BYK

spectro2guide Family

Portable Spectrophotometer

Operating Manual

A member of ALTANA

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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 For Your Safety

Warning: 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.

The safety instructions also include information about disposal, liability and copyright.

Warning: Ergonomic hazard due to discomfort and fatigue possible.

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

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

Warning: Eye damage can be 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.

1.2 Disposal

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

1.3 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 [▸ 8]

1.4 Copyright

Specific properties and structural characteristics of the instrument are intellectual property of BYK-Gardner. The copyright of this manual remains with BYK-Gardner.

This document must not be reproduced fully or in party, published or used for any other competitive purposes, no matter whether against payment or not, without prior written authorization from BYK-Gardner.

BYK-Gardner reserves the right to update the instrument, software and written documentation without prior notice.

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1.5 Declarations

1.5.1 Declaration of Conformity (EU)

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

1.5.2 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.
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.

RF exposure statement (portable devices)

This device complies with the RF exposure SAR test exclusion requirements for portable devices, if a minimum separation distance (2 cm) to the antenna is kept. If the device is used and held correctly, the distance to the antenna will be maintained and the risk of human contact during normal operation is minimized.

1.5.3 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.

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

1.5.4 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

1.6 Intended Use

The instrument is designed to measure color, gloss, and fluorescence 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 unit onto a surface and pressing either the **Operate** button on the rear 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 to read or write data. A resistive display allows additional functionalities.

2 System Description

The **spectro2guide** is a portable spectrophotometer which is operated by the touch screen display and the **Operate** button. The button is used to switch on the instrument and to trigger a measurement. On the touchscreen display you can select icons and functions directly.

2.1 Feature Matrix

The BYK-Gardner **spectro2guide** product family offers a wide range of color control handheld spectrophotometers. For every purpose the best instrument is available.

	spectro2go / spectro2go XS	spectro2guide	spectro2guide Pro
Digital Standards	Yes	Yes	Yes
Color Measurement	Yes	Yes	Yes
Gloss Measurement	Yes / No	Yes	Yes
Fluorescence Measurement	No	Yes	Yes
Jetness Measurement	No	No	Yes
Docking Station	Accessory	Included	Included
Included Software	smart-chart	smart-chart	smart-chart

For more product details see:

- https://www.byk-instruments.com/en/Color-Control/spectro2guide-Color-Control-Handheld-Spectrophotometer/c/2337

2.2 Delivery Content

The items listed below are contained in the packaging:

- Delivery of spectro2go / spectro2go XS [▶ 11]
- Delivery of spectro2guide [▶ 12]
- Delivery of spectro2guide Pro [▶ 13]

Please contact BYK-Gardner if any item is missing or damaged.

2.2.1 Delivery of spectro2go / spectro2go XS

The **spectro2go** product variant provides measurement of color and gloss in one instrument. The **spectro2go XS** product has a very small aperture size (5 mm) to measure small parts. Gloss measurement is not supported here.

1	System documentation	5	Power supply
2	Instrument with protective cap	6	Power supply adapters type A/C/G/I
3	USB online cable type C/A for direct data transfer	7	External black high gloss and green standard for testing
4	Hand strap and	8	External white standard for calibration

For more product details refer to our website:

- **spectro2go**: https://www.byk-instruments.com/p/7085
- **spectro2go XS**: https://www.byk-instruments.com/p/7095

NOTICE

- The docking station in the **spectro2guide** delivery can be purchased as an accessory for the **spectro2go**.
- All sections about docking station within this documentation are also valid for **spectro2go** with docking station.

2.2.2 Delivery of spectro2guide

The **spectro2guide** product variant provides measurement of color, gloss and fluorescence in one instrument. It comes with a docking station.

1	System documentation	6	Hand strap and USB cable type B/A to connect docking station with PC
2	Instrument with protective cap	7	Docking station
3	Power supply	8	External black high gloss and green standard for testing
4	USB online cable type C/A for direct data transfer	9	External white standard for calibration
5	Power supply cable		

Following items are provided additionally for the **spectro2guide**:

- Docking station **(7)**
- USB cable type B/A to connect docking station with PC **(6)**

For more details on the **spectro2guide** refer to our website:

- https://www.byk-instruments.com/c/p-32824

2.2.3 Delivery of spectro2guide Pro

Within the BYK-Gardner **spectro2guide** product family, the **spectro2guide Pro** offers the widest range of functions.

It comes with a 45°C:0° circumferential geometry and an improved accuracy to measure the jetness of deep black colors.

The **Pro** product variant provides measurement of color, gloss, fluorescence and jetness in one instrument.

1	System documentation	6	External deep black standard for jetness testing and grey standard for jetness calibration
2	Instrument with protective cap	7	External black high gloss and green color standard for testing
3	Docking station	8	External white standard for color calibration
4	Power supply and USB online cable type C/A for direct data transfer	9	LED flashlight to check deep black samples and the jetness standards for cleanliness
5	Power supply cable, USB cable type B/A to connect docking station with PC and hand strap		

Following items are available exclusively for the **spectro2guide Pro**:

- Jetness standards **(6)**
- LED flashlight **(9)**

For more details on the **spectro2guide Pro** refer to our website:

- https://www.byk-instruments.com/p/7087

2.3 Names and Functions of Parts

2.3.1 Frontside

1 LED:

Measure:

- Lights up in green during measurement.
- Lights up in blue if the sample is fluorescent, see "Fluorescence Measurement [▶ 36]".
- Lights up in pink if color change due to fluorescence is bigger than 1/3 of the tolerance value. This is the default value, it can be changed in the software "smartchart".
- Blinks red in case of a measurement error.

NOTICE

The indication of fluorescence is not available for the **spectro2go**.

Charge:

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

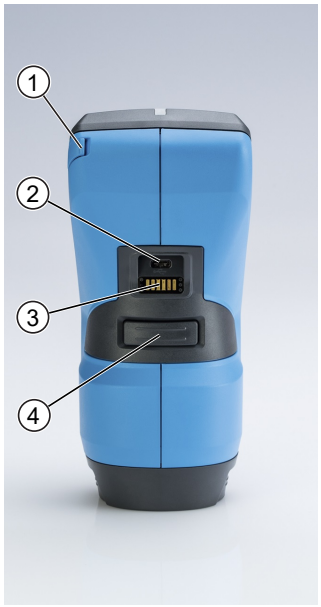
2 Touch screen display:

- Touch the icons on the screen with your finger or the stylus in order to operate the instrument.

3 Protective cap:

- Remove before putting into docking station or performing measurements.
- Attach when instrument is not used or placed in the transportation case.

2.3.2 Rearside



1 Stylus (inserted in instrument):
- Can be used for touching the icons on the screen.

2 USB type C plug:
- Charging: Connect to power supply in order to charge the instrument.
- Data transfer: Connect to PC in order to transfer data between instrument and software “smart-chart”.

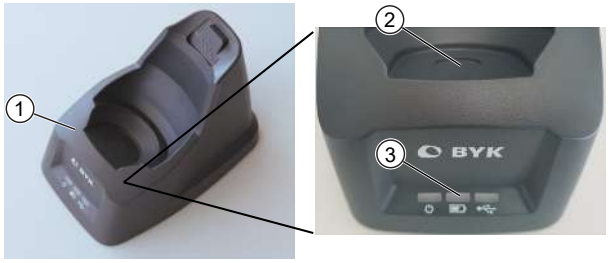
3 Contact plates:
- Used for charging and data connection with docking station.
- Always keep the electrical contacts clean and dry.

4 Button **Operate**:

Press halfway:
- A camera is switched on that shows the surface to be measured on the display.

Press completely:
- Instrument is switched off: Turns the instrument on.
- Instrument is switched on: Executes a measurement.

2.3.3 Docking Station



1 Docking station:
- Charges the instrument.
- Connects instrument and computer.

2 White test standard:

- Used to perform auto diagnosis of instrument.

3 Docking station LEDs - from left to right:

- Power: Indicates that docking station is power supplied.
- Battery: Indicates that instrument is charged.
- USB: Indicates an active data connection to a computer.

2.3.4 Instrument in Docking Station

1 Instrument inserted in docking station

2.3.5 Test and Calibration Standards

1 Black high gloss test standard
2 Green test standard
3 White calibration standard

Consult Instrument Calibration [▶ 58] for details on usage.

2.3.6 Exclusive Parts for Pro Variant

The **spectro2guide Pro** delivery includes following additional parts.

2.3.6.1 Standards

For jetness check and calibration two additional standards are provided.

1	Deep black color standard for jetness checking	2	Gray standard for jetness calibration

See "Instrument Calibration [▶ 58]" > "Pro Variant [▶ 65]" for details on usage.

2.3.6.2 Flashlight

Jetness measurement requires very high accuracy. An LED flashlight is provided to check the cleanliness of the jetness standards and samples.

1	On/Off switch	2	Power LED

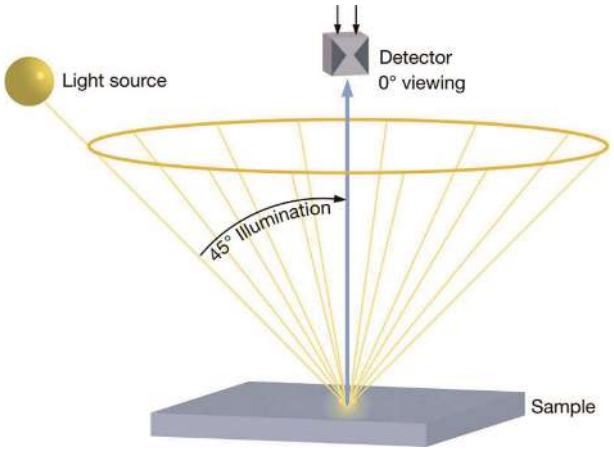
Before jetness check or calibration make sure that no dust is on the jetness standards. See "Cleaning the Jetness Standards [▶ 83]" for details on usage.

2.4 Measurement Principle

The instrument is available with two different measurement geometries.

2.4.1 Geometry 45°c:0°

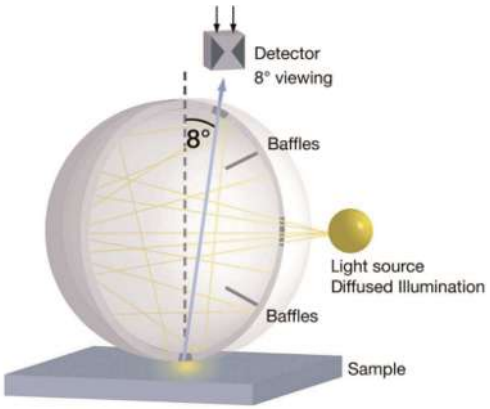
The 45°c:0° geometry uses 45° circumferential illumination and 0° viewing perpendicular to the sample plane. The circumferential illumination is essential to achieve repeatable measurement results on directional and structured surfaces



The 45/0 geometry simulates the normal condition used for color evaluation. For example, when we read a glossy magazine we position it to avoid the gloss from coming into our eye. A high gloss sample with the same pigmentation is visually judged darker by the eye when compared to a matte or structured sample.

2.4.2 Geometry d:8°

A sphere geometry illuminates the sample diffusely by means of a white coated integration sphere. Baffles prevent the light from directly illuminating the sample surface. Measurement is done using an 8° view angle.



A sphere instrument may be operated under two different measurement conditions: **specular included (spin)** or **specular excluded (spex)**. In the "spin" mode, the total reflected light is measured. In the "spex" mode, a gloss trap is used to capture the directly reflected light (gloss). Color is measured independent of the sample's gloss or surface texture.

2.5 Software Installation

The software “smart-chart” is a modern and intuitive program to document, analyze and optimize your color, gloss and fluorescence data. It is available in two different software packages: “smart-lab Color” and “smart-process Color”.

- Download the ZIP file from:
  https://www.byk-instruments.com/spectro2guide
- Save it on your hard drive into a new folder.
- 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.

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. The standard delivery includes two licenses for the selected software package.

3 Getting Started

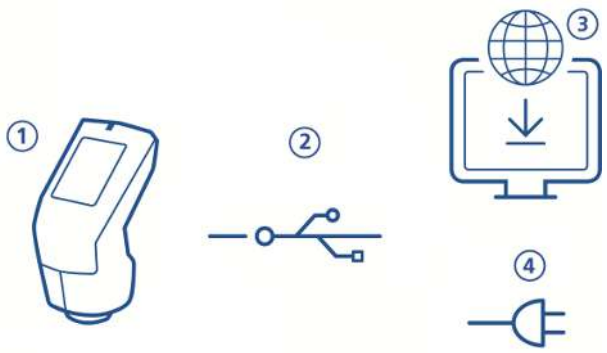
Please observe following notes when you put the instrument into operation.

- Assemble the entire system, consisting of instrument, docking station (option) and software. Consult System Diagram [▶ 20] for more information.
- Place the instrument in the docking station and allow it to charge fully. The docking station automatically **charges** the instrument and performs auto diagnosis. Consult Docking Station [▶ 21] and Charging Procedures [▶ 22] 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 [▶ 22] for more information.
- Press the displayed icons on the touch screen with your finger or the stylus in order to navigate through the menu and perform functions.
- Use the hand strap as protection against dropping the instrument.
- Use the software "smart-chart" to tap the full potential of the instrument. Consult Software Installation [▶ 19] for more information.

3.1 System Diagram

3.1.1 System Setup for spectro2go

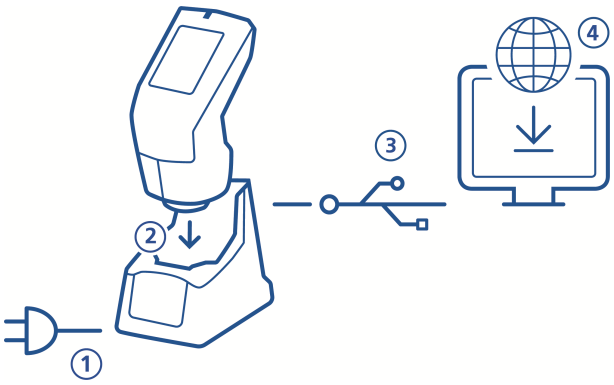
The entire system consists of instrument, power supply and software.



1. Connect instrument **(1)** via USB cable **(2)** with PC.
2. Download and install "smart-chart" software **(3)**.
3. Turn instrument on by pressing the **Operate** button.
4. If instrument is to be charged, disconnect USB cable from PC.
5. Connect instrument **(1)** via USB cable **(2)** with power supply **(4)**.

3.1.2 System Setup for spectro2guide

The entire system consists of instrument, docking station with power supply and software.



1. Connect docking station with power supply **(1)**.
2. Place instrument in docking station **(2)**.
3. Docking station automatically charges the instrument and performs auto diagnosis.
4. Connect docking station with PC via USB cable **(3)**.
5. Download and install "smart-chart" software **(4)**.
6. Turn instrument on by pressing the **Operate** button.

3.2 Docking Station

The docking station is used to store the instrument when it is not in use. It charges the instrument and automatically performs auto diagnosis after positioning. This ensures that the instrument is always ready for operation.

Default interval for auto diagnosis is 7 days - this can be adapted via the system settings, see Instrument Calibration [▶ 58].

To put the docking station into operation:

- Connect the docking station with the charger to the power supply grid.
- Connect the docking station via USB cable to the computer that is meant to run the software "smart-chart", see Software Installation [▶ 19].
- The power LED lights up in green and the docking station is ready to use.

NOTICE

If you buy a docking station as an accessory for the **spectro2go**, you can add it via the configuration menu, see Instrument Calibration [▶ 58].

3.3 Charging Procedures

The instrument provides two ways for charging.

3.3.1 Charge via Docking Station

Check that the docking station is power supplied and put the instrument into the docking station. The charge LED indicates the following states:

- 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 in the docking station as long as the instrument is not in use.

3.3.2 Charge via Power Supply

Connect the instrument with the USB cable to the power supply.

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

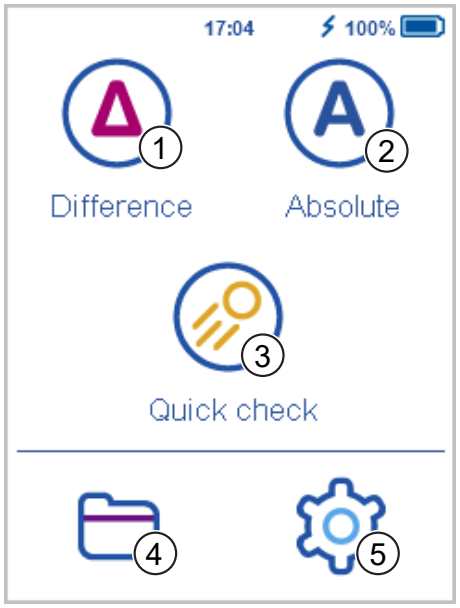
Disconnect the instrument from the power supply when it is fully charged.

NOTICE!

If you have both docking station and power supply the docking station is the preferred option for charging. It provides more power to the instrument – the charging is faster.

3.4 Using the Main Menu

The screen below shows the icons that are displayed by default.



1	**Difference** Compare standard and sample. Results are saved automatically. Details see Difference Measurement [▶ 26].	2	**Absolute** Take absolute measurements without compare. Results are saved automatically. Details see Absolute Measurement [▶ 33].

3	**Quick Check** Perform quick evaluations without saving. Details see Perform Quick Check [▶ 32].	4	**Browse** View and delete measurement data. Details see Browse Measurements [▶ 42].
5	**Configuration** Change measurement parameter or instrument settings and calibrate instrument. Details see System Configuration [▶ 46].		

Additional Icons

Two more icons can be displayed - depending on whether you have activated **Opacity** or downloaded an **Organizer** from "smart-chart".

Opacity

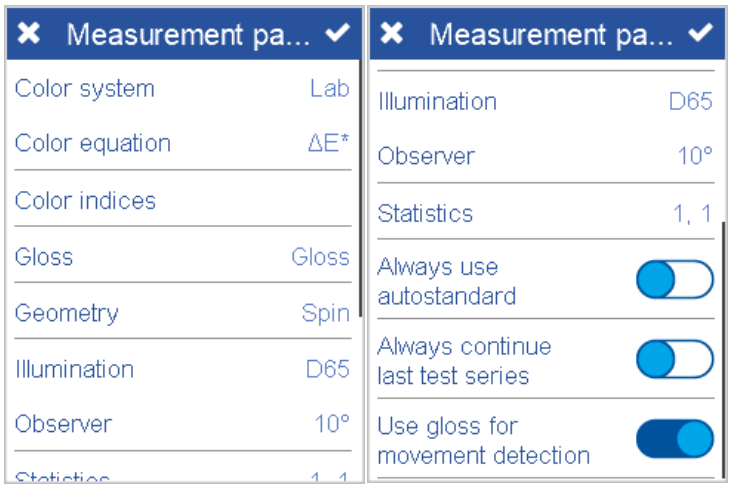
Activate under **Configuration > Measurement Parameters > Color Indices**. Details see Opacity Measurement [▶ 34].

Organizer

Download at least one organizer from "smart-chart". Details see Organizer Measurement [▶ 40].

3.5 Setting Measurement Parameter

The instrument is working with default measurement parameters. Before starting with measurements these parameters may have to be controlled. Go to **Configuration** > **Measurement parameter**.



Color system Select color system. Default is **CIE L*a*b***. Details see Color System [▶ 47].	**Illumination** Select standard illuminant. Default is **D65**.
Color equation Select color equation. Default is **ΔE***. Details see Color Equation [▶ 48].	**Observer** Select standard observer. Default is **10°**.
Color indices Select color indices. Default is none. Details see Color Indices [▶ 50].	**Statistics** No. of readings to be taken per standard or per sample. Statistics are evaluated, if **n > 1**. Details see Statistics [▶ 52].

Gloss (*)	**Always use autostandard**
Turn gloss measurement on or off.	Search for nearest standard is always active.
Geometry	**Always continue last test series**
Select d:8 measurement condition. Default is **Spin**. Available for cat.no. 7070, 7086. Details see Geometry [▶ 51].	No new test series is created; latest series is opened automatically.
Use gloss for movement detection (*)	
An error message appears if instrument is moved during measurement. Default is activated. If message appears without movements, deactivate this option – e.g. when measuring very thin foils.	

(*) Gloss measurement not included in spectro2go XS due to small aperture.

Additional Parameter

Depending on the model of your instrument additional measurement parameter can be available.

Fluorescence
Turn fluorescence indices on or off. Available for **spectro2guide** and **spectro2guide Pro**. Details see Fluorescence Measurement [▶ 36].
Jetness indices
Turn jetness and grayness indices on or off. Available for **spectro2guide Pro**. Details see Jetness Measurement [▶ 37] and Grayness Measurement [▶ 39].

Setting Measurement Parameter

To set measurement parameter:

- Click on the parameter you want to set.
- A respective list with selectable parameters appears.
- Choose the required parameter and confirm via the checkmark in the upper right corner.
- Repeat these steps for all desired parameters.

Confirm by clicking on the checkmark in the upper right corner. More details see Measurement Parameter [▶ 47].

NOTICE

- Changes in the measurement parameter apply to new standards only.
- Standards with existing measurement data will be measured with previous parameter to ensure data consistency.

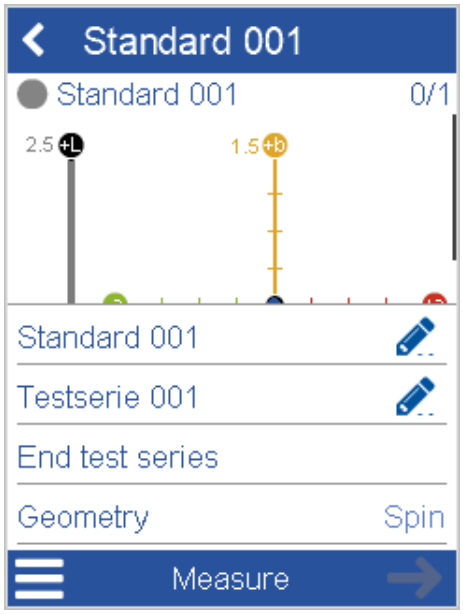
4 Perform Measurements

The instrument provides various types of measurement functions:

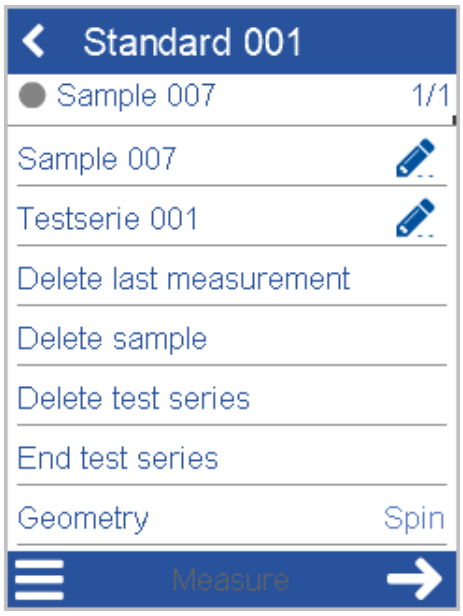
1. Difference Measurement [▶ 26]: In this mode samples are compared to a standard and the results are saved automatically.
   - Load existing Standard [▶ 26]: Compare sample(s) to a standard
   - Search for closest Standard [▶ 30]: Search for best match in instrument
   - Measure new standard [▶ 31]: Create standard based on current sample
2. Quick check [▶ 32]: Perform quick evaluations without automatically saving the data.
3. Absolute measurement [▶ 33]: Take absolute measurements without compare. Results are saved automatically.
4. Special measurements:
   - Opacity measurement [▶ 34]: Measure the opacity of a coating. Measurement values are stored.
   - Fluorescence Measurement [▶ 36]: Predict the color stability of a coating over the time.
   - Jetness Measurement [▶ 37]: Measure the jetness of extreme black colors.
   - Grayness Measurement [▶ 39]: Measure gray colors with additional indices.
   - Organizer Measurement [▶ 40]: Load organizers with predefined measurement sequence via "smart chart" into the instrument. An organizer will guide you through the measurement process.

Context Menu

The measurements are controlled via the context menu – available via the hamburger menu icon in the lower left corner of the display. Click for example on the icon **Difference**, create a new standard and open the context menu.



The context menu starts with less entries and grows up during measurements.



Finally, the context menu provides following commands:

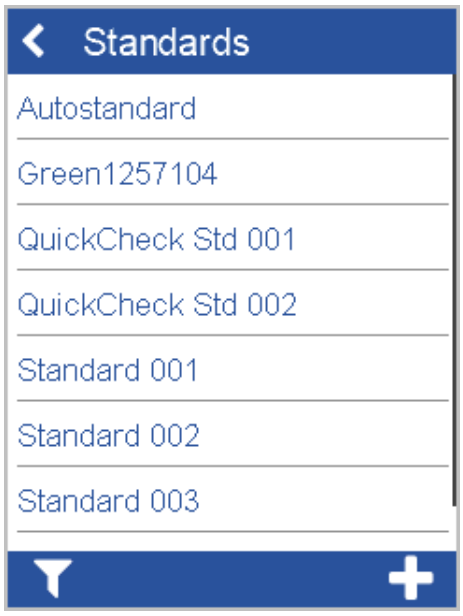
- **Rename Sample**
- **Rename Testserie**
- **Delete last measurement**
- **Delete sample**
- **Delete test series**
- **End test series**
- **Geometry**

4.1 Difference Measurement

Using this function you can compare standard and sample(s). You can load existing standards, search for the closest standard or measure new standards. Click on icon **Difference**.

4.1.1 Loading existing Standard

In case standards are already stored in the instrument, the list with existing standards appears.

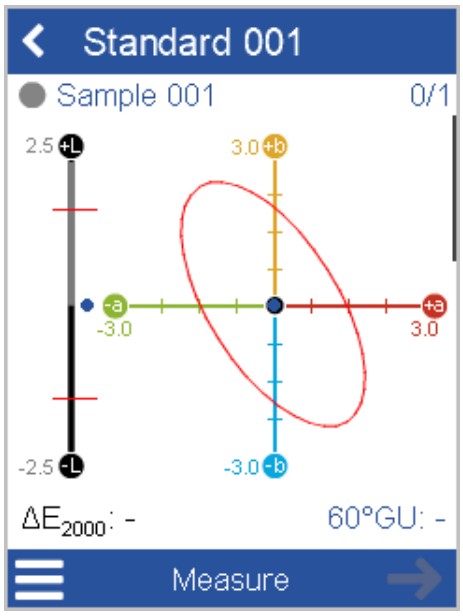


Select a standard to continue. The list with existing test series appears.

To continue existing test serie select it from list.

To add a new test serie click on **New test series**.

The new test serie is created and the measurement screen is displayed.



Select **Rename test serie**s from context menu, if required.

Enter the name and confirm via the checkmark in the upper right corner.

The instrument is ready to measure.

Place instrument on sample.

Click on **Measure** or press the **Operate** button.

Sample is measured and automatically saved.

Scroll down to see data table and statistics.

NOTICE

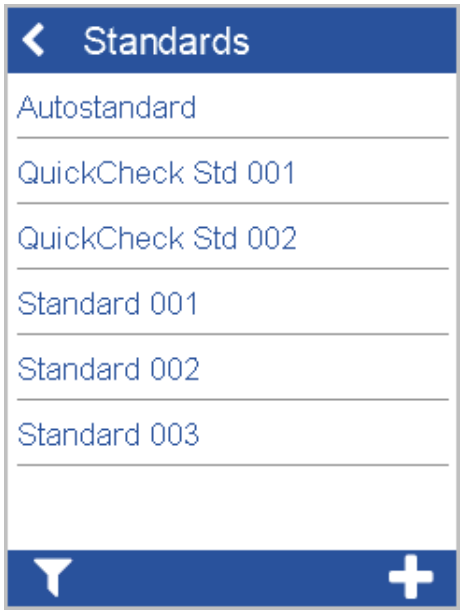
There are various options to configure the display of the data for the measurement results, e.g.:

- Display absolute values for standard and sample
- Display differences between standard and sample
- Display statistical data with 1...3 columns
- Activate/inactivate fixed statistics etc.

Details see Measurement Parameter [▶ 47].

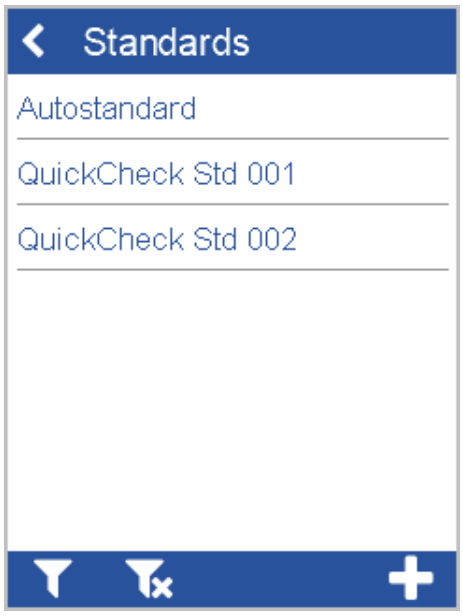
4.1.1.1 Using the Filter Function

The instrument provides a function to filter for standards. This is helpful in case of many standards being stored in the instrument. Click on the filter icon in the lower left. The screen to enter the filter criteria is displayed.



Enter the criteria for the filter - i.e. a part of the standard name.

After confirmation all standards matching the current criteria are displayed.



To change the filter criteria, select the filter icon again. To remove the filter, select the cancel filter icon.

4.1.2 Search for closest Standard

Using this function you can measure any sample - the system will automatically present the standard(s) in the instrument, which are closest to the current sample. Click on icon **Difference**. The list with existing standards is displayed.

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

NOTICE

The option **Autostandard** only appears when at least one standard is stored in the instrument. Measure your current sample just one time to search for closest standard.

Following scenarios are supported:

- **Nearest standard found**: If matching standard is found in instrument, it is selected automatically.
- **Some standards close**: If more than one matching standard is found in instrument, a list for selection is displayed.
- **No good match**: No matching standard was found in the instrument.

4.1.3 Measure new Standard

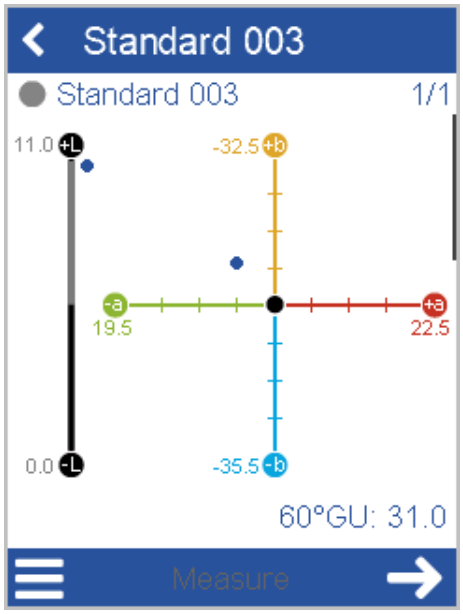
Using this function, you can create new standards. Click on icon **Difference**. The list with existing standards is displayed.

To add a new standard, click on **+**.

A new standard is created.

The input window for the standard name appears.

Accept the default name or enter a desired name and click on the checkmark in the upper right corner. The instrument is ready to measure the standard.



Place instrument on standard.

Click on **Measure** or press the **Operate** button.

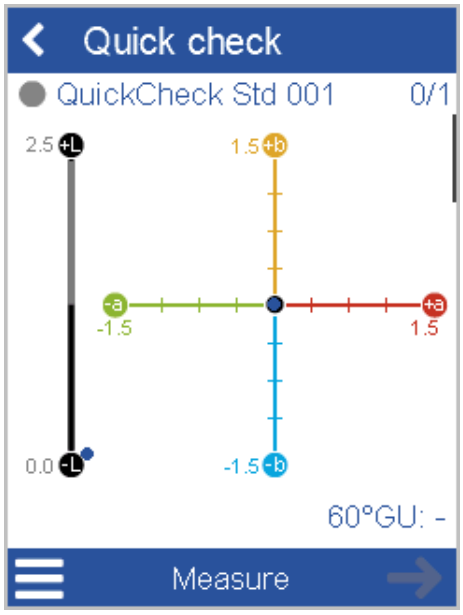
Standard is measured and automatically saved.

NOTICE

New standards can also be downloaded from “smart-chart” into the instrument.

4.2 Perform Quick Check

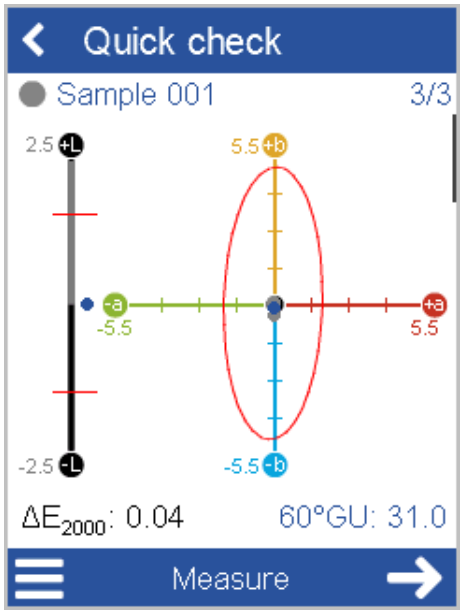
Using this function, you can compare a standard with one or more samples without saving for a quick evaluation. Click on icon **Quick check**. The instrument is ready to measure the *standard* for the quick check.



Place instrument on *standard*.

Click on **Measure** or press button **Operate** to measure the *standard*.

Continue with **Next** and place instrument on the *sample*.



Click on **Measure** or press button **Operate**. To measure the *sample*.

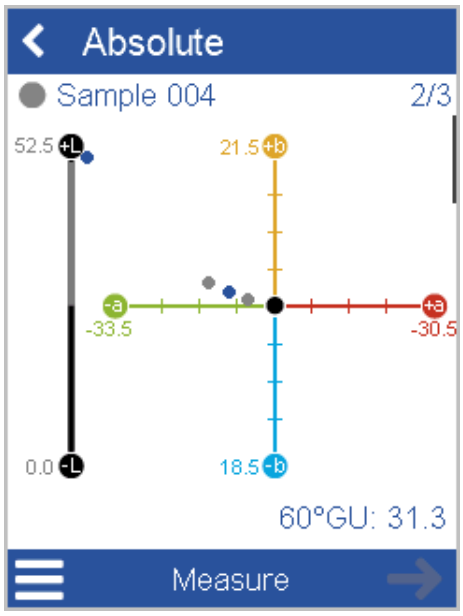
Continue with the next sample.

NOTICE

Measurements are **not** saved by default. To save the standards and samples measured select **Save data** from the context menu.

4.3 Absolute Measurement

Using this function, you can take measurements without comparing to a standard. Click on icon **Absolute**.



Place instrument on sample.

Click on **Measure** or press the **Operate** button.

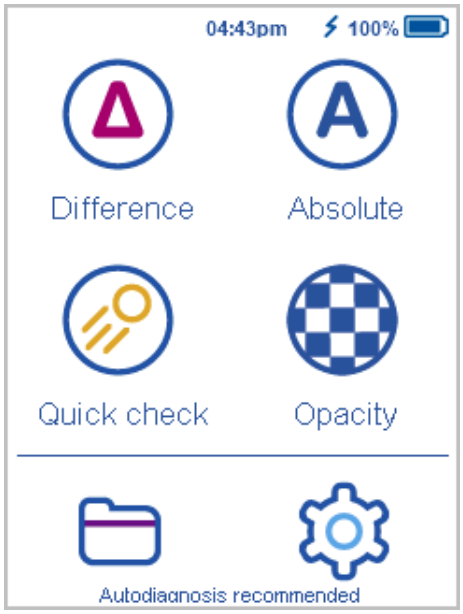
Sample is measured and automatically saved.

4.4 Opacity Measurement

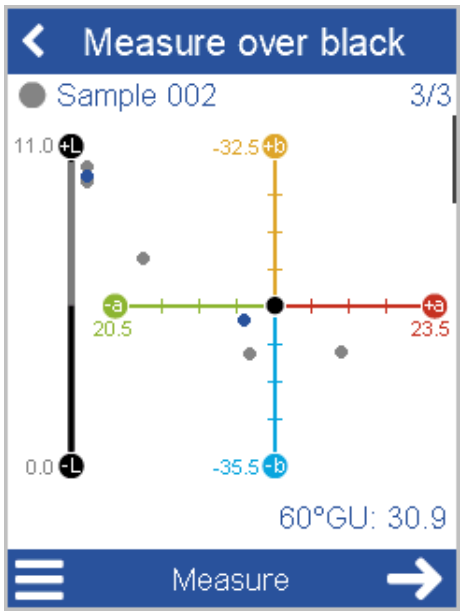
With this function you can measure the hiding power of your coating using for example the BYK-Gardner **byko-charts**:

- https://www.byk-instruments.com/c/p-5916

To display the measurement icon in the main menu, **Opacity** has to be selected as a color index, see Color Indices [▶ 50].



Click on icon **Opacity**. The measurement starts with the reading over **black** and finishes with the reading over **white**.

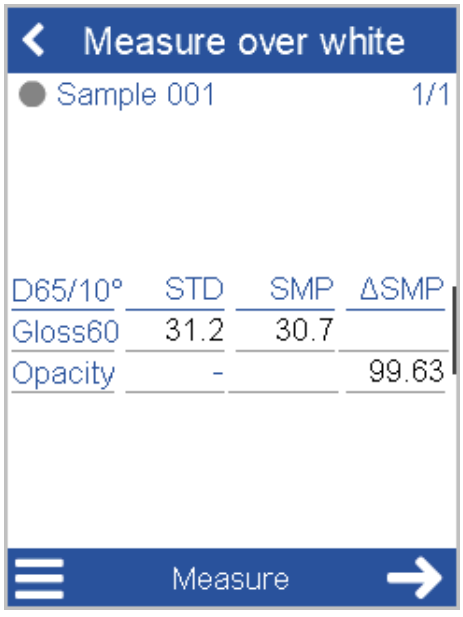


Place instrument on the **black** background.

Click on **Measure** or press the **Operate** button.

Sample is measured and automatically saved.

Continue with **Next** and place instrument on the **white** surface.



Click on **Measure** or press the **Operate** button.

Sample is measured and automatically saved.

Scroll down to see the **Opacity** value in %.

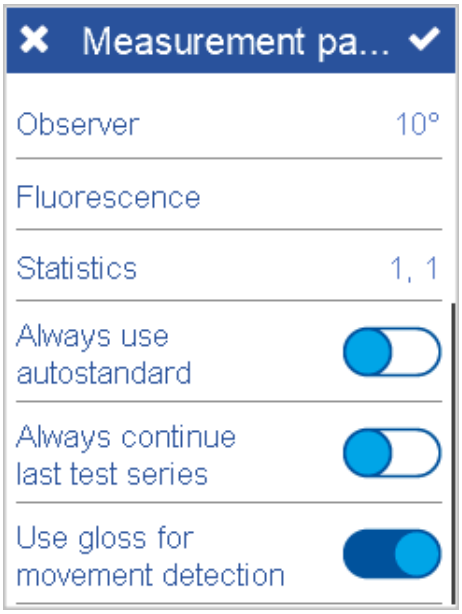
4.5 Fluorescence Measurement

The **spectro2guide** and the **spectro2guide Pro** can detect fluorescent light excited in UV and visible range. With this function you can predict the color stability.

A monochromatic illumination is used to excite fluorescent material in the sample. For this the instrument is equipped with additional 12 LEDs (360 - 660 nm):

- 2 ultra-violet LEDs and
- 10 monochromatic LEDs.

To measure fluorescence, the corresponding indices have to be activated. Go to **Configuration** > **Measurement parameter** > **Fluorescence**.



Following indices are relevant:

- **ΔE FI**: Indicates whether and how much fluorescent energy is emitted. The original specimen are compared to the specimen after the estimated fluorescence degradation.
- **ΔE_{zero}**: Calculates the estimated color difference after the fluorescence has decayed.

Place instrument on flourescent sample and measure it, see for example "Difference Measurement [▶ 26]".

The status of the fluorescence detection is signaled via an acoustic and a visual signal. For the visual signal the status LED on the top of the instrument is used, see "Frontside [▶ 14]":

- **Status LED = Blue**: Fluorescence has been detected.
  - Emitted energy > 1% of excited energy.
  - This must apply to at least 1 of the 12 monochromatic LEDs.
- **Status LED = Pink**: Fluorescence excides predefined limit.
  - The difference has to be larger than 1/3 of the tolerance due to fluorescence.
  - This tolerance value can be customized in the software "smart-chart".

A quantification of the fluorescent light is possible with the "Fluorescence" slider in the software "smart-chart".

A calculation is made for the color data after fluorescence has decayed - e.g. due to the impact of sunlight.

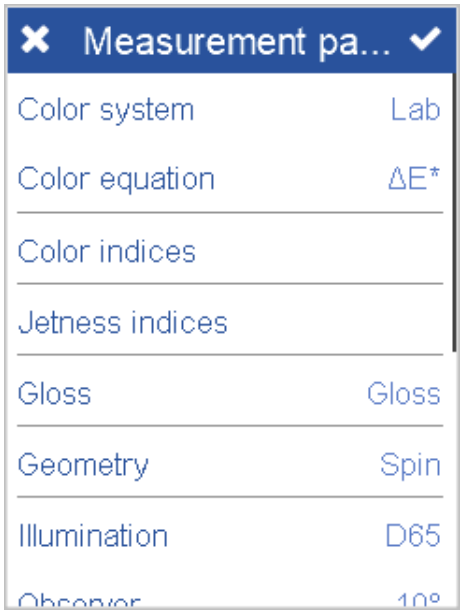
4.6 Jetness Measurement

The **spectro2guide Pro** can measure the jetness of deep black colors with special indices.

NOTICE

For jetness measurements separate check and calibration standards are included, see "Instrument Calibration [▶ 58]" > "Pro Variant [▶ 65]".

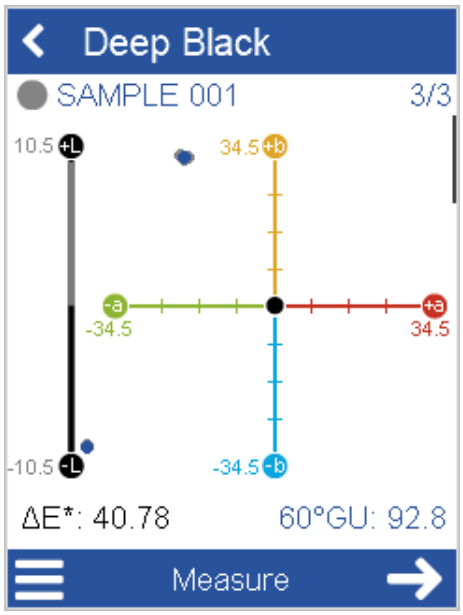
To switch the instrument into jetness measurement mode the corresponding indices must be activated. Go to **Configuration** > **Measurement parameter** > **Jetness indices**.



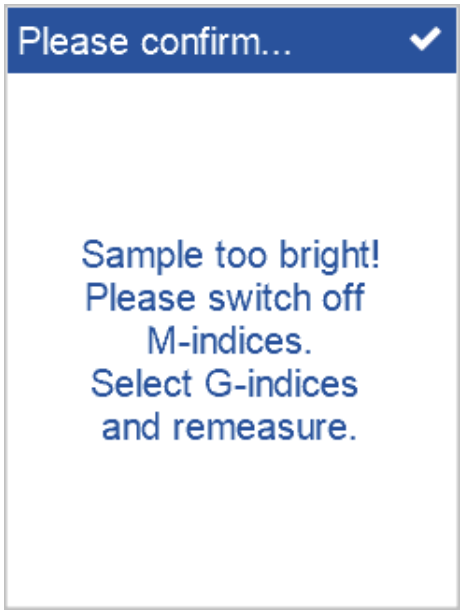
For blackness / jetness measurement following indices are relevant:

- **My**: Blackness determines the lightness of black without colored undertone.
- **Mc**: Jetness determines the color depending black value.
- **dM**: Undertone determines the absolute contribution of hue.
  - Undertone +dM = Blue shade
  - – Undertone -dM = Brown shade

Place instrument on deep black sample and measure it, see for example "Difference Measurement [▶ 26]".



Activating these indices changes to a different measuring mode in the instrument - which can be used for samples with deepest black only. If measuring other colors an error message will appear.



To measure all other colors, deactivate the jetness indices. This changes the instrument back to the default measuring mode.

NOTICE

An LED flashlight is included in delivery to check deep black samples and the separate jetness standards for cleanliness before use. For the best usage of the flashlight see "Cleaning the Jetness Standards [▶ 83]".

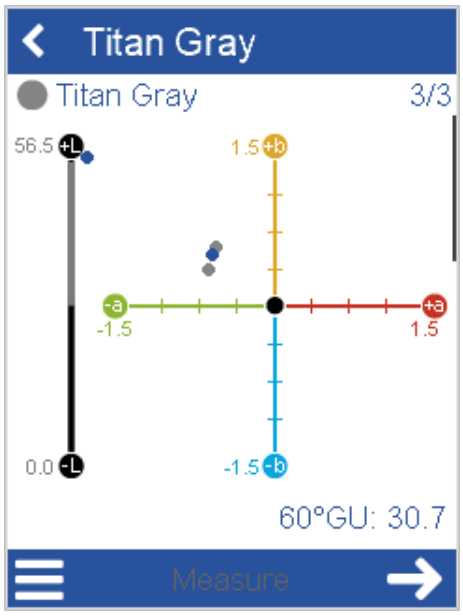
4.7 Grayness Measurement

The **spectro2guide Pro** provides additional indices for the measurement of gray colors. Go to **Configuration** > **Measurement Parameters** > **Jetness indices**.

For grayness measurement following indices are relevant:

- **Gy**: Indicates the gray value of a sample.
- **Gc**: Indicates the hue-dependent gray value of a sample.
- **dG**: Indicates the hue of a gray color.

Place instrument on deep black sample and measure it, see for example “Difference Measurement [▶ 26]”.



The measurement of gray samples takes place in the normal color measurement mode.

NOTICE

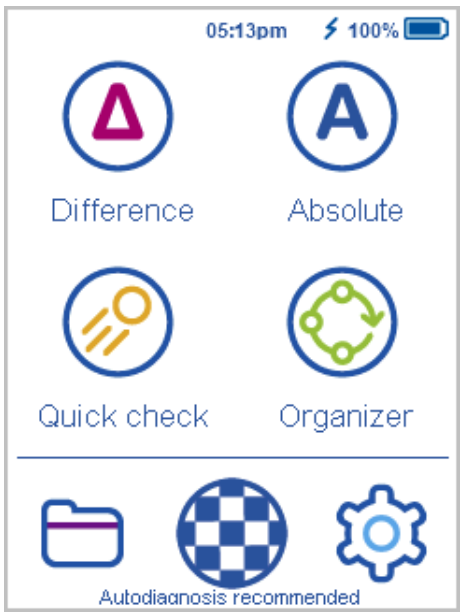
To measure gray samples deactivate the jetness indices **My**, **Mc**, **dM** and just activate the grayness indices **Gy**, **Gc**, **dG**, see Jetness Measurement [▶ 37].

4.8 Organizer Measurement

Standardization of Measurement Procedure

It is possible to predefine the measurement sequence in the software “smart-process” with the so-called “organizer”.

The organizer icon appears after downloading an organizer from “smart-process” into the instrument.



Multiple organizers can be downloaded. The organizer selected for measurement will guide you through the whole measurement process.

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.

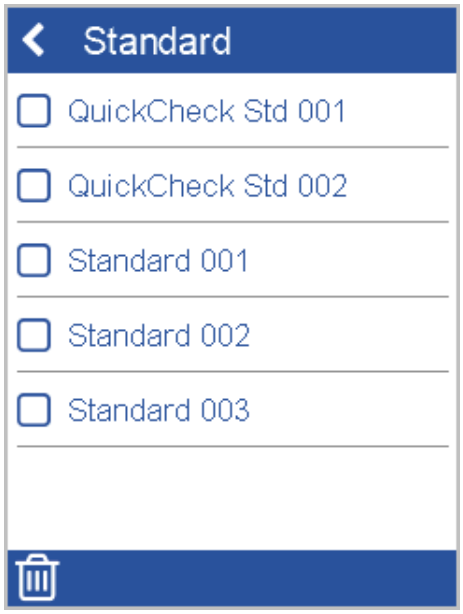
You can browse through the list to view or delete the data.

NOTICE

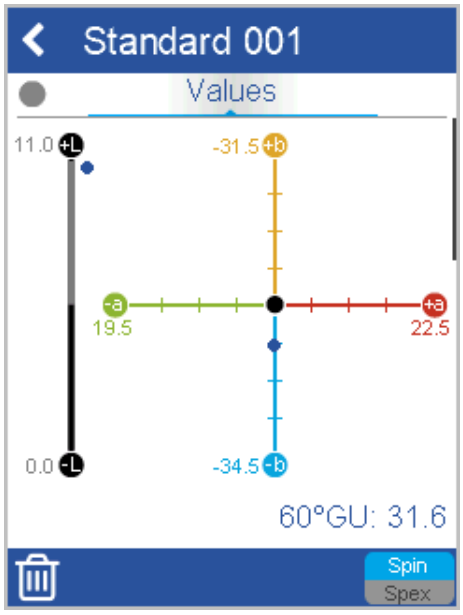
You can also use the software "smart-chart" to delete stored measurement values or standards.

5.1 View Measurement Data

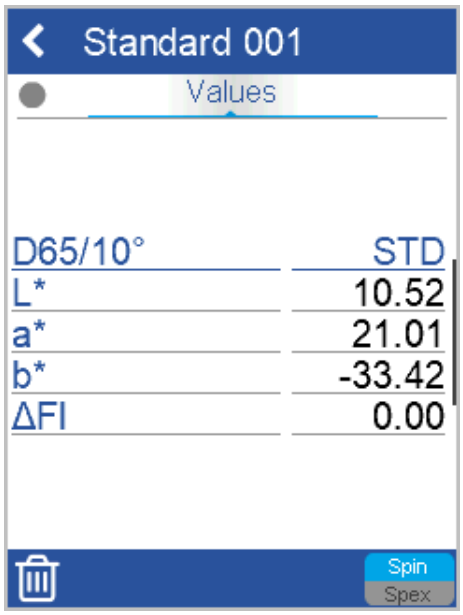
In the list of measurement types open the object for which you want to view the measured data – for example "**Difference**". The standards for which test series were measured are displayed.



Open the desired object to view the measurement data.



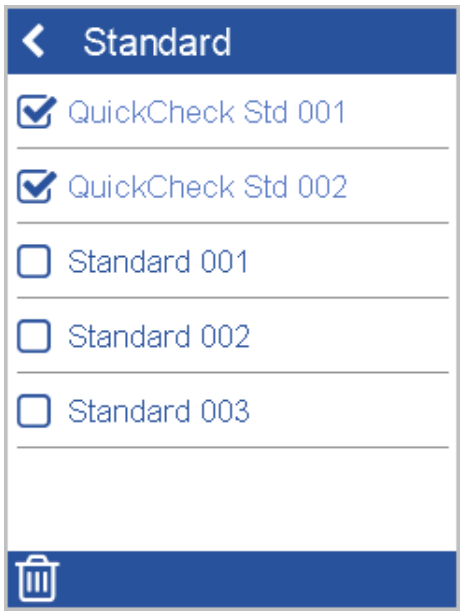
Scroll down to view values and statistics.



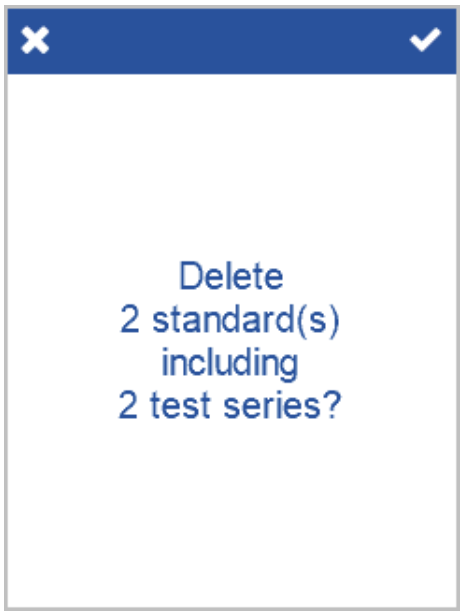
You can browse through the different samples measured.

5.2 Delete Standard

You can delete standards with all stored test series. Select **Standard** and select the standard(s) to be deleted in the list.



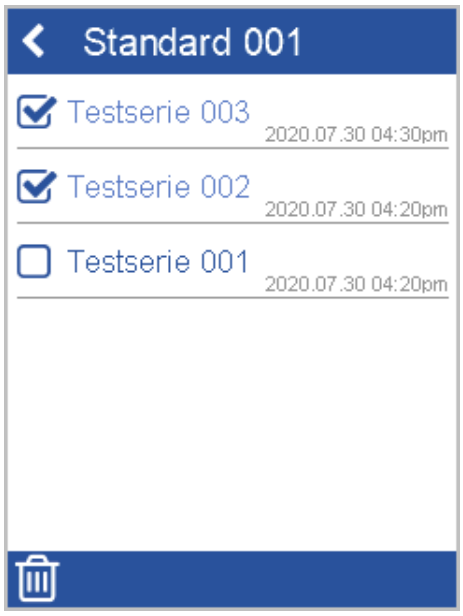
Click on the **Trashcan** icon. A confirmation dialog is displayed.



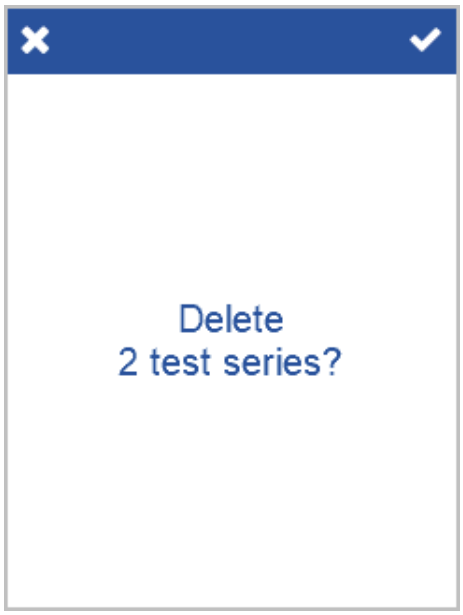
Confirm with the checkmark in the upper right corner. The selected objects are deleted.

5.3 Delete Test Series

To delete only single test series select **Difference**, click on the standard and select the test series to be deleted in the list.



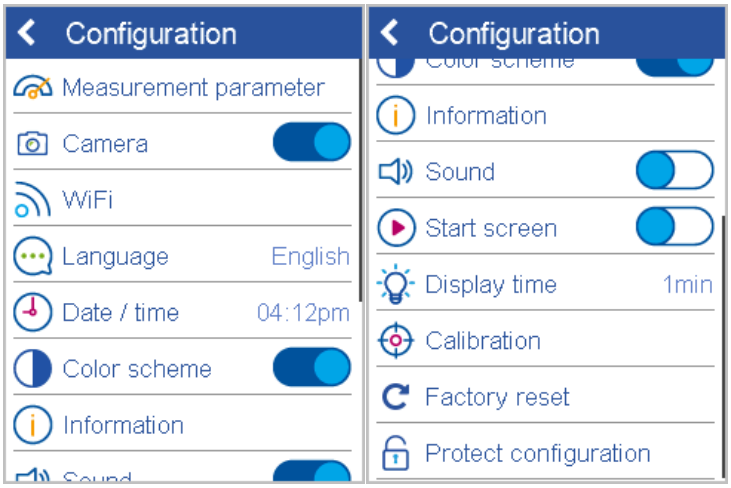
Click on the **Trashcan** icon. A confirmation dialog is displayed.



Confirm with the checkmark in the upper right corner. The selected test series are deleted.

6 System Configuration

With this function you can configure the instrument according to your needs.



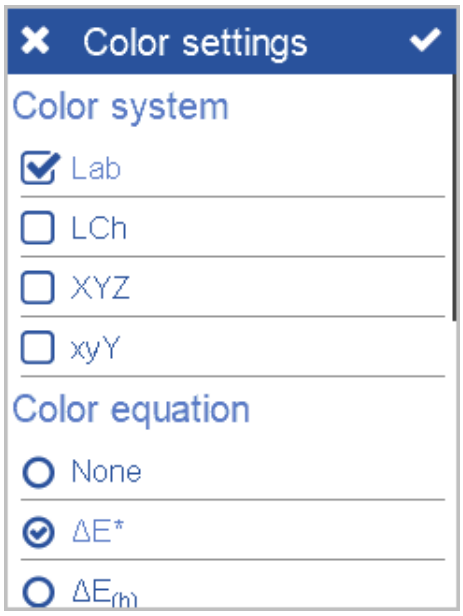
Measurement parameter Set measurement parameter here, see Measurement Parameter [▶ 47].	**Sound** Switch instrument sound on/off here.
Camera Switch integrated camera on/off here. It shows the sample surface in the display.	**Start screen** Switch startup animation on/off here.
WiFi Configure the integrated WiFi adapter here, see Wireless Connection [▶ 54].	**Display time** Defines the interval for automatic shutdown of instrument if not used.
Language Select instrument language here.	**Calibration** Calibrate and check instrument manually here, see Instrument Calibration [▶ 58].
Date / time Set date and time here.	**Factory reset** Reset instrument to the initial settings here, see Perform Factory Reset [▶ 76].
Color scheme Adjust screen brightness to day and night conditions here.	**Protect configuration** Protect the system by a password here, see Protect Configuration [▶ 77].
Information Get instrument, network and legal information here.	

6.1 Measurement Parameter

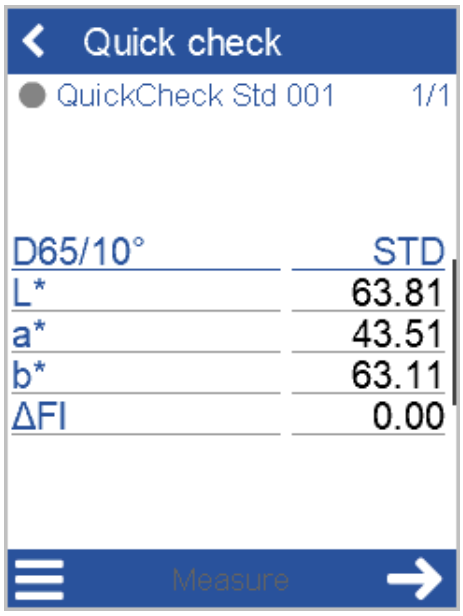
The list of measurement parameter is shown in section Setting Measurement Parameter [▶ 23]. Below the most important parameter are described.

6.1.1 Color System

Go to **Measurement parameter** > **Color system** and select the color system(s) you want to use for measurements.



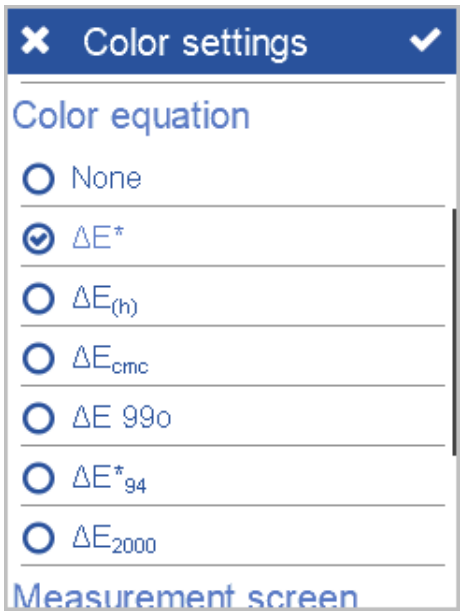
These color systems are visible in the measurements results.



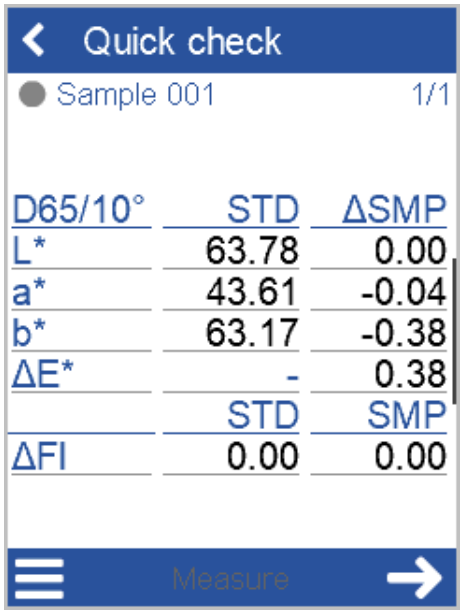
If the graph is shown, scroll down to see results in the first color system. Scroll more down to see the results in the next color system.

6.1.2 Color Equation

Go to **Measurement parameter** > **Color equation** and select the color equation you want to use for measurements.

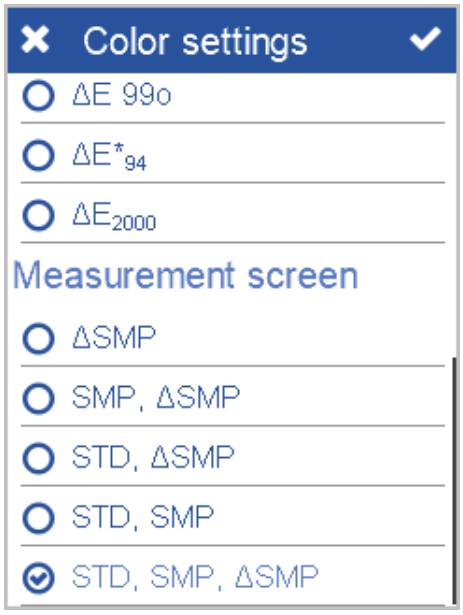


The color equation is visible in the measurements results.



6.1.3 Measurement Screen

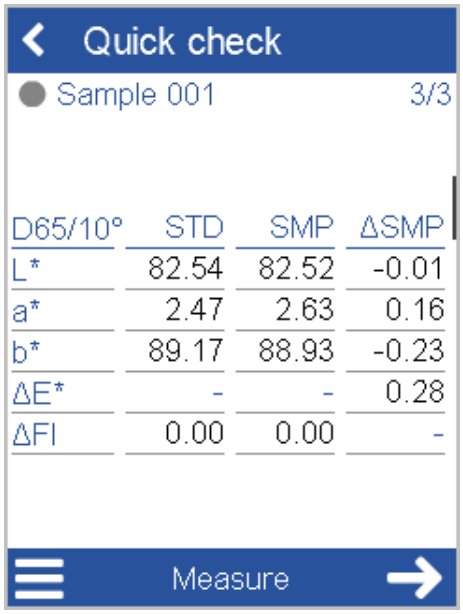
Go to **Measurement parameter** > **Color equation** and scroll down to **Measurement screen**. Select the data to be displayed in the measurement results.



Following data can be selected:

- STD = Standard
- SMP = Sample,
- Δ = Difference (Delta) between Standard and Sample.

These data are visible in the measurements results.

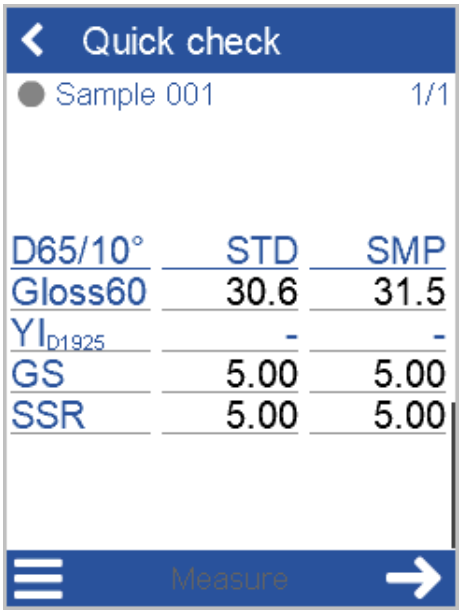


The default setting is **SMP, ΔSMP**. In the example shown above the value for **STD** is displayed too.

6.1.4 Color Indices

Go to **Measurement parameter** > **Color indices** and select the color indices you want to use for measurements. You can decide to display absolute and/or difference values.

These color indices are visible in the measurements results.



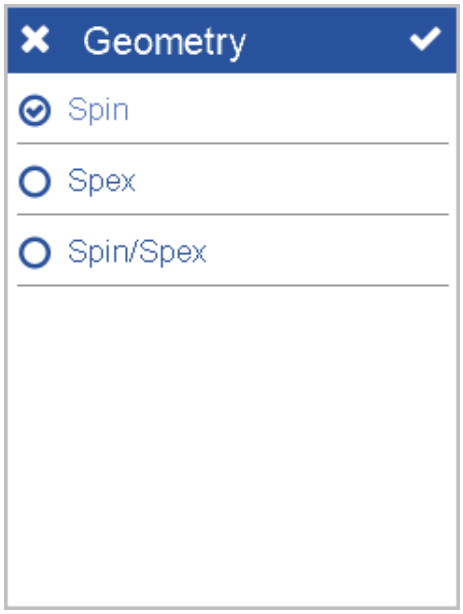
Another example can be found in Opacity Measurement [▶ 34].

6.1.5 Geometry

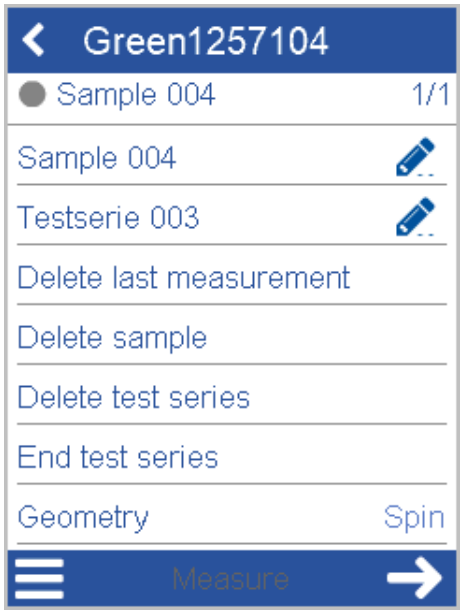
If your instrument is a sphere instrument (see Geometry d:8° [▶ 18]) you can configure the measurement condition:

- **Specular included (Spin)** or
- **Specular excluded (Spex)**.

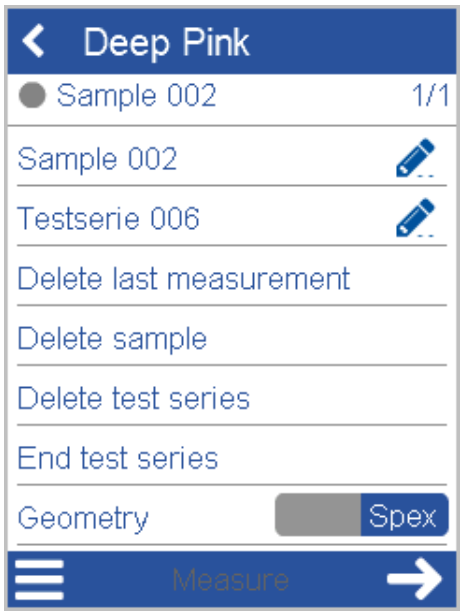
Go to **Measurement parameter** > **Geometry** and select the mode to be used during measurement.



The mode is visible in the measurement screen when using the context menu which is accessed via the hamburger menu icon.



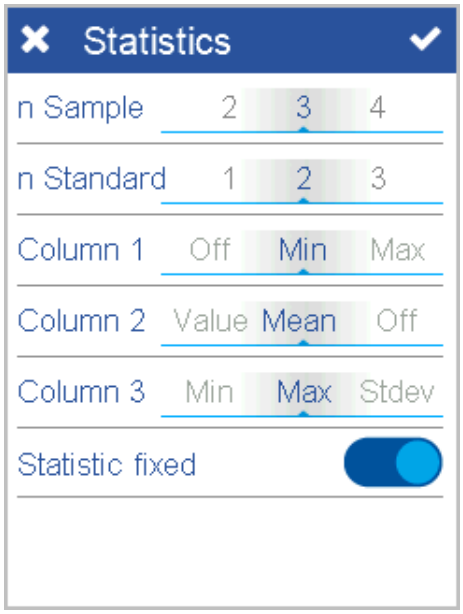
If you select the option **Spin/Spex** in **Measurement parameter**, the context menu offers a control to toggle between the two modes.



Click left on the control to select **Spin** and click right to select **Spex**.

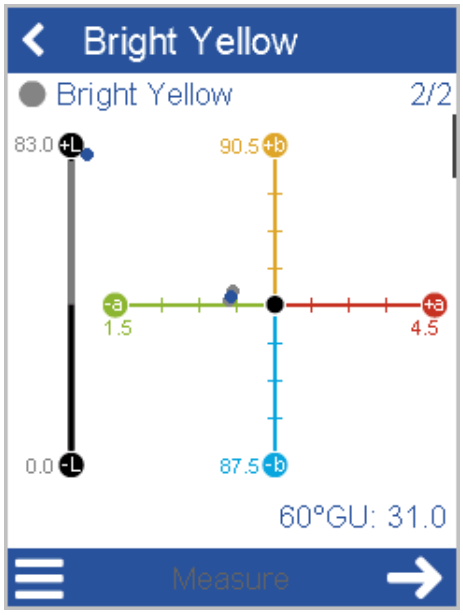
6.1.6 Statistics

Go to **Measurement parameter** > **Statistics** and select the statistic options to be used during measurement: The number of measurements required on standard and on sample and statistic data to be displayed.

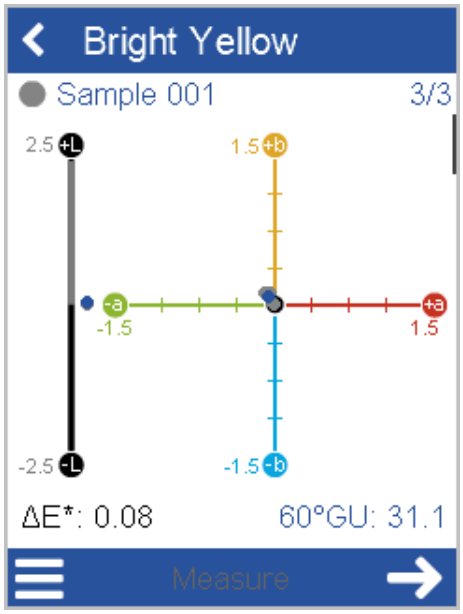


The number of measurements required is visible in the measurements results in the upper right of the screen, e.g. “2/2” means: 2 measurements are required and 2 measurements are done.

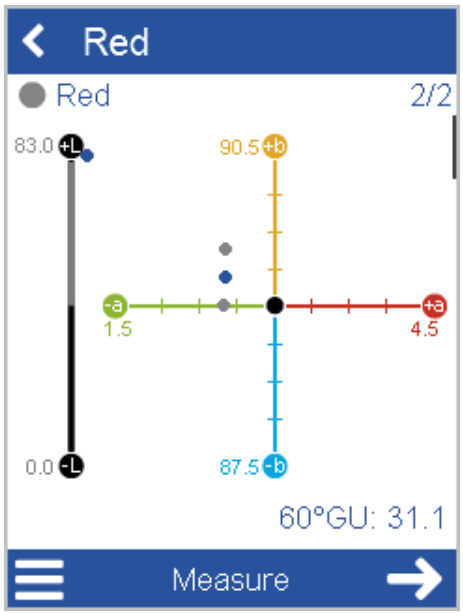
If the no. of measurements on standard is e.g. “2”, the icon for **Next** becomes active after the second measurement.



If the no. of measurements on sample is e.g. "3", the icon for **Next** becomes active after the third measurement.



The option **Statistic fixed** means: The exact no. of measurements is to be made.



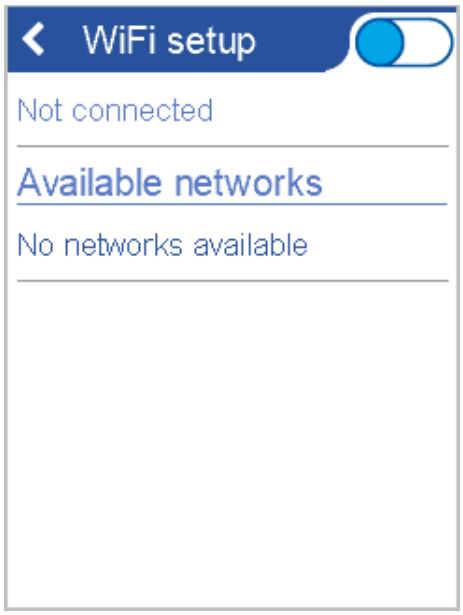
If this option is inactive, the minimum no. is required, but additional measurements can be made – both **Measure** and **Next** are active.

6.2 Wireless Connection

The instrument is equipped with a WiFi adapter. You can use the WiFi connection alternatively to the USB connection.

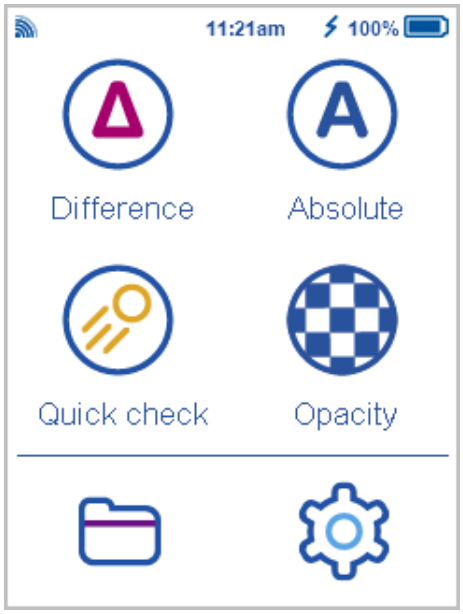
6.2.1 Connect Automatically

In the configuration menu select **WiFi** and then your respective country. The WiFi setup screen is displayed.



Activate the WiFi toggle button. The list of available WLAN networks is displayed. Select the desired network from the list.

Enter the WiFi key - required if the network is secured. The instrument connects to the network, a confirmation message is displayed.

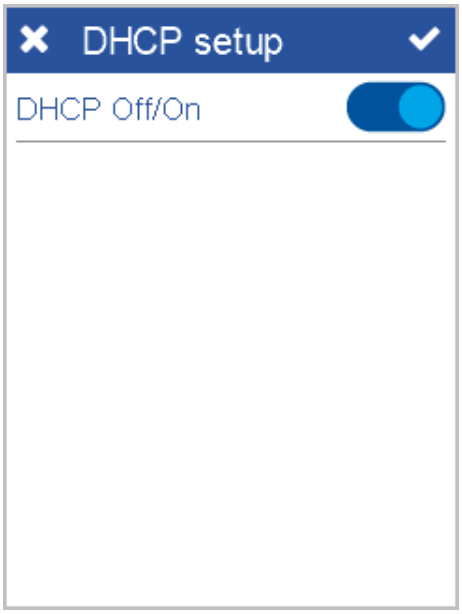


You are connected to the network. In the main menu the WiFi symbol is shown indicating the current field strength. The chosen network will be connected automatically if in range.

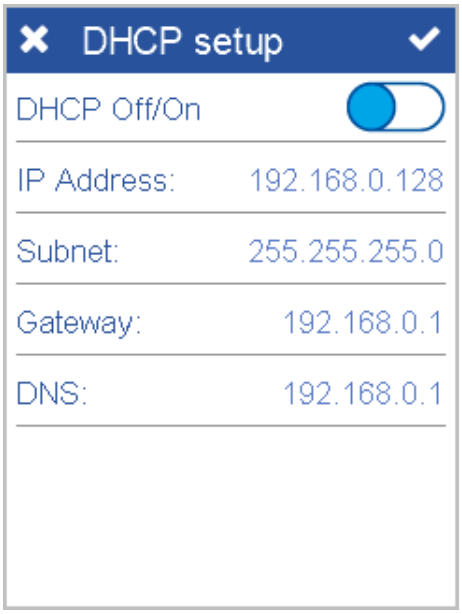
6.2.2 Connect Manually

If required, the DHCP setup can also be done manually.

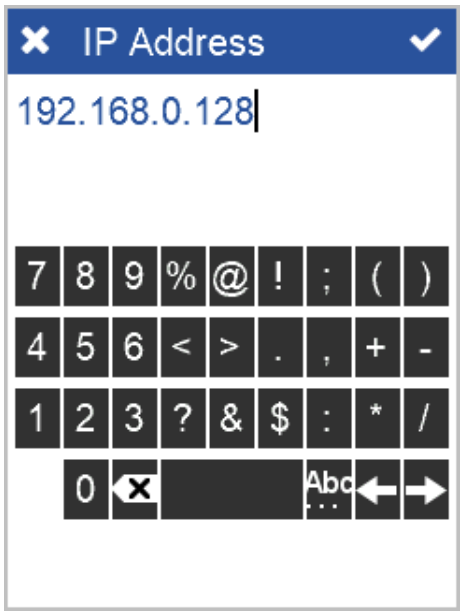
By clicking on the line showing **Not connected** or **<Network-Name>** you can decide to activate or deactivate the DHCP option.



If the DHCP option is inactive, you can enter the IP details for the WiFi connection manually.



Click a line to enter the corresponding data.



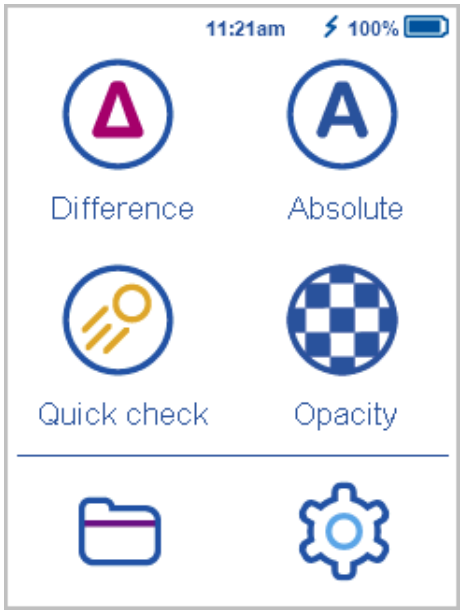
Accept your changes to enter the WiFi key – required if the network is secured. The instrument connects to the network, a confirmation message is displayed. The active connection is shown in the WiFi configuration screen.

6.2.3 Network Information

The network data like MAC and IP address can be checked in the information screen.

6.2.4 Disconnect Network

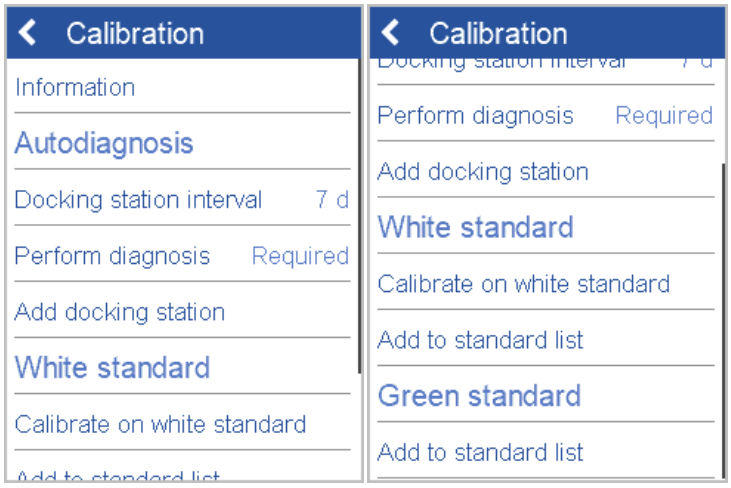
To disconnect from the network, switch the WiFi option off in the WiFi configuration screen.



The Wifi icon disappears in the main menu.

6.3 Instrument Calibration

The system delivery comprises a calibration tile and test tiles for color and gloss, see Test and Calibration Standards [▶ 16]. These tiles can be used to check if your instrument is measuring correctly. Each tile comes with a dedicated serial number matching your instrument. In the configuration menu select **Calibration**.



Information	**White standard**
Check date of last calibration, serial numbers and values for calibration and test tiles here.	Comprises the options for instrument calibration.
Autodiagnosis	**Calibrate on white standard**
Comprises the options for auto diagnosis.	Start the manual calibration procedure here.
Docking station interval	**Add standard to list**
Select interval for the auto diagnosis here. Possible values: 1, 3, 7, 14 days. Default: 7 days.	Add calibration tile to the list of standards in the instrument.

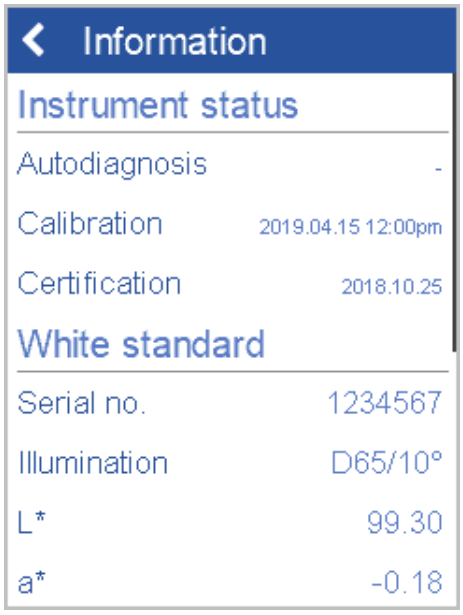
Perform diagnosis	**Green standard**
Start the auto diagnosis procedure here.	Comprises the options for instrument test.
Add docking station	**Add standard to list**
Turn your spectro2go into spectro2guide here or replace existing docking station.	Add test standard to the list of standards in the instrument.

NOTICE

- The option **Add standard to list** is active if the standard has not been added yet.
- To delete these standards from memory, use the function Browse Measurements [▶ 42].

6.3.1 Calibration Information

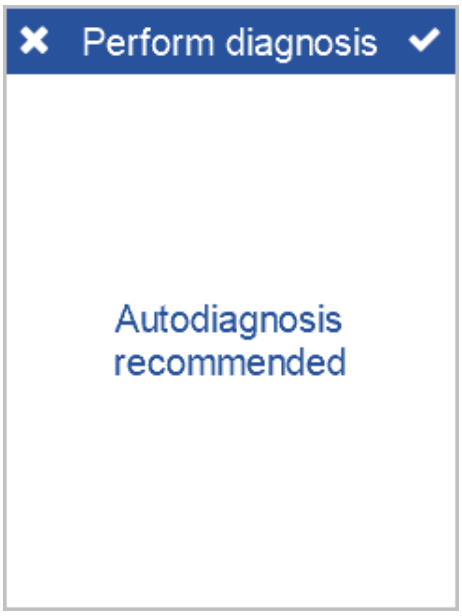
Use the information screen to check the current status of diagnosis and calibration.



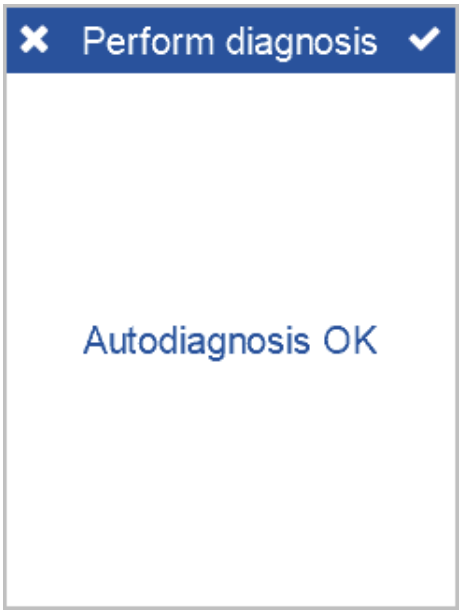
The screen shows the details for instrument status and for calibration and test standards.

6.3.2 Auto Diagnosis and Calibration

The auto diagnosis takes place in the docking station. The white test standard in the docking station is used to check color and gloss. In the given interval the auto diagnosis is requested.

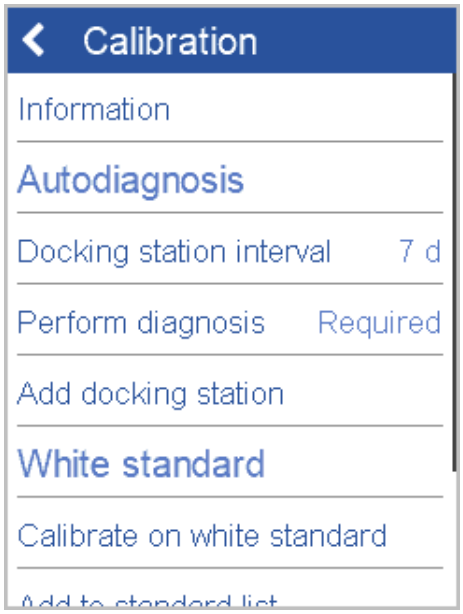


If auto diagnosis in the docking station passes, you can use the instruments to measure.



If auto diagnosis fails, following message appears: “Please clean white test standard of docking station or calibrate on external white calibration standard.”

After calibration on the external white calibration standard following message appears: "Perform diagnosis: Required".



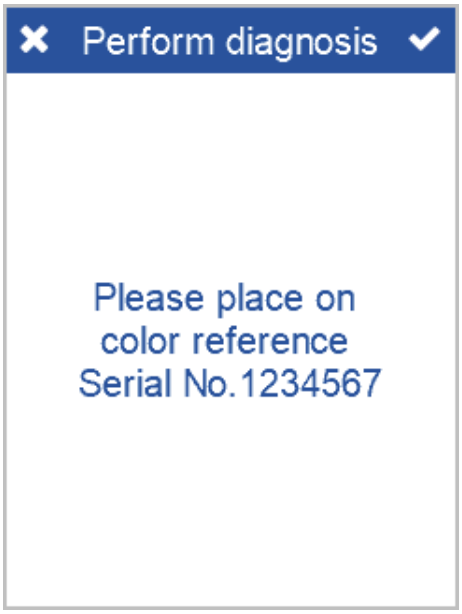
Verify performance on external test standard color (green) and external test standard gloss (high gloss). Take care for correct alignment of instrument on standard. The instrument will guide you through the diagnosis procedure.

NOTICE

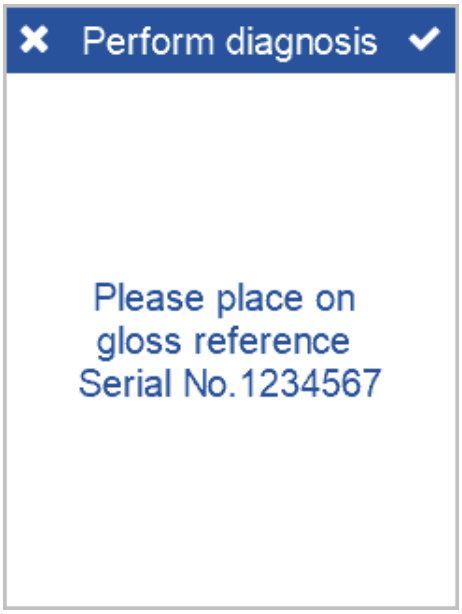
- The auto diagnosis and calibration apply for the use with a docking station. In case of **spectro2go** the external test and calibration standards are to be used.
- If the instrument has not been put in the docking station and no manual external auto diagnosis has been performed for 4 weeks, the auto diagnosis reminder will be displayed automatically.

6.3.3 Manual Diagnosis

The option **Perform diagnosis** can be performed manually at any time to check the instrument on the test standards. The instrument will guide you through the diagnosis procedure. First measure on test standard color.



Second measure on test standard gloss.

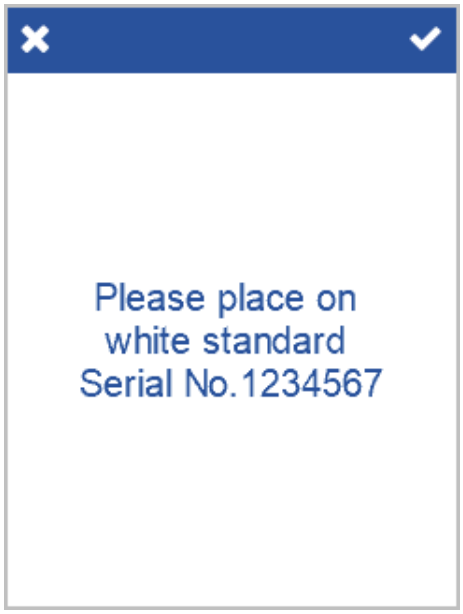


If diagnosis passes, you can use the instruments to measure.

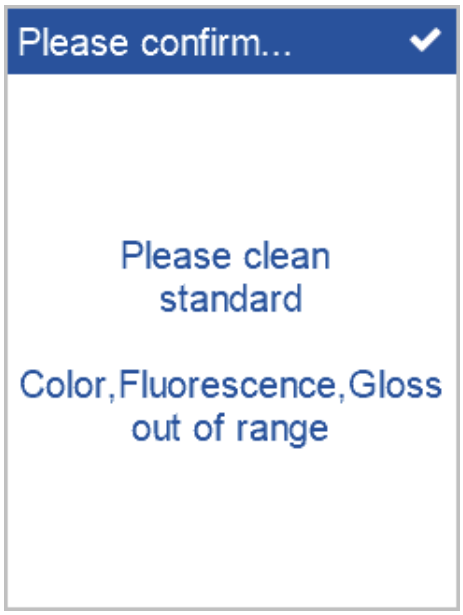
If diagnosis fails, clean test standard and repeat or calibrate on external white standard.

6.3.4 Calibration Standard

If auto diagnosis or manual diagnosis fails, use the option **Calibrate on white standard**. The instrument will guide you through the calibration procedure.



If calibration fails, clean test standard and repeat.



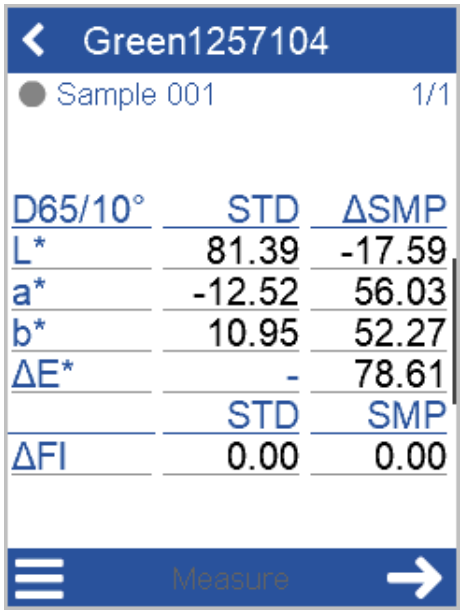
NOTICE

Perform calibration only, if required to ensure correct status of your calibration standard.

6.3.5 Test Standards

To document the correct measurement status of your instrument you can save the test standards in the system memory. Select the option **Add standard to list** and use Difference Measurement [▶ 26] to frequently monitor instrument performance.

Select the corresponding item from the list and measure it on the external test standard.



If the differences are within your tolerances you can continue to measure with your instrument. Otherwise calibrate your instrument on the white standard.

NOTICE

Every difference measurement is stored in the instrument. Transfer the measurement data to "smart-chart" to document each test case.

6.3.6 Pro Variant

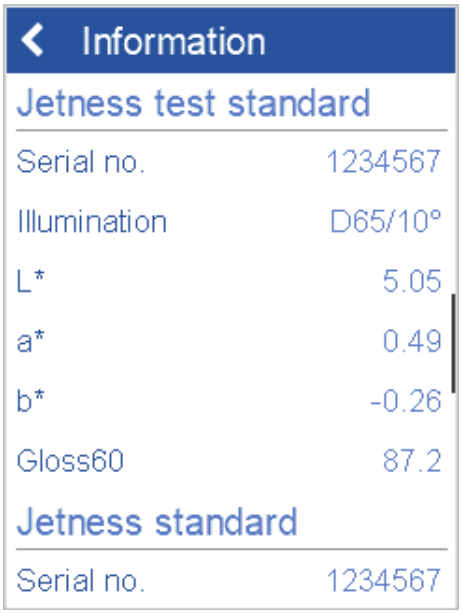
For **spectro2guide pro** special standards for jetness test and calibration are provided, see "Exclusive Parts for Pro Variant [▶ 17]".

NOTICE

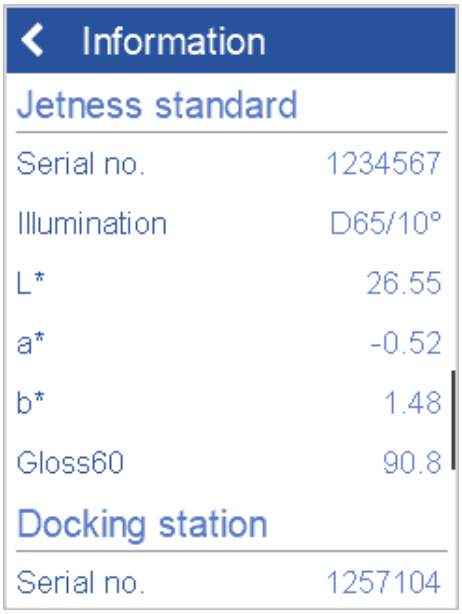
Always use the LED flashlight included in delivery to check the cleanliness of your black test and gray calibration standard – see "Cleaning the Jetness Standards [▶ 83]".

6.3.6.1 Calibration Information

The jetness standards are fix assigned to your instrument. To check this go to **Configuration** > **Calibration** > **Information**. Scroll down to **Jetness test standard** to view the details for the black test standard.



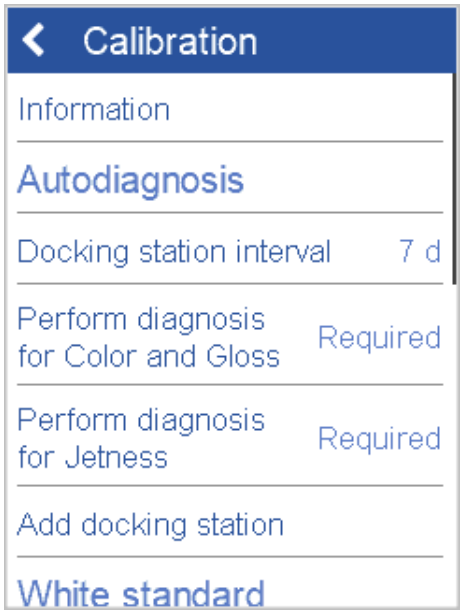
Scroll more down to **Jetness standard** to view the details for the gray calibration standard.



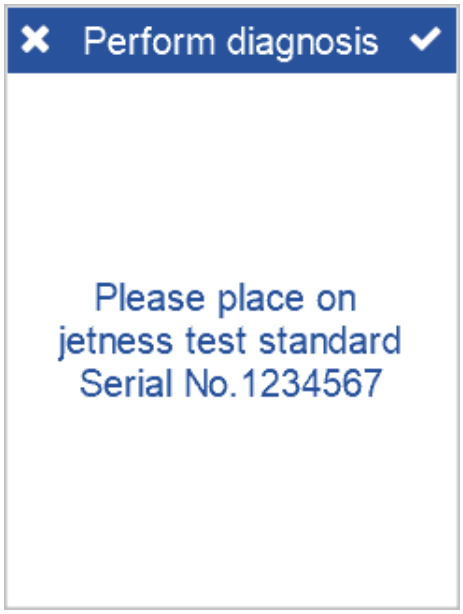
Use the **Back** icon to return to the calibration menu.

6.3.6.2 Jetness Diagnosis

The diagnosis for jetness can be performed manually at any time to check the instrument on the black test standard. Scroll down to **Autodiagnosis** and click on **Perform diagnosis for Jetness**.

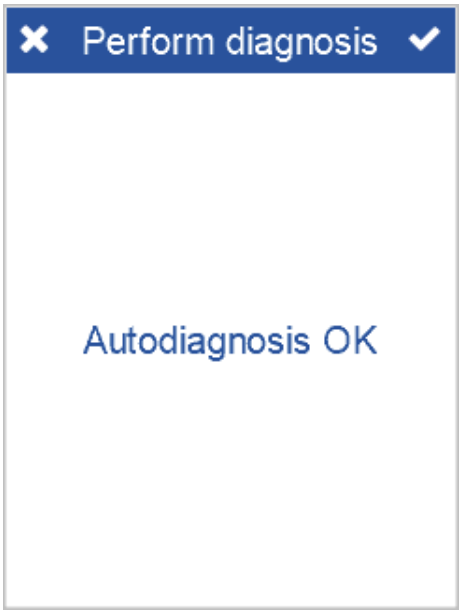


The instrument will guide you through the diagnosis procedure.



During diagnosis the message "Diagnosis in progress" is displayed. If diagnosis fails clean the test standard and repeat.

If it still fails, perform calibration on gray jetness standard, see "Jetness Calibration [▶ 69]". If diagnosis is successful, the message "Autodiagnosis OK" is displayed.



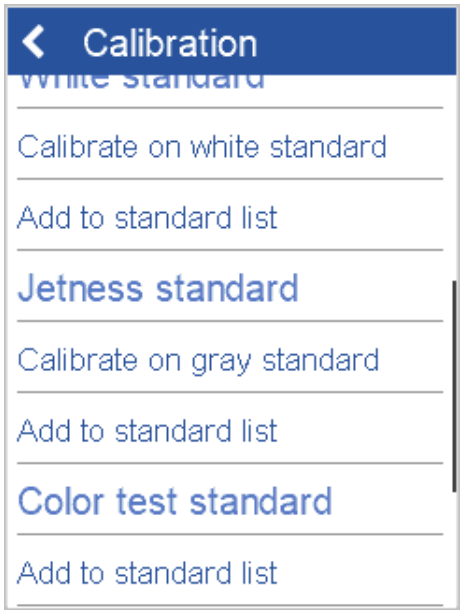
You can use your instrument for measurements.

6.3.6.3 Jetness Calibration

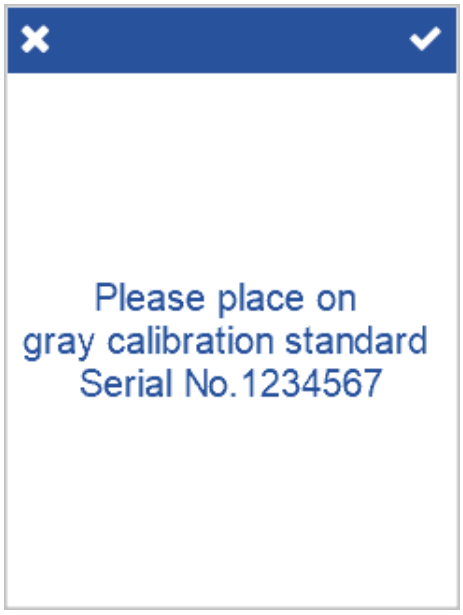
If diagnosis on black test standard fails, perform calibration on gray standard.

6.3.6.3.1 Calibration Procedure

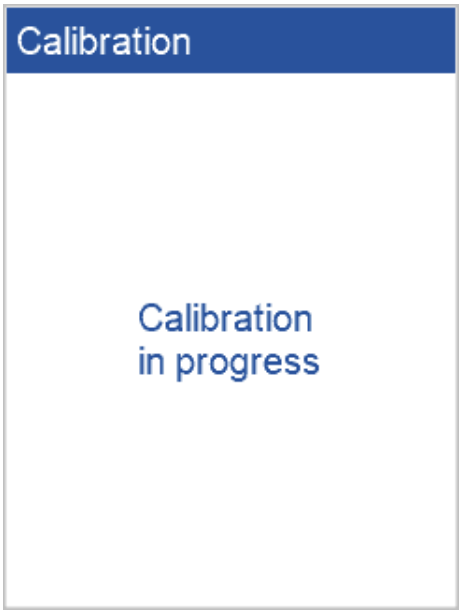
Scroll down to **Jetness standard** and click on **Calibrate on gray standard**.



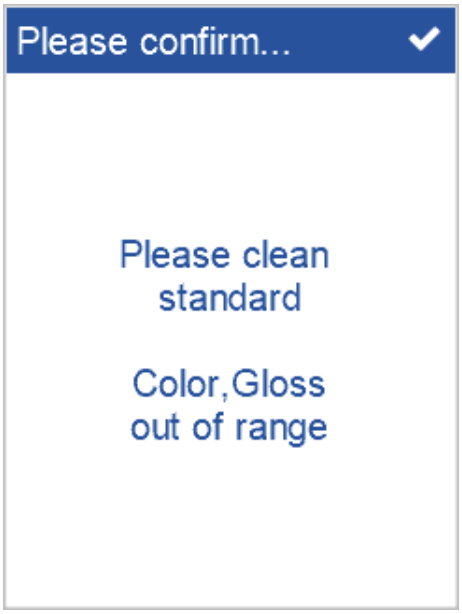
The instrument will guide you through the calibration procedure.



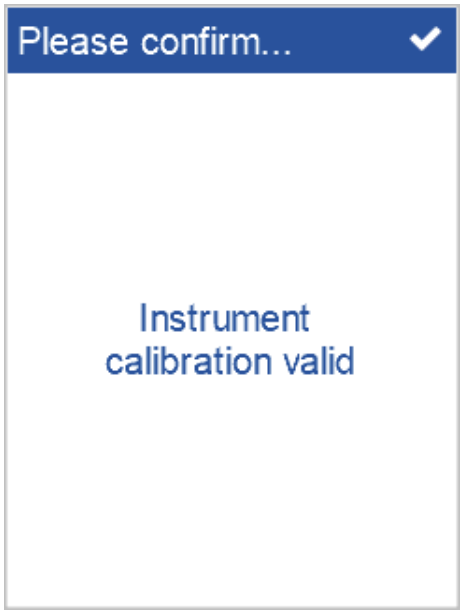
During calibration the message "Calibration in progress" is displayed.



If calibration fails clean the calibration standard and repeat. If it still fails, contact our customer service.



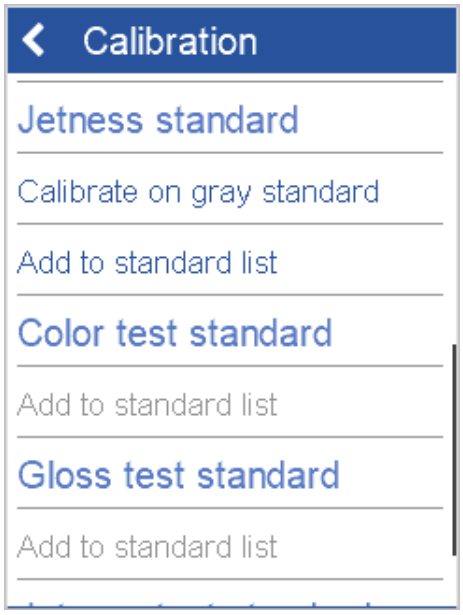
If calibration is successful, the message "Instrument calibration valid" is displayed.



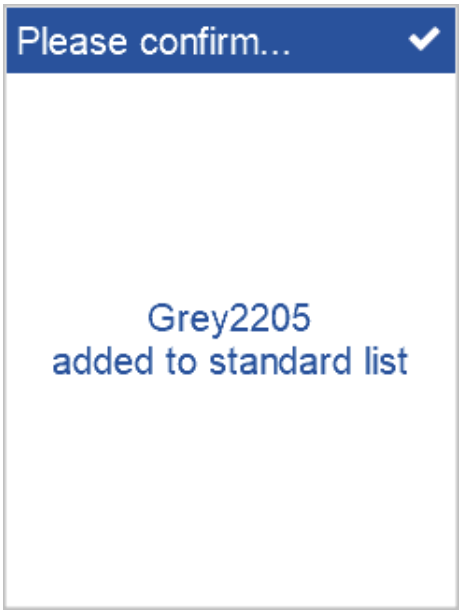
Confirm the message. You can now repeat the "Jetness Diagnosis [▶ 67]" on the black standard.

6.3.6.3.2 Standard Management

To document the correct measurement status of your instrument you can save the calibration standard in the system memory. In the section **Jetness standard** select the option **Add standard to list**.

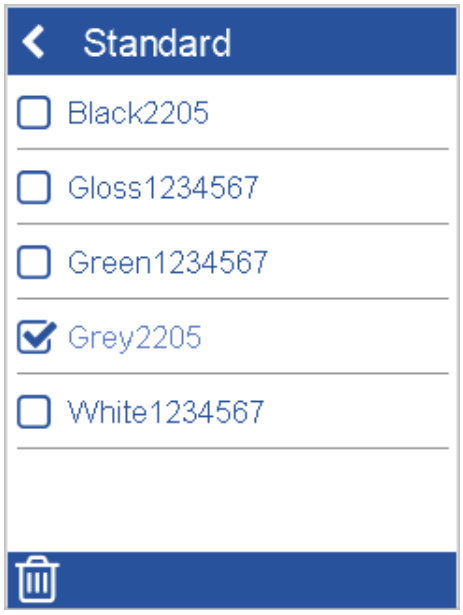


The gray jetness standard will be added to the list of standards in the system memory.



Use "Difference Measurement [▶ 26]" to frequently monitor instrument performance.

Select the gray calibration standard from the list and measure it. The measurement results will be saved automatically in the system memory.



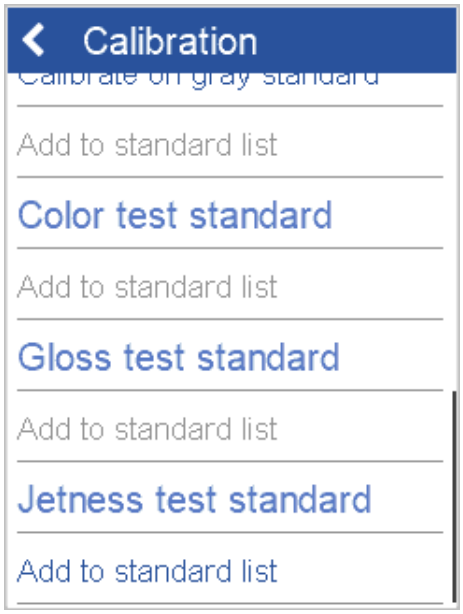
To delete the item from the system memory use the function "Browse Measurements [▶ 42]" > "Delete Standard [▶ 43]".

NOTICE

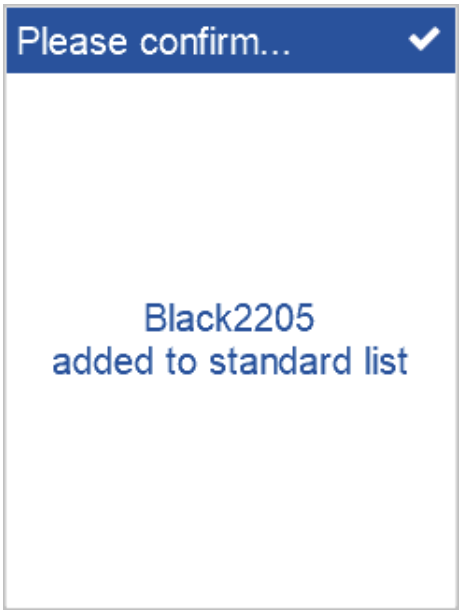
The option **Add to standard list** will be inactive next time when the gray calibration standard has already been added to the system memory.

6.3.6.4 Jetness Test Standard

To document the correct measurement status of your instrument you can save the black test standard in the system memory. In the section **Jetness test standard** select the option **Add standard to list**.

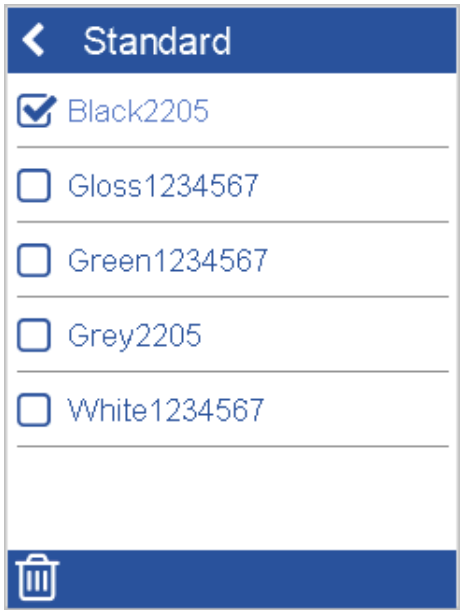


The black jetness test standard will be added to the list of standards in the system memory.



Use **Difference Measurement** to frequently monitor instrument performance. Select the black test standard from the list and measure it.

The measurement results will be saved automatically in the system memory.



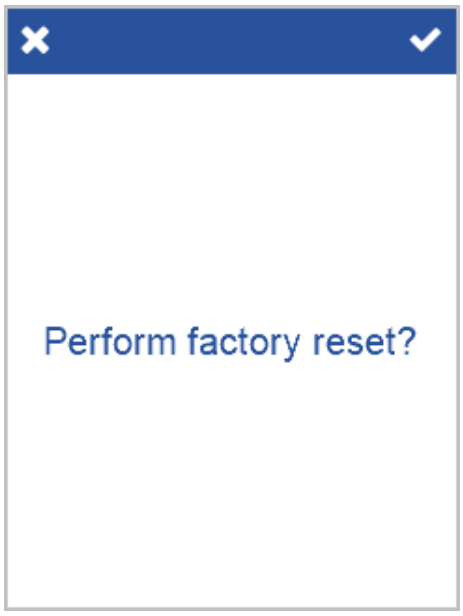
To delete the item from the system memory use the function "Browse Measurements [▶ 42]" > "Delete Standard [▶ 43]".

NOTICE

The option **Add to standard list** will be inactive next time when the black test standard has already been added to the system memory.

6.4 Perform Factory Reset

If you are having technical problems with your instrument, you can perform a fallback to the factory settings. In the configuration menu select **Factory reset**.



Confirm the security message to perform the fallback. You have to enter a password - details see Technical Data [▶ 80].

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

6.5 Protect Configuration

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

Activate the option. You must 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 main menu 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

The system provides messages on the display in case of errors or problems:

- Error messages are displayed in red color. In this case the measured values are **invalid**. Measurement **has** to be repeated.
- Warning messages are displayed in orange color. In this case the measured values are **valid**. Measurement **can** be repeated.

7.1 Measurement Problems

Message	Solution
Calibration invalid. Please perform calibration.	Perform calibration the external 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.
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.
Sample to bright! Please switch off M-indices …	Disable the jetness indices – see "Jetness Measurement [▶ 37]" - and repeat.
Device moved during measurement.	Appears if instrument is moved during measurement. Repeat measurement on a different spot without moving the instrument. If message appears without movements, deactivate the option **Use gloss for movement detection**, see "Setting Measurement Parameter [▶ 23]". This may be necessary for example when measuring very thin foils.
Gloss and temperature out of range.	Allow instrument to cool down and repeat.
Temperature out of range.	Allow instrument to cool down and repeat.
Gloss out of range.	Repeat measurement on a different spot.

7.2 Connection Problems

Message	Solution
No WiFi connection.	Make sure WiFi connection is available. Activate WiFi function. Make sure the instrument is within the WiFi range. Reduce distance to the router. Increase range of the router. WiFi settings not adjusted correctly. Re-Enter password.
No connection between instrument and software.	Make sure instrument is connected. Connect instrument via USB or WiFi.
No data transfer to software.	Instrument within a measurement. Switch to home screen.

7.3 Battery Problems

Message	Solution
Low battery.	Recharge battery first.
Battery empty. Instrument is switching off...	Charge the instrument using the docking station or external power supply.
Battery empty.	Charge the instrument using the docking station or external power supply.
Instrument is not charging in docking station.	Make sure power supply is connected. Make sure instrument is positioned correctly. If instrument is still not charging, contact service.
Instrument is not charging via USB connection.	Make sure USB power supply provides a minimum of 500 mA (1500 mA recommended). If instrument is still not charging, use docking station.

7.4 Error Messages

Message	Solution
Error! White calibration in docking station.	Use external white calibration standard and repeat calibration. If white calibration is okay, please clean white test standard of docking station. If calibration fails again, contact service.
Error! Please clean white tile or call customer service.	Clean white tile and repeat white calibration. If white calibration fails again, contact service.
Error! White calibration on external white calibration standard.	Use docking station and perform diagnosis. If white calibration is okay, clean external white calibration standard. If calibration fails again, contact service.

8 Technical Data

8.1 Color

Geometry	45°c:0°, d:8° (spin/spex)
Aperture size / Measurement spot	12 mm / 8 mm 5 mm / 4 mm (spectro2go XS)
Spectral range color	400 - 700 nm, 10 nm resolution
Spectral range fluorescence	340 - 760 nm, 10 nm resolution (spectro2guide only)
Repeatability	0.01 ΔE94 (10 readings on white)
Reproducibility	0.1 ΔE94 (average of 12 BCRA II tiles)
Color systems	CIELab/Ch, Lab(h), XYZ, Yxy
Color differences	ΔE*, ΔE(h), ΔE94, ΔECMC, ΔE99, ΔE2000
Indices	YIE313, YID 1925, WIE 313, CIE, Berger, Color Strength, Opacity, Metamerism, Grayscale, Jetness (spectro2guide Pro only)
Illuminants	A, C, D50, D55, D65, D75, F2, F6, F7, F8, F10, F11, UL30
Observer	2°, 10°

8.2 Gloss (*)

Gloss geometry	60°
Aperture size	5 x 10 mm
Measurement range	0 - 100 GU
Repeatability	0 - 20 GU: ± 0.1 GU 20 - 100 GU: ± 0.2 GU
Reproducibility	0 - 20 GU: ± 0.5 GU 20 - 100 GU: ± 1.0 GU

(*) Gloss measurement not included in spectro2go XS.

8.3 WLAN RF Specifications

Frequency range		2400 MHz - 2483.5 MHz	
IEEE standards	802.11b	802.11g	802.11n
Modulation	DSSS/CCK	OFDM	OFDM
Transfer rate	Max. 11 Mbps	Max. 54 Mbps	Max. 65 Mbps
Max. output	19.0 dBm	16.5 dBm	15.5 dBm

8.4 WLAN Antenna

Max. gain	2 dBi

8.5 General

Memory	4,000 standards and 10,000 samples
Languages	English, German, French, Italian, Spanish, Russian, Japanese, Chinese
Dimensions (LxWxH)	87 x 110 x 188 mm (3.4 x 4.3 x 7.4 in)
Operation altitude	Up to 2,000 m / 6,561 ft
Weight	45/0: 690 g (1.52 lbs) d/8: 707 g (1.56 lbs)
Interface	Docking station: USB-B Instrument: USB-C
Battery	7.2 V ; 2350 mAh ; 16.92 Wh
Instrument	Input: 12 V, max. 2 A (docking station) 5 V, max. 2 A (USB-C)
Docking station	Input: 12 V, max. 2 A (power supply) 5 V, max. 0.5 A (USB-B) Output: 12 V, max. 2 A
Power supply (docking station)	Input: 100 - 240 V ~ , 50 - 60 Hz, max. 1 A Output: 12 V, max. 3 A
Power supply (instrument)	Input: 90 - 264 V ~ , 47 - 63 Hz, max. 0.5 A Output: 5 V ⎓ , max. 2.1 A (USB)
Password for factory reset	touchthecolor

9 Service and Maintenance

9.1 General Information

CAUTION: Damage possible by insertion of objects

Inserting any objects into the measurement aperture could damage the instrument. Do not insert any objects into the measurement aperture.

CAUTION: Damage possible by using acetone for cleaning

Instrument housing, white and green standard tile can be damaged when they get in contact with acetone. Do not use acetone for cleaning.

CAUTION: Damage possible by the attempt of self-repair

The instrument can be damaged. Warranty claims expire. Do not attempt to make any repairs yourself. Contact our customer service in case of malfunction.

9.2 Storing the Instrument

Align the protective cap when the instrument is not in use. Use the instrument case for storage.

9.3 Cleaning the Instrument

Use a soft, moist cloth for cleaning. For cleaning excessive dirt, use propanol.

9.4 Cleaning the Standard Tiles

Using dirty or damaged standard tiles can impact the accuracy of measurements significantly. Clean the standard tiles when they are dirty to avoid measuring inaccuracy.

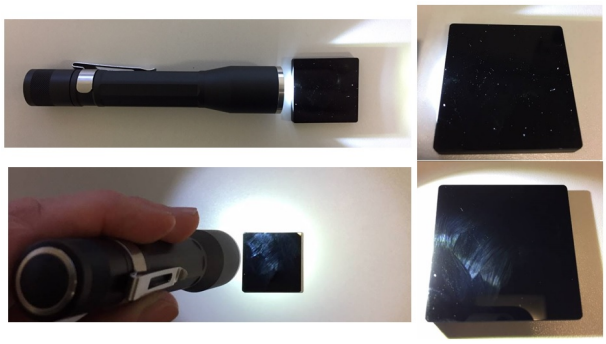
Use a new lint-free cloth, dust-free lens paper or an optical cloth for cleaning. For dirt that is difficult to remove, use an optical cloth dipped in propanol. Then wipe the surface with a dry optical cloth.

CAUTION: Damage possible of the standard tiles due to wrong cleaning

Apply only slight pressure as you clean and make certain there are no large particles stuck in the cloth that could damage the surface. We highly recommend to handle the standard tiles with great care. Store them always enclosed.

9.5 Cleaning the Jetness Standards

The accuracy of the measurement can be significantly impacted by using dirty or damaged standards. An LED flashlight is provided to check the cleanliness – see "Exclusive Parts for Pro Variant [▶ 17]".



Use the LED flashlight on black samples and on the jetness standards:

- An angle of 0° ... 15° is good to detect dust on the surface.
- An angle of 75° ... 90° is good to detect streaks on the surface.

Since the surfaces of the standards are highly sensitive, cleaning must be undertaken with great care. Make sure to observe the following rules.

WARNING: Do not use any acetone!

- To clean standards, use a new lint-free cloth, dust-free lens paper or an optical cloth.
- Apply only slight pressure as you clean and make certain there are no large particles stuck in the cloth that could damage the surface.
- For dirt that is difficult to remove, use an optical cloth dipped in propanol. Then wipe the surface with a dry optical cloth.
- It is highly recommended to handle the standards with great care. They should always be stored enclosed.
- Exact calibration is not possible unless the standard is in perfect condition. If the condition of the standard seems doubtful because of its appearance or measurement errors, we will be happy to check it for you.

9.6 Calibration and Repair Service

Our Service Offer

BYK-Gardner´s global network of own ISO/IEC 17025 accredited service points is equipped with the full line of reference measuring standards and tools needed to ensure highest quality service on a global basis:

- Preventive Maintenance for a longer life
- Certification Services for Standards and Physical Testing Tools
- Repair Service
- On-site Service

Consult Service Points for the list of ISO/IEC 17025 accredited service points.

Read the information about the BYK-Gardner global service on our website:

- https://www.byk-instruments.com/technical-services

Preventive Maintenance

To increase the reliability and life time of your instrument, regular inspections and optimizations are recommended. With our Preventive Maintenance solution your instrument will always be in the best shape. We clean the optics, check all functions, test and, if required, adjust the measured values by using reference standards.

Preventive maintenance is recommended every 12 - 24 months depending on usage and should only be performed by BYK-Gardner technical service centers. The complete list of certified service centers can be found on:

- https://www.byk-instruments.com/global-service-centers

9.7 Contact Addresses

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Germany

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BYK-Gardner USA
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Columbia, MD 21046
USA

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	301-483-6500
Fax:	800-394-8215
	301-483-6555

Notes

A member of ALTANA

Download your manuals from:
https://www.byk-instruments.com/p/7070

Download your software from:
https://www.byk-instruments.com/software#spectro2guide

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