried

declare, that this instrument complies with the requirements of the following EU directives:

- 2014/30/EU - Electromagnetic Compatibility
- 2014/35/EU - Low Voltage
- 2014/53/EU - Radio Equipment Directive (RED)

The following harmonized standards were applied:

- EN 61010-1:2010
- EN 61326-1:2013

Geretsried, November 13, 2019

Frank R. Wagner

Managing Director

1.3.2 FCC Declaration (USA)

This equipment contains a radio module with FCC ID QPU8000.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user´s authority to operate the equipment.

NOTICE! To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operations at closer distances than this are not recommended.

1.3.3 IC Declaration (Canada)

This equipment contains a radio module with IC ID 4523A-SN8000.

This Class A digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

NOTICE! To satisfy IC RF exposure requirements for mobile transmitting devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operations at closer distances than this are not recommended.

1.3.4 Japanese Declaration

This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification under the Japanese Radio Law.

MIC ID: R 006-000497

1.4 Disclaimer

Exclusion of Liability

No liability other than as provided by law is assumed for direct or indirect damage sustained in association with the use of the instrument, the software or documentation.

BYK-Gardner precludes all liability claims if the usage described in "Intended Use" is disregarded. Any other usage than described in "Intended Use" is not according to the purpose of the instrument and leads to termination of liability claims.

See also

Intended Use [▸ 6]

1.5 Disposal

Disused electrical equipment such as this instrument must be professionally disposed. Do not dispose it in household garbage and make sure to observe the national law in your country.

2 System Description

The **spectro2profiler** is a portable spectrophotometer that measures color, gloss, 2D reflectivity and 3D structure of surfaces. It is operated by the **Operate** button and the touch-screen display on the top side.

The **Operate** button is used to switch on the instrument and to trigger a measurement. The touch-screen display is used to select icons and functions directly.

This chapter gives an overview of the instrument parts and their functions.

2.1 Delivery Content

The items listed below are contained in the packaging. Please contact BYK-Gardner, if any item is missing or damaged.

1	Safety instructions and short instructions	6	Black: Test standard for gloss
2	Instrument	7	USB cable type A/C for charging and data transfer
3	Protective cap	8	USB cable type C/C for fast charging and data transfer
4	White: Calibration standard	9	Power adapters
5	Green: Test standard for color	10	Power supply

2.2 Names and Functions of Parts

2.2.1 Frontside

1 **Operate** button:

Press halfway:

- The camera is switched on showing the surface to be measured on the display.

Press completely:

- Instrument is off: Turns instrument on.
- Instrument is on: Executes a measurement.

2 Touch-screen display:

Touch the icons on the screen with your finger or with a pen in order to operate the instrument.

3 + 4 LEDs:

Charge:

- Pulsates in red during charging.
- Lights up in green when the instrument is fully charged.

Measure:

- Lights up in green during measurement.
- Blinks red in case of a measurement error.

2.2.2 Backside

1 USB type C plug:

- Connected to power-supply: Charge the battery in the instrument.
- Connected to PC: Charge and transfer data between instrument and computer.

2.2.3 Protective Cap

Protective cap:

- Use it to protect the measurement aperture of the instrument.
- Always attach to measurement aperture if instrument is not used.

2.2.4 Power Supply

Power supply and adapters:

- Use to charge the battery in the instrument.
- Use the adapter matching your current wall socket.

2.2.5 USB-Cables

USB cables:

- Type A/C: Connect instrument with power supply for charging and with PC for charging and data transfer
- Type C/C: Connect instrument with PC for fast charging and data transfer.

2.2.6 Checking Tiles

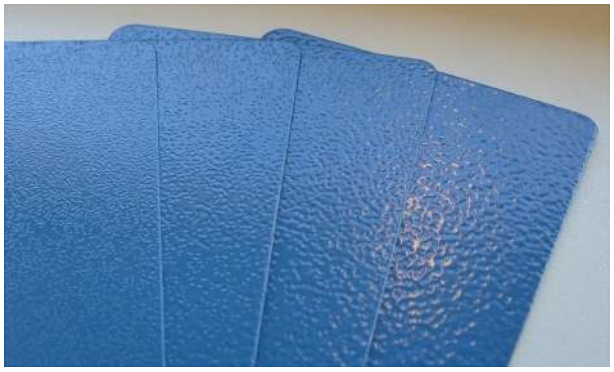
In the case following checking tiles are placed:

- White standard: Used to calibrate the instrument.
- Green standard: Used to test color measurement.
- Black standard: Used to test gloss measurement.

Consult “Test and Calibration [▶ 24]“ for more information.

2.3 Measurement Principle

Our visual perception sees color, gloss, and surface topography together. For example: Following powder coating samples have same color, but different textures.



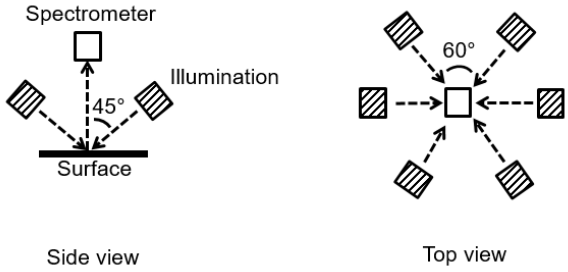
The same applies to leather-like surfaces. For example: Following car interior samples have same color, but different grains.

The conclusion is: To measure just color is not enough – color **and** topography of a sample is to be measured in order to be able to compare it to a standard. The **spectro2profiler** is the combination of different measurement techniques in one instrument:

- Color measurement
- Gloss measurement
- 2D reflectivity measurement
- 3D topography measurement

2.3.1 Color Measurement

The **spectro2profiler** uses a 45/0 geometry with 6 illuminations.

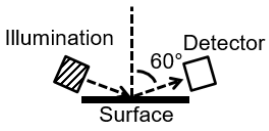


Side view Top view

The 45/0 is more close to our visual impression (gloss is excluded). The measurement aperture size is bigger than in conventional solid color measurement instruments. This gives statistical better values for larger parts.

2.3.2 Gloss Measurement

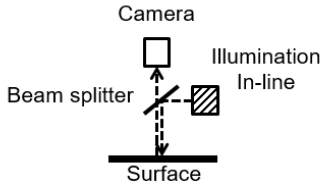
The **spectro2profiler** uses classic 60° gloss measurement - according to international standards. This way the measurement results can be compared to historical data.



This is a must-have due to existing specifications for e.g. interior parts. However, the results strongly depend on the measuring direction – with the disadvantage that cast shadows on a structured surface falsify the results.

2.3.3 2D Reflectivity Measurement

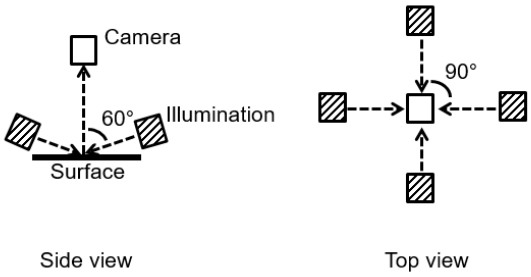
To overcome the disadvantage mentioned above the **spectro2profiler** uses a new approach for objective measurement: The illumination takes place in-line; the reflections are measured with a 2D camera.



The in-line setup eliminates cast shadows. The advantage is: No shadow zones, no directionality in the measurement results. Additionally, the camera image provides 2D reflectivity data for spatially resolved reflectivity measurements.

2.3.4 3D Topography Measurement

The **spectro2profiler** uses photometric stereo technique with 4 light sources. With this setup multiple images are taken under different lightning conditions.



The analysis of these multiple images allows to estimate the surface curvature. Based on the curvature the height map of the surface can be calculated.

Summary

The **spectro2profiler** is the combination of different measurement techniques in one instrument:

- Classic color measurement
- Classic gloss and new 2D reflectivity measurement
- New 3D topography measurement

1 **45/0 color measurement:** Area diameter = 25 mm	2 **60° specular gloss measurement:** Area = 15 mm x 25 mm
3 **2D reflectivity measurement:** Area = 15 mm x 15 mm	4 **3D topography measurement:** Area = 15 mm x 15 mm

For more details on the new approach for objective measurement BYK-Gardner provides professional trainings to interested customers.

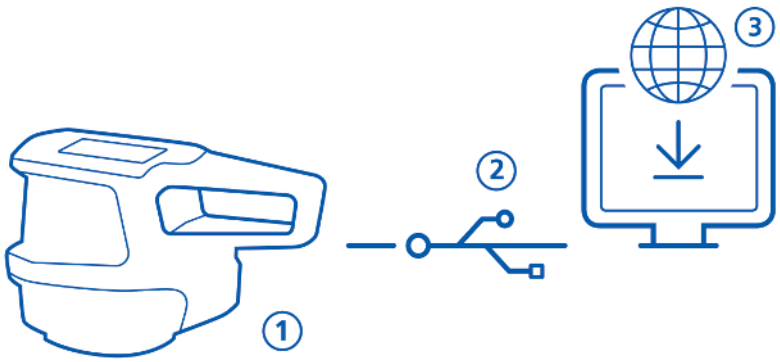
3 Getting Started

Please observe following notes when you put the instrument into operation:

- Assemble the system, consisting of instrument, USB cable, power supply or PC and software. Consult “System Diagram [▸ 19]” for more information.
- Connect the instrument to the power supply and allow it to charge fully. Consult “Charging Procedures [▸ 20]“ for more information.
- Perform a calibration if necessary. Consult “Test and Calibration [▸ 24]“ for more information.
- Press the **Operate** button in order to turn the instrument on.
- Become familiar with the main menu for a quick navigation. Consult “Using the Main Menu [▸ 21]“ for more information.
- Press the displayed icons on the touch-screen with your finger or with a stylus in order to navigate through the menu and perform functions.
- Check and adjust measurement parameters. Consult “Setting Parameters [▸ 22]“ for more information.
- Always hold the instrument carefully as protection against dropping.
- Use the software “smart-chart” to tap the full potential of the instrument. Consult “Software Installation [▸ 22]” for more information.

3.1 System Diagram

The entire system consists of instrument, calibration and test tiles and software for data transfer and analysis.



Connect instrument with PC via USB cable **(1).**

After first connect instrument is automatically turned on.

The battery pack in the instrument is automatically charged **(2)**.

If instrument has turned off, turn it on by pressing the **Operate** button.

Download and install “smart-chart” software **(3)**.

3.2 Charging Procedures

The instrument provides two ways for charging:

- Standard Charge via USB Type A/C
- Fast Charge via USB Type C/C

3.2.1 Standard Charge via USB Type A/C

The power supply is connected to the wall socket.

Connected the instrument via the USB cable type A/C to the power supply.

The charge LED indicates the current status:

- Pulsates red as long as the battery charge is < 15%.
- Pulsates yellow as long as the battery charge is < 50%.
- Pulsates green as long as the battery charge is < 90%.
- Lights up in green when the battery charge is ≥ 90%.

Keep the instrument connected as long as the instrument is not in use.

The instrument is fully charged and can be put in operation.

NOTICE

The USB connector type A is to be inserted in the correct direction.

3.2.2 Fast Charge via USB Type C/C

Connect the instrument with the USB cable type C/C to your PC.

The instrument loading bar on the display shows the battery charge.

Disconnect the instrument from the USB cable when it is fully charged.

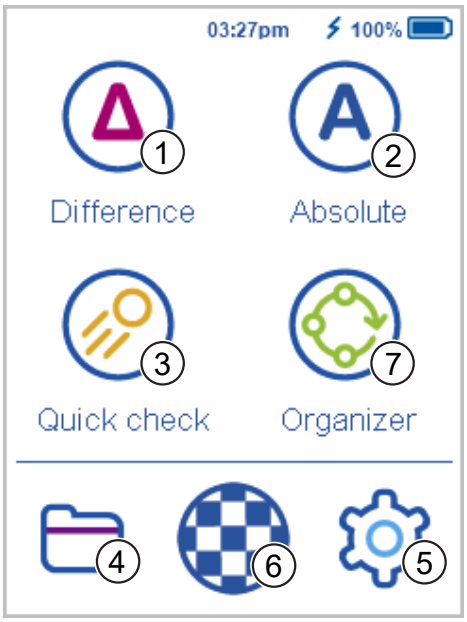
The instrument is fully charged and can be put in operation.

NOTICE

The USB connector type C can be inserted in both directions.

3.3 Using the Main Menu

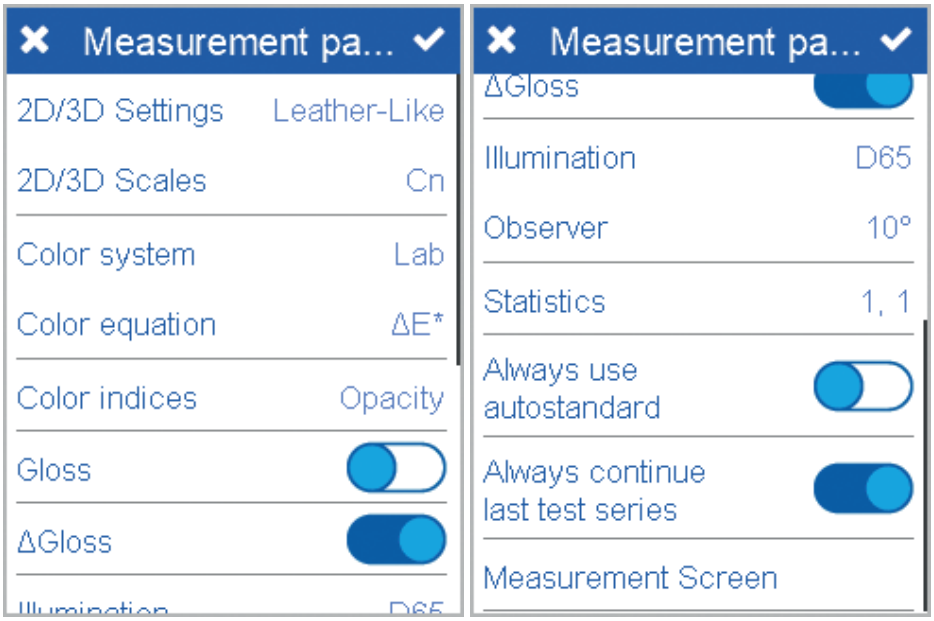
The screen below shows the icons that can be displayed on the main menu.



1	**Difference** Compare standard and sample. Results are saved automatically.	2	**Absolute** Take absolute measurements without compare. Results are saved automatically.
3	**Quick Check** Perform quick evaluations without saving.	4	**Browse** View and delete measurement data.
5	**Configuration** Change measurement parameters or instrument settings.	6	**Opacity**: Activate via **Configuration > Measurement Parameters > Color Indices**.
7	**Organizer** Download at least one organizer from smart-chart.		

3.4 Setting Parameters

Go to **Configuration > Measurement Parameters.**



A respective list with selectable parameters appears. Consult “Measurement Parameters [▶ 45]“ for more information.

Choose the required parameter and confirm by clicking on the checkmark in the upper right corner.

Repeat these steps until you set all desired parameters.

Confirm by clicking on the checkmark in the upper right corner.

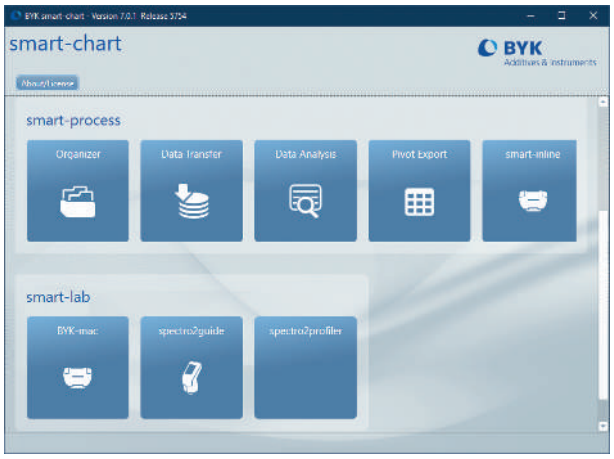
The measurement parameters are set.

NOTICE

Setting measurement parameters is required for off-line mode only. Standards and organizers transferred from “smart-chart” have already set all necessary parameters.

3.5 Software Installation

The software suite “smart-chart” is a modern and intuitive PC program to document, analyze and optimize your color, gloss, reflectivity and topography data.



It is available in two different software packages: “smart-lab” and “smart-process”. The standard delivery includes two licenses for the selected software package.

3.5.1 Download and Installation

Download the ZIP file from:

- https://www.byk-instruments.com/spectro2profiler

Save the file into a new folder and extract the complete archive.

In the extracted folder, right mouse click on the file “**install.exe**”.

Select “**Run as administrator**”.

Follow the setup instructions on the screen.

3.5.2 Software Registration

After software download both software packages can be used for 30 days free trial. Thereafter, you need to register either for one of the two software packages. In the main window of “smart-chart” click on the button “**About/ License**”.

You can retrieve your license on-line or off-line. In order to change your PC you can return your license on your old PC and re-install it on your new PC. In case of questions contact your support team at BYK-Gardner.

3.6 Test and Calibration

The **spectro2profiler** has a long-term stable calibration. This can be monitored using the calibration standard included in the delivery.

If you measure the standard and the values are out of the specification, the instrument will ask you for calibration using this standard.

Consult “Test and Calibration [▸ 47]“ for more information.

4 Perform Measurements

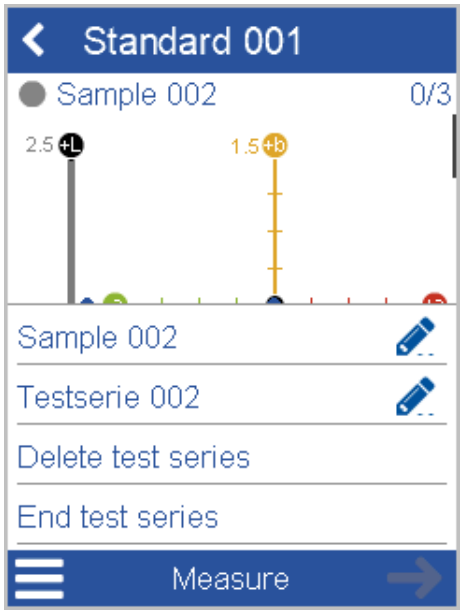
The instrument provides various types of measurement functions:

- Difference Measurement: In this mode the results are saved automatically.
  - "Autostandard [▶ 26]": Measure sample and search for nearest standard.
  - "Standard Measurement [▶ 29]": Measure sample and save it as new standard.
  - "Difference Measurement": Compare sample(s) with standard.
- "Absolute Measurement [▶ 33]": Take measurements without comparison. Results are saved automatically.
- "Quick check [▶ 34]": Measure standard and than measure samples to compare with standard - without saving the results.
- "Opacity Measurement [▶ 35]": Measure the hiding power of coatings. Results are saved automatically.
- "Organizer Usage [▶ 36]": Perform defined measurement routines - predefines in "smart-chart". Results are saved automatically.

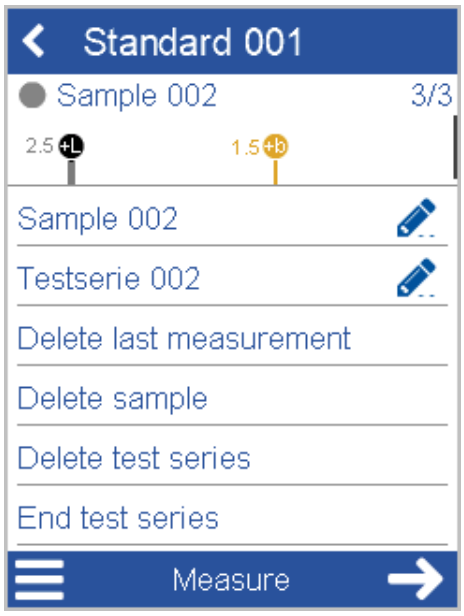
Make sure your measurement parameters are set. Consult "Setting Parameters [▶ 22]" for more information.

Context Menu

The context menu is accessed via the "hamburger" menu symbol. First click on the symbol opens the menu. Second click closes the menu. In initial state the menu contains just a few commands.



The menu grows up during measurement process. After taking measurements it contains more commands.



In the final state the menu provides following commands

- **Sample (Rename)**
- **Testserie (Rename)**
- **Delete last measurement**
- **Delete sample**
- **Delete test series**
- **End test series**

NOTICE

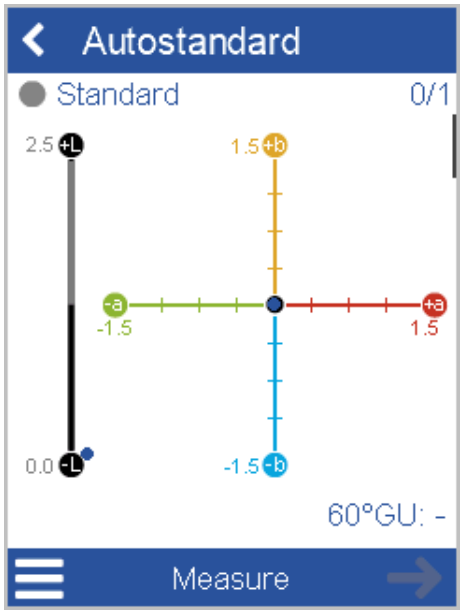
Renaming is not supported. You have to give proper name before first measurement.

4.1 Using Autostandard

Using this function you can measure any sample - the system will automatically present the standard(s) in the instrument, which are nearest to the current sample.

Click on icon "**Difference**". The list with existing standards is displayed.

Click on item "**Autostandard**". The measurement screen "**Standard**" is displayed.

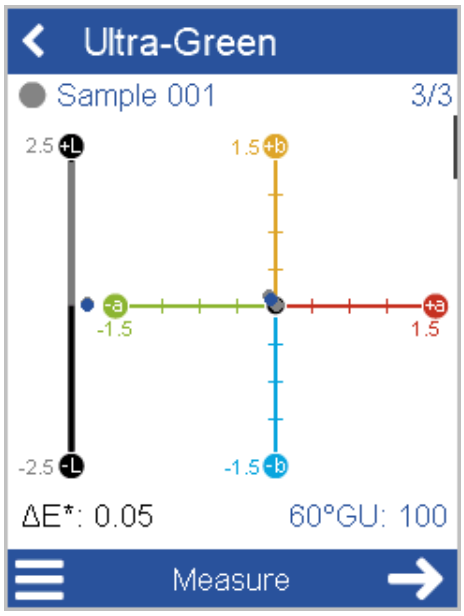


Measure your current sample or check zone just one times to search for standard. Following scenarios are supported:

- **Nearest standard found**
- **Some standards close**
- **No good match**

4.1.1 Nearest standard found

If matching standard is found in instrument, it is selected automatically. The measurement screen "**Sample <xxx>**" is displayed.



Measure sample or check zone <n> times and proceed with the next sample or check zone.

4.1.2 Some Standards Close

If more than one matching standard is found in instrument, the screen "**Some standards close**" is displayed.

Select the best matching standard from the list and continue measuring.

4.1.3 No Good Match

If no matching standard is found in instrument, the screen "**No good match**" is displayed.

Select the best matching standard from the list and continue measuring.

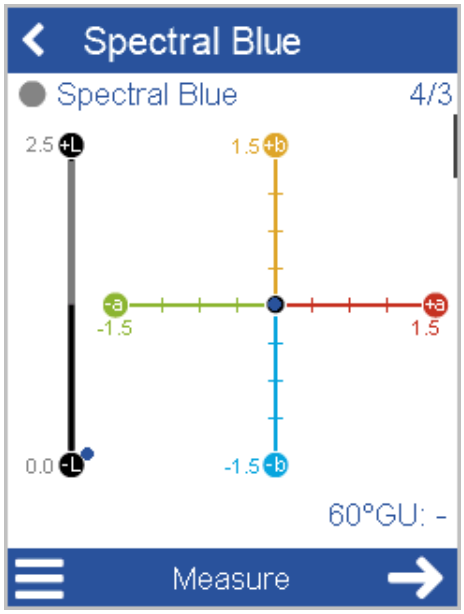
4.2 Standard Measurement

Using this function you can create new standards directly from the sample currently measured.

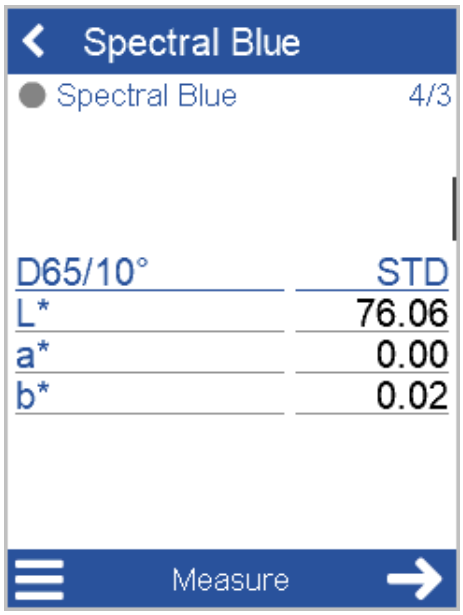
Click on icon "**Difference**". The list with existing standards is displayed.

Click on the "**+**" symbol to create a new standard. The screen "**Standard name**" is displayed.

Enter a proper name, click on the checkmark symbol to accept and continue measuring.



Scroll down to see the measurement details.

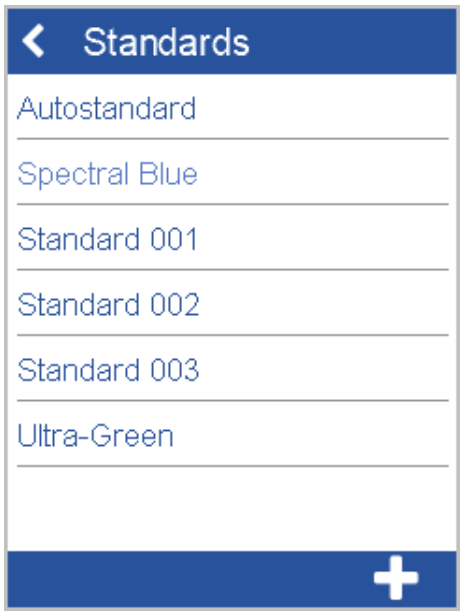


Click the arrow symbol to continue with next sample or select "**End test series**" from context menu.

4.3 Difference Measurement

Using this function you can compare standard and sample(s).

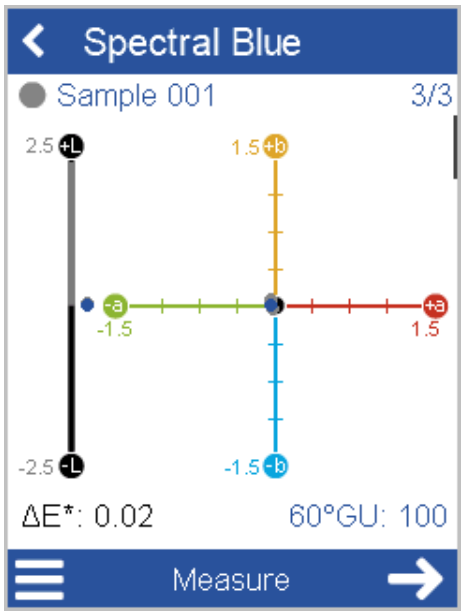
Click on icon "**Difference**". The list with existing standards is displayed.



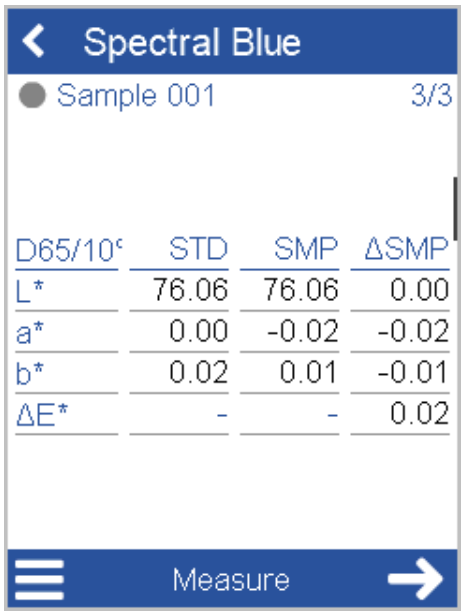
Perform measurement:

- Select standard from list.
- Place instrument on sample.
- Click on "**Measure**" or press "**Operate**" button.

Sample is measured and automatically saved.



Scroll down to see data table and statistics.

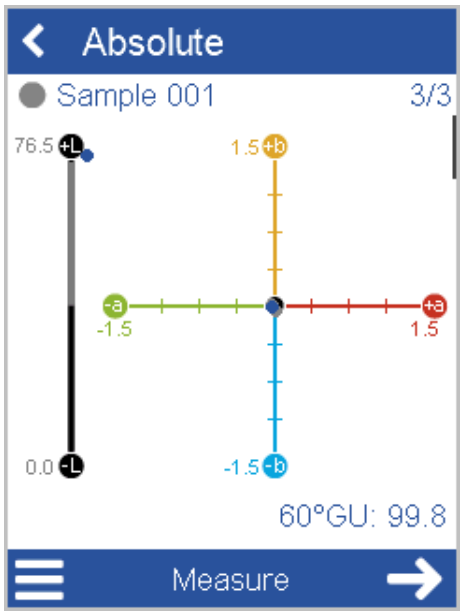


Click the arrow symbol to continue with next sample or select "**End test series**" from context menu.

4.4 Absolute Measurement

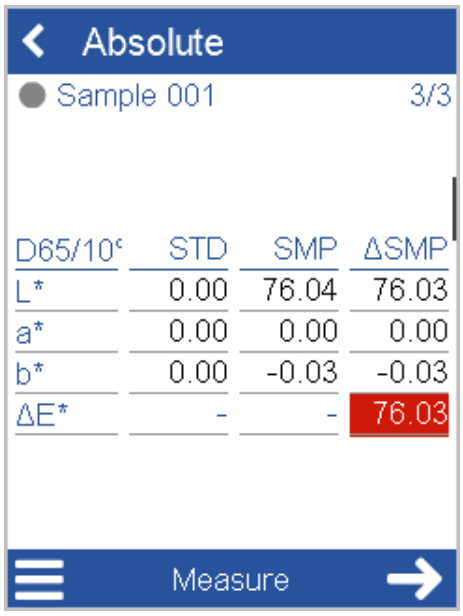
Using this function you can take measurements without compare to standard.

Click on icon "**Absolute**". The measurement continues at your last test series.



Perform measurement:

- Click on "**Measure**" or press "**Operate**" button.
- Sample is measured and automatically saved.
- Scroll down to see data table and statistics.

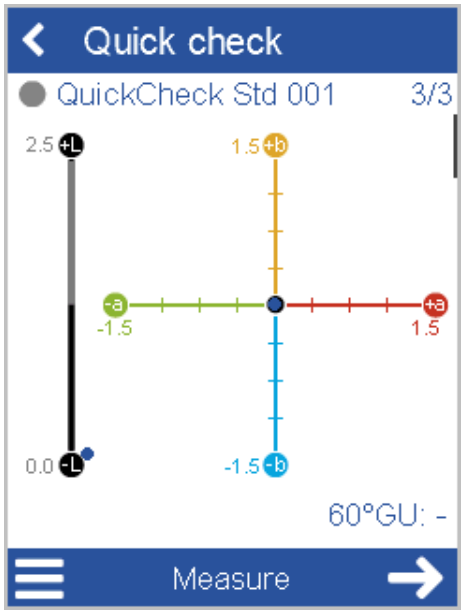


Click the arrow symbol to continue with next sample or select "**End test series**" from context menu.

4.5 Perform Quick Check

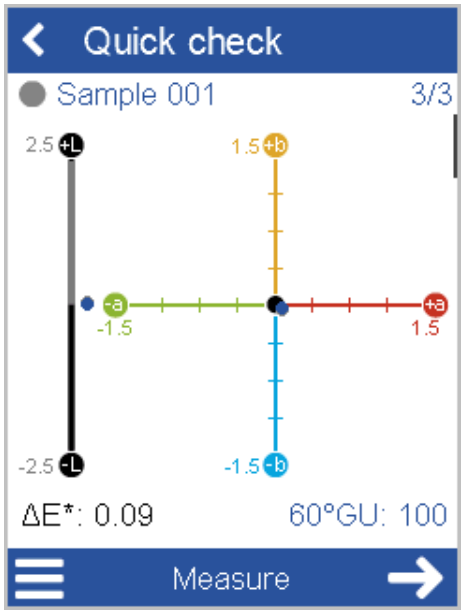
Using this function you can compare a standard with one or more samples without saving for a quick evaluation.

Click on icon "**Quick check**". The measurement starts with the standard.



Perform measurement:

- Click on "**Measure**" or press "**Operate**" button.
- Standard is measured. Results are not saved.
- Click on arrow symbol and measure (first) sample.



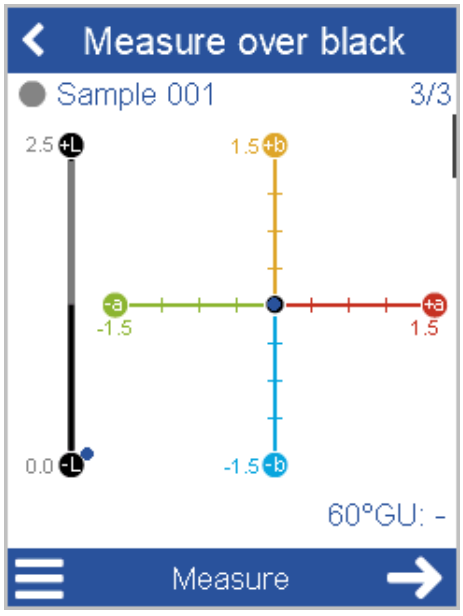
Click the arrow symbol to continue with next sample or select "**End test series**" from context menu.

4.6 Opacity Measurement

With this function you can measure the hiding power of your using - for example - our **byko-charts**, see https://www.byk-instruments.com/c/p-5916.

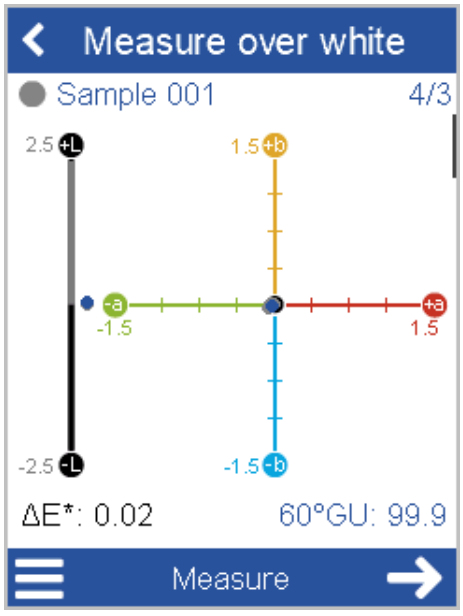
Note that the option "**Opacity**" has to be activated in the **Color indices**, see: "Setting Parameters [▶ 22]".

Click on icon "**Opacity**". The measurement starts on the *black* surface and finishes on the *white* surface.



Perform measurement:

- Place instrument on *black* surface.
- Click on "**Measure**" or press "**Operate**" button.
- The *black* sample is measured and automatically saved.
- Place instrument on *white* surface.
- Click on arrow symbol and measure on *white* surface.



Click the arrow symbol to continue with next sample and measure it on *black* and *white* or select "**End test series**" from context menu.

4.7 Organizer Usage

Organize the Measurement Process

It is possible to predefine measurement sequences with the software “smart-process”. The measurement can be accelerated via so-called “organizers”.

The “**Organizer**” icon appears after downloading at least one organizer from “smart-process” to the instrument.

5 Browse Measurements

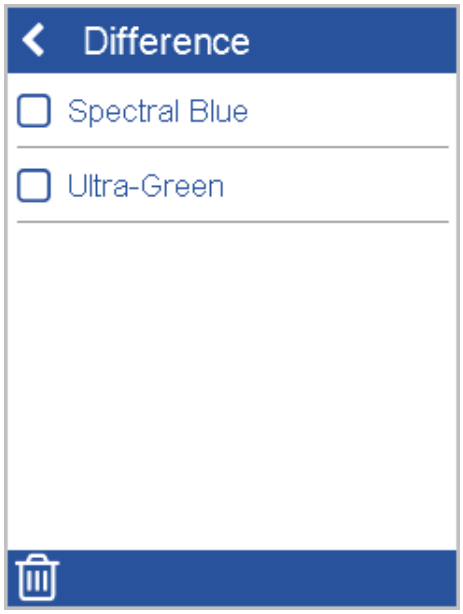
Using this function you can view measured data and / or delete existing standards or test series.

Click on icon **Browse**. The list with all types of measurements is displayed.

You can browse through the list in order to view or delete the data.

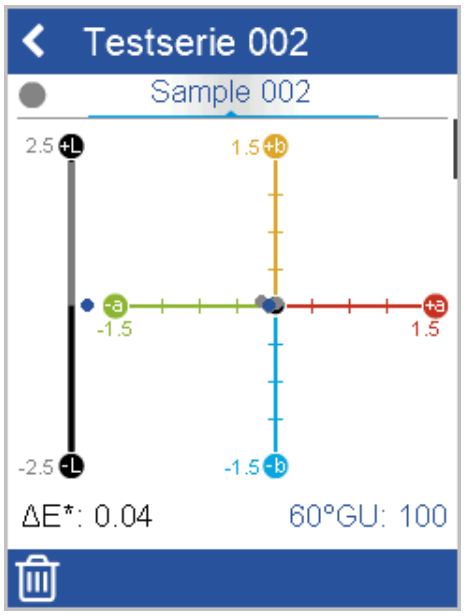
5.1 View Measurements

In the list of measurement types open the object for which you want to view the measured data – for example "**Difference**". The standards which have been measured are displayed.

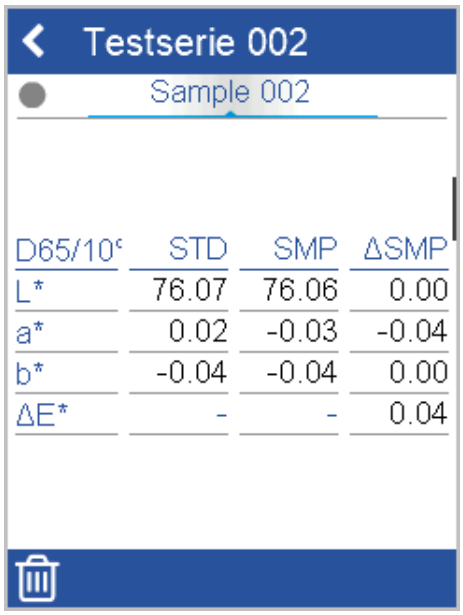


Open the desired object to view the measurement data. The last test series is displayed.

Open the test series to view the measurement data.



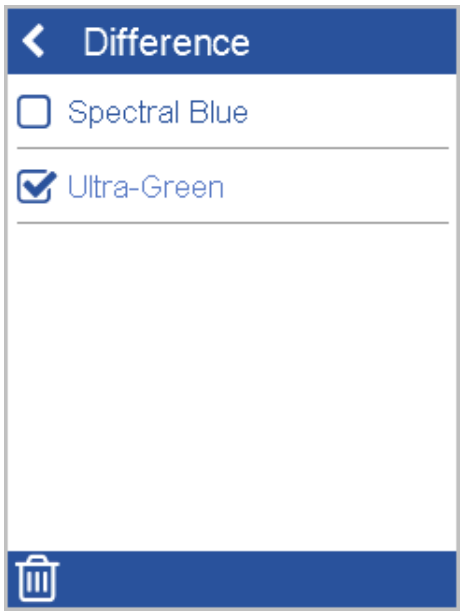
Scroll down to view values and statistics.



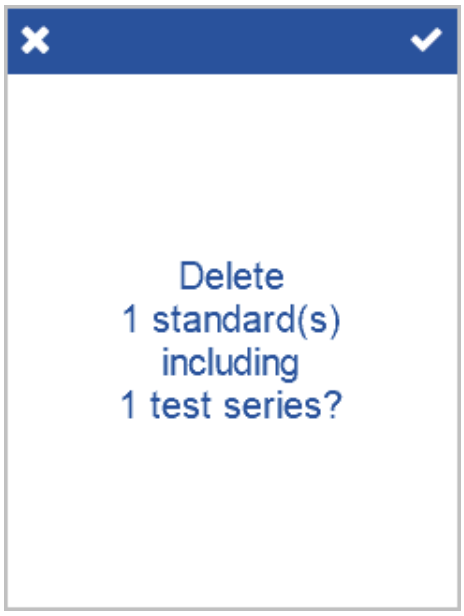
Browse through the different sample measured.

5.2 Delete Complete Standard

You can delete complete standards with all their measured data. Select the object(s) to be deleted in the list.



Click on the **Trashcan** icon. A confirmation dialog is displayed.

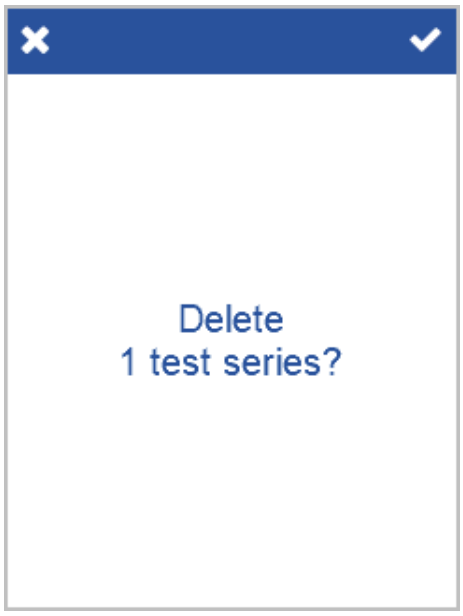


The selected objects are deleted.

5.3 Delete Measurement Data

Do not select the standard in the list but click the standard to open it. The test serie is listed.

Select the test serie to be deleted and click on the **Trashcan** icon. A confirmation dialog is displayed.



The selected object is deleted.

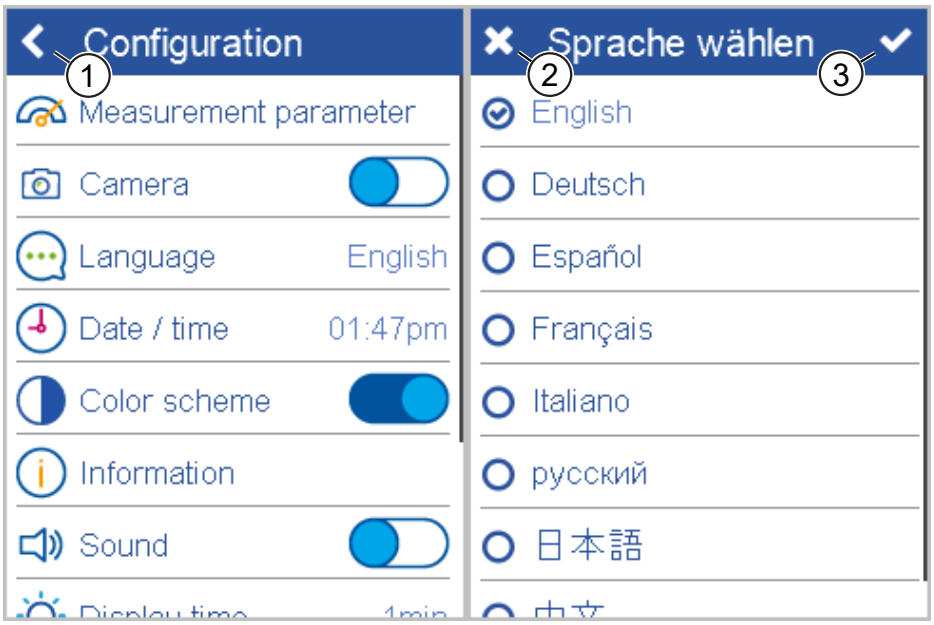
6 Configuration

With this function you can configure the system according to your needs. For example: You can set time and language or choose various measurement parameters.

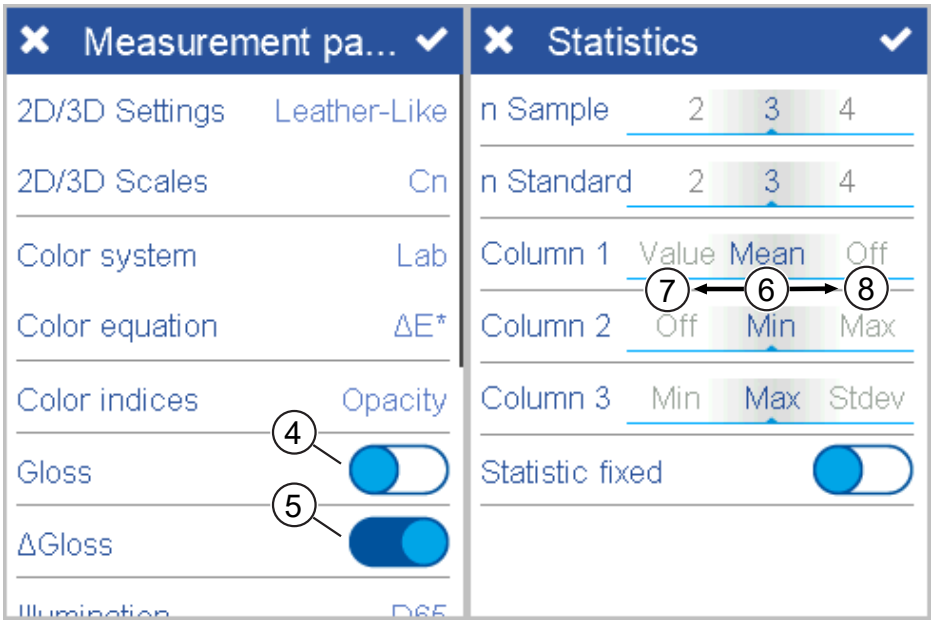
Click on icon **Configuration**. The configuration screen is displayed. There are different types provided to change the configuration of the system.

6.1 Configuration Types

The configuration screens provide buttons for easy navigation. The current settings can just be viewed or changed and saved.



Some options can be activated via a so-called toggle button. Some options can be configured via a rotating menu – which is working like a wheel.

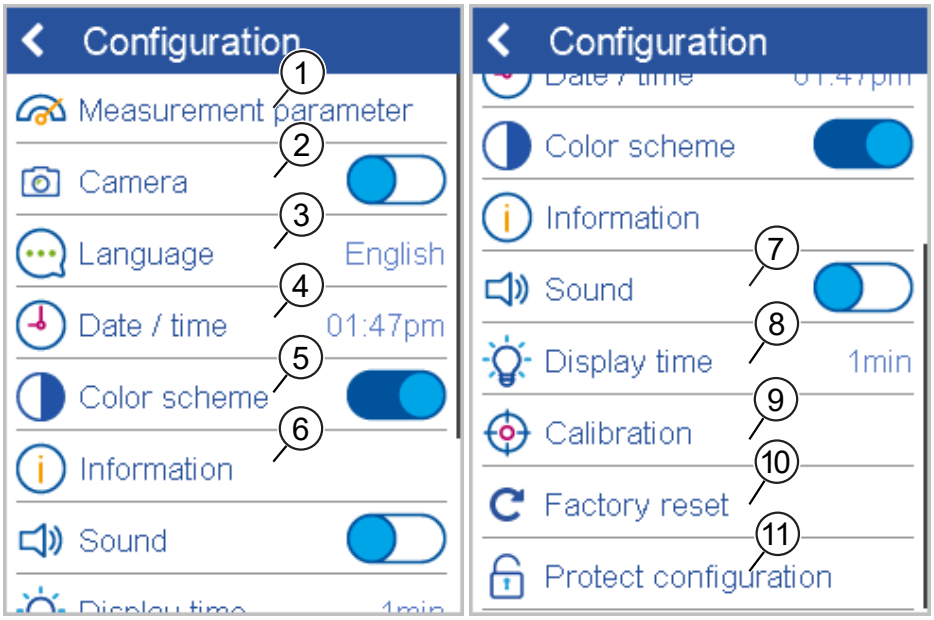


These options have following meaning.

1 **Back**: Go back to previous screen.	5 **Active**: Option is activated. Click left to deactivate.
2 **Cancel**: Go back to previous screen without saving.	6 **Wheel**: Tap an entry in the menu and move it to the left or to the right.
3 **Accept**: Go back to the previous screen and save your changes.	7 **Left**: One step to the left moves the wheel to next value.
4 **Inactive**: Option is deactivated. Click right to activate.	8 **Right**: One step to the right moves the wheel to previous value.

6.2 Configuration Options

The configuration screen consists of an upper and a lower part. You can slide the screen to the bottom and back to the top to view the options available.



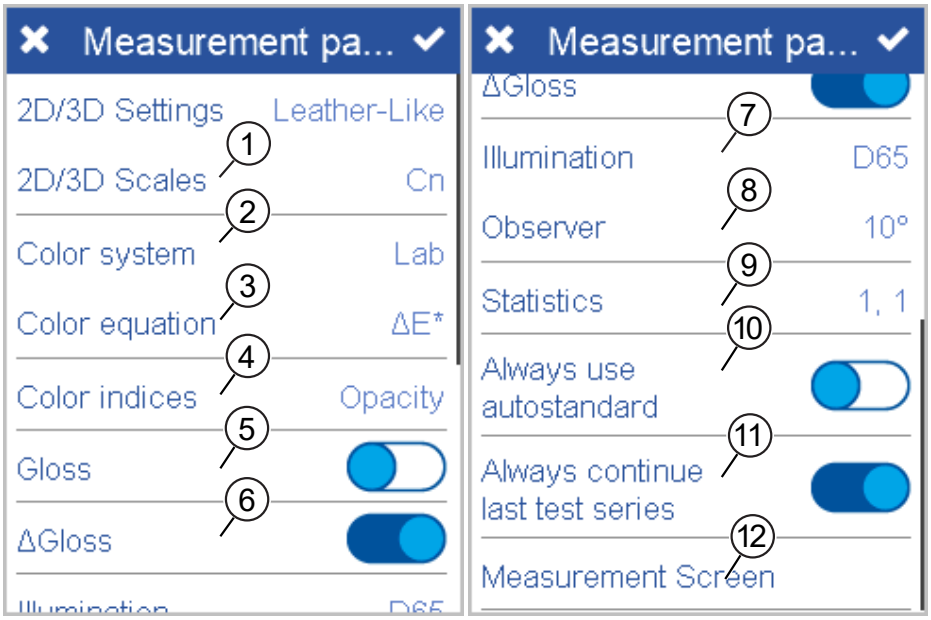
These options have following meaning.

1 **Measurement Parameters:** Set measurement parameters here. Consult “Measurement Parameters [▶ 45]“ for more information.	7 **Sound:** Switch instrument sound on/off here.
2 **Camera:** The instrument is able to show the surface to be measured on the display when the button **Operate** is pressed halfway. You can switch this function on/off here.	8 **Display time**: Defines the interval for automatic shutdown of instrument if not used. Consult “Display Time [▶ 46]” for more information.
3 **Language:** Select instrument language here.	8 **Calibration:** Calibrate instrument manually. Consult “Test and Calibratation [▶ 47]” for more information.

4 **Date / Time:** Set system time, time zone and daylight saving time here	10 **Factory Reset** Reset instrument to factory settings here. Consult “Factory Reset [▶ 50]” for more information.
5 **Color Scheme** Adjust screen brightness to day and night conditions here.	11 **Protect configuration**: If activated a password is required to open the configuration screen. Consult “Protect Configuration [▶ 51]” for more information.
6 **Information** Shows system, network and legal information. Consult “System Information [▶ 46]” for more information.	

6.2.1 Measurement Parameters

Via this function you can configure how the measurements are to be done.



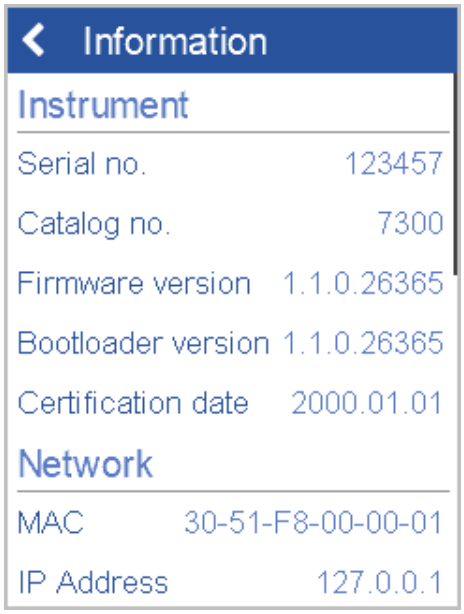
These options have following meaning.

1 **2D/3D Scales** Select scales for 2D reflectivity measurement and 3D structure analysis.	7 **Illumination** Select standard illuminant. Default is **D65**.
2 **Color System** Select color system. Default is **CIE L*a*b***.	8 **Statistics** No. of readings to be taken per standard or per sample. Statistics are evaluated, if **n > 1**.
3 **Color Equation** Select color equation. Default is **ΔE***.	9 **Observer** Select standard observer. Default is **10°**.
4 **Color Indices** Select color indices.	10 **Always use autostandard** Search for nearest standard is always active.

Default is none.	
5 **Gloss** Turn gloss measurement on or off.	11 **Always continue last test series** No new test series is created; latest series is opened automatically.
6 **ΔGloss** Turn difference measurement for gloss on or off.	12 **Measurement Screen** Select data to be displayed on screen.

6.2.2 System Information

Via this menu entry you can view the details about your instrument.



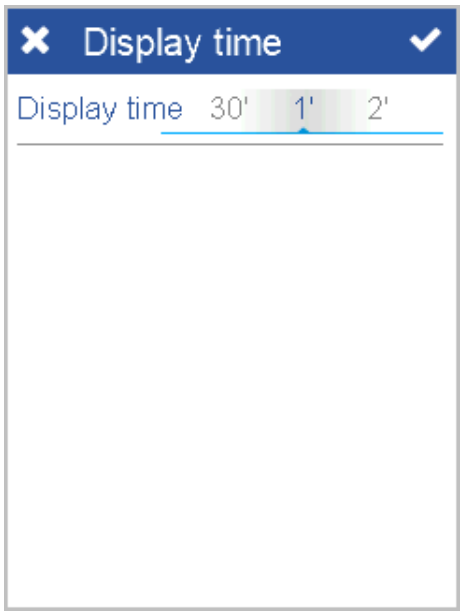
Following data is displayed:

- Serial Number: The unique ID of your instrument.
- Catalog Number: The order number in our products catalog.
- Firmware Version: The current version of the system software.
- Certification Date: The date of the last certification. A re-certification by BYK-Gardner should take place once a year.
- Network data like MAC or IP address: Only relevant in case of active WiFi connection.

In case you contact your local BYK-Gardner service center please have these data handy.

6.2.3 Display Time

You can configure the time interval for the automatic shutdown of your instrument.



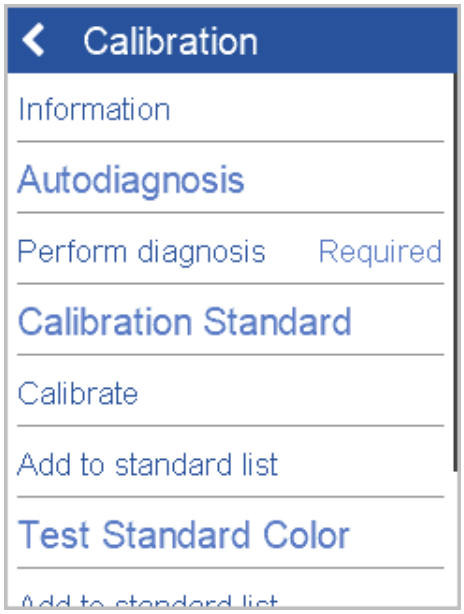
Following values are possible (in minutes): 1, 2, 5, 10, 15, 30.

6.2.4 Test and Calibration

The system delivery comprises a calibration tile and test tiles for color and gloss. These tiles can be used to check if your instrument is measuring correctly. Each tile comes with a dedicated serial number matching your instrument.

To use a tile, open the cover and remove the protective cap form your instrument.

Place the instrument on the tile and select **Configuration > Calibration**.



NOTICE

Once you have measured your test tiles you can save them as standard. This way you can use “Difference Measurement [▶ 31]” later on to check the difference between test tile and instrument.

You have following options:

- **Information**: Check serial no. and date.
- **Autodiagnosis**: Perform this, if required.
- **Calibration Standard**: Use the white tile.
- **Test Standard Color**: Use the green tile.
- **Test Standard Gloss**: Use the black tile.

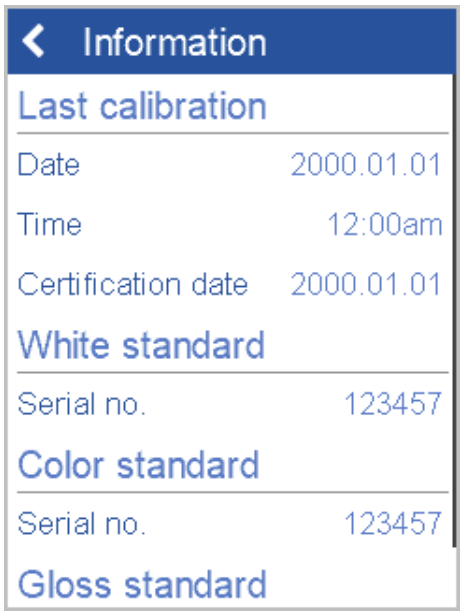
We recommend to test your instrument once a day and to calibrate your instrument once a month. Take care that your calibration tile and test tiles are clean. Always keep them closed in the transportation case.

NOTICE

The test procedures just perform measurings on your test tiles. The calibration procedure changes data in your instrument.

6.2.4.1 Information

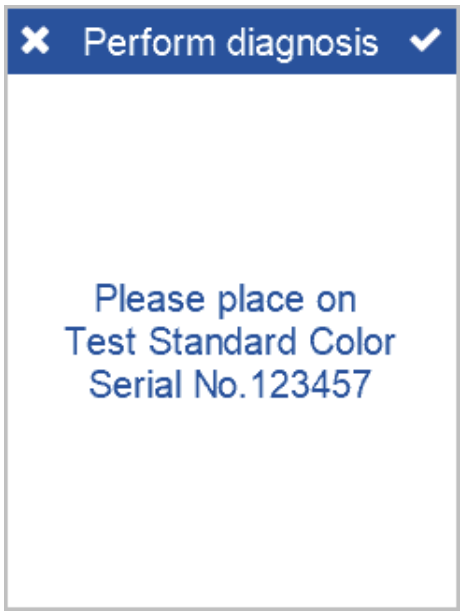
Select menu option **Information**.



You can check date of last calibration and serial numbers for your calibration and test tiles. Scroll down to see all details.

6.2.4.2 Autodiagnosis

You will be informed by the instrument, when a diagnosis is required. Select menu option **Autodiagnosis**.



Follow the instructions on the screen.

6.2.4.3 Calibration

Place instrument on **white** standard and perform following steps:

1. Select menu option **Calibrate**.
2. The instrument gives you instructions and automatically guides you through the calibration.
3. Follow the instructions of the instrument.

The white standard is measured. If necessary the data in your instrument is adapted automatically.

6.2.4.4 Color-Test

Place instrument on **green** standard and perform following steps:

1. Select menu option **Test Standard Color**.
2. The instrument gives you instructions and automatically guides you through the test.
3. Follow the instructions of the instrument.

The green standard is measured. No data is changed in your in your instrument.

6.2.4.5 Gloss-Test

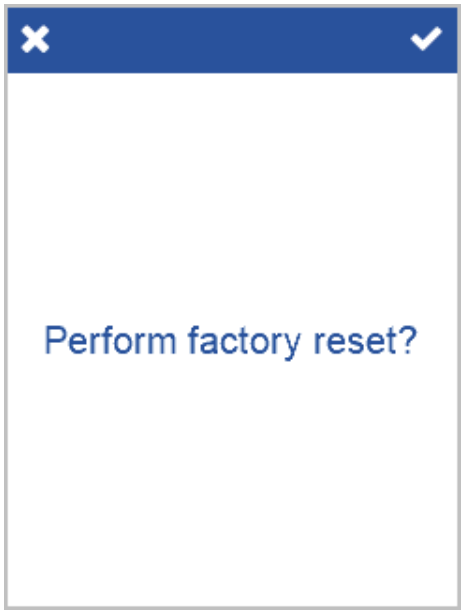
Place instrument on **black** standard and perform following steps:

1. Select menu option **Test Standard Gloss**.
2. The instrument gives you instructions and automatically guides you through the test.
3. Follow the instructions of the instrument.

The black standard is measured. No data is changed in your in your instrument.

6.2.5 Factory Reset

If you are having technical problems with your instrument, you can perform a fallback to the factory settings.



Confirm the security message to perform the fallback. You have to enter a password - details see section Technical Data.

After fallback all your personal configuration and measurement data in the device will be lost. The instrument is set back to original state.

6.2.6 Protect Configuration

You can protect the current configuration of your instrument via password against accidental or intentional changes. Select **Protect configuration**.

Activate the option. You have to enter a password. The password is shown in clear text during input. There is no 2nd confirmation input of password required.

If the option is activated the **Configuration** menu can only be accessed from the dashboard by entering the password. Note down the password on a secure place – if you do not remember, you will have to contact your local BYK-Gardner certified service center to get the master password.

7 Troubleshooting

Problem/Error message	Solution
Error! Please clean White Tile or call customer service.	Clean white tile and repeat white calibration. If white calibration fails again, contact service.
Calibration invalid. Please perform calibration.	Perform calibration using the white calibration standard.
Measurement failed! Please repeat. Ambient light …	Appears if an error occurs during measurement. Make sure to completely cover measurement aperture. Make sure to hold the instrument stable during measurement. Repeat measurement.
Battery empty. Instrument is switching off ...	Charge the instrument using the USB cable.
Battery empty.	Charge the instrument using the USB cable.
Instrument temperature too high!	Instrument temperature is > 45°C. Allow the instrument to cool down.
Instrument temperature too low!	Instrument temperature is < 5°C. Allow the instrument to warm up.
Memory full! Please delete stored measurements.	Delete stored measurements.
Light protection ring is broken or fell off	Contact service.
Error! White calibration on external white calibration standard.	Repeat calibration. If white calibration is okay, clean external white calibration standard. If calibration fails again, contact service.
Instrument is not charging via USB connection.	Make sure USB power supply provides a minimum of 500 mA (1500 mA recommended).
No connection between instrument and software	Make sure instrument is connected via USB.
No data transfer to software	Instrument within a measurement. Switch back to the main menu.

8 Technical Data

Color

Geometry	45°c:0°
Aperture Size	Diameter 25 mm
Spectral Range	400–700 nm, 10 nm resolution
Repeatability(1)	0,01 ΔE94 (10 readings on white)
Reproducibility(1)	0,1 ΔE94 (average of 12 BCRA tiles)
Color Systems	CIELab/Ch, Lab(h), XYZ, Yxy
Color Differences	ΔE*, ΔE(h), ΔE94, ΔECMC, ΔE99, ΔE2000
Indices	YI_{E313}, YI_{D1925}, WI_{E313}, W_{ICIE}, WI_{Berger}, Opacity, Metamerism, Gray Scale
Illuminants	A, C, D50, D55, D65, D75, F2, F6, F7, F8, F10, F11, UL30
Observer	2°, 10°

Gloss

Aperture Size	25×15 mm		
Measurement Range		Repeatability(1)	Reproducibility(1)
	± 0.1 GU	± 0.1 GU	± 0.1 GU
	± 0.2 GU	± 0.2 GU	± 0.2 GU

2D Reflectivity

Aperture Size	15 × 15 mm
Measurement Range	0 – 500 000, technical performance guaranteed within 0 – 2500
Spatial Resolution	60 µm
Repeatability(1)	0.5 % (10 readings on structure reference standard)
Reproducibility(1)	1.0 % (on structure reference standard)

3D Structure (Mean Cell Size, Mean Cell Amplitude)

Aperture Size	15 × 15 mm
Measurement Range	Cs: 0 –255 mm^2, Ca: 2 µm–2 mm (perceived)
Spatial Resolution	60 µm
Height Resolution	1–2 µm
Repeatability(1)	2% (10 readings on structure reference standard)
Reproducibility(1)	5% (on structure reference standard)

General Data

Memory	3000 samples with images
	10 000 samples without images
Languages	English, German, French, Italian, Spanish, Russian, Japanese, Chinese
Dimensions (LxWxH)	150 x 240 x 155 mm (5,9 × 9,5 × 6,1 in)
Weight	1530 g (3,37 lbs)
Interface	USB Type-C (USB 3.1)
Battery	7,2 V; 2350 mAh; 16,92 Wh
Device	Input: 5 V–12 V DC; max. 3.0 A
Power Supply	Input: 100–240 V AC; 50–60 Hz; max. 1,0 A
	Output: 5 V DC; max. 2,1 A
Temperature Range	Operation: 10° C to 40° C (50° F to 104° F)
	Storage: 0° C to 60° C (32° F to 140° F)
Relative Humidity	Up to 85 % at 35° C (95° F) non-condensing
Operating Altitude	Up to 2000 m (6561 feet)
Passwords for Factory Reset	byk-instruments

Download manual from:

https://www.byk-instruments.com/c/4584

9 Service Points

	BYK-Gardner global service centers with ISO / IEC 17025 accredited laboratories

Headquarter Germany c/o BYK-Gardner GmbH Lausitzer Strasse 8, 82538 Geretsried, Germany	**Headquarter USA** c/o BYK-Gardner USA 9104 Guilford Rd., Columbia, MD 21046, USA	**Headquarter PTE** c/o BYK USA dba Paul N. Gardner 316 N.E. First Street Pompano Beach, FL 33060 - 6608, USA
BYK-Gardner Service Point Austria, Hungary, Slovenia c/o Friedrich W. Bloch GmbH Wagramerstrasse 201, 1210 Vienna, Austria	**BYK-Gardner Service Point France** c/o Eckart France S.A.S. 31 Rue Amilcar Cipriani 93400, Saint Ouen, France	**BYK-Gardner Service Point Spain** c/o Actega Artística S.A.U. Calle Balmes 8, Suite: 3º 2ª, 08291 Ripollet, Spain
BYK-Gardner Service Point UK and Ireland c/o BYK Additives Ltd. 450 Bath Road, Longford, Heathrow, UB7 0EB, United Kingdom	**BYK-Gardner Service Point South Latin America** c/o MAST Comercial e Importadora LTDA Rua Itaporanga, 340-B, Bairro Paraiso, Santo André - SP, 09190-640, Brazil	**BYK-Gardner Service Point China** c/o BYK (Tongling) Co. Ltd. Shanghai Branch Block 6A, Building A, No 88 Hong Cao Road, Xuhui District, Shanghai 200233, P.R. China
BYK-Gardner Service Point India BYK India Pvt. Ltd. 147, Mumbai - Pune Road 411018 Pune Maharashtra, India	**BYK-Gardner Service Point Japan** c/o Tetsutani Co. Ltd. Chuo-ku, Osaka, Tokui cho 2-2-2, Japan	
Complete list of service centers	https://www.byk-instruments.com/global-service-centers	

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