BYK



wave-scan 3 / wave-scan 3 dual

Orange Peel Meter

Operating Instructions

A member of ALTANA

© Copyright 2026 BYK-Gardner GmbH
All rights reserved

Table of Contents

1 Introduction 6
1.1 For Your Safety 7
1.1.1 Meaning of the Symbols 7
1.1.2 Warning - Possibility of Injuries 7
1.2 Disposal 9
1.3 Disclaimer 9
1.4 Copyright 10
1.5 Declarations 10
1.5.1 EU Declaration of Conformity 10
1.5.2 FCC Declaration (USA) 11
1.5.3 IC Declaration (Canada) 11
1.5.4 Japanese Declaration 11
1.6 Intended Use 12
2 System Description 13
2.1 Delivery Content 13
2.1.1 Transportation Case 13
2.1.2 Names and Functions of Parts 14
2.2 Measurement Principle 15
2.2.1 Measurement of Waviness 15
2.2.2 Wavelength and Scales 16
2.2.3 Measurement of Dullness 16
2.2.4 Structure Spectrum 17
2.3 List of Documents 17
2.4 Desktop Software 17
2.4.1 Download 17
2.4.2 Installation 18
3 Getting Started 19
3.1 System Diagram 19
3.2 Powering the Instrument 20
3.2.1 Rechargeable Battery Pack 20
3.2.2 Charging the Instrument 21
3.2.3 Battery Warning 22
3.2.4 Switching On 22
3.3 Attaching the Hand Strap 22
3.4 Using the Main Menu 23
3.5 Inclination Sensor 24
3.6 Starting Measurements 24
3.7 Testing the Instrument 25
4 Quick Measurements 26
4.1 Measuring 26
4.2 Initial Menu 26
4.3 Procedure 27
4.4 Results 28

4.5 Messages ... 28
4.6 Final Menu ... 29

5 Standard Measurements ... 30
5.1 Overview ... 30
5.2 Measuring ... 31
5.3 Standards ... 32
5.4 Test Series ... 33
5.5 Samples ... 33
5.5.1 Initial Menu ... 34
5.5.2 First Measurement ... 35
5.5.3 Final Menu ... 36
5.5.4 Next Measurement ... 36
5.6 Aborting ... 37

6 Organizer Measurements ... 38
6.1 Organizer Files ... 38
6.2 Organizer Process ... 39
6.3 Upload to Database ... 41

7 Browse Measurements ... 42
7.1 View Data ... 42
7.2 Delete Data ... 44

8 Configuration ... 46
8.1 Measurement Parameters ... 48
8.1.1 Scales ... 49
8.1.2 Statistics ... 49
8.1.3 Scan Length ... 50
8.1.4 Plausibility ... 51
8.1.5 Interrupt Statistics ... 52
8.1.6 Orientation Detection ... 53
8.2 WiFi Connection (Option) ... 53
8.3 System Information ... 56
8.4 Auto-Rotation ... 57
8.5 Display Time ... 57
8.6 Checking Tiles ... 58
8.7 Factory Reset ... 59
8.8 Protect Configuration ... 60
8.9 Shutdown ... 61

9 Appendix ... 62
9.1 Application Hints ... 62
9.1.1 Single Measurements ... 62
9.1.2 Regular Test Series ... 62
9.1.3 Objects with several Test Zones ... 62
9.1.4 Occasional Test Series ... 62
9.2 Cleaning Instructions ... 63
9.2.1 Cleaning the Instrument ... 63

9.2.2 Cleaning the Test Tiles ... 64
9.3 System Messages ... 65
9.4 Global Services ... 69
9.4.1 First Diagnosis on the Telephone or by E-mail ... 69
9.4.2 Preventive Maintenance, Calibration, and Recertification ... 69
9.4.3 Provisioning of Loaners ... 69
9.4.4 Maintenance Agreement ... 69
9.4.5 Extended Warranty Contracts ... 69
9.5 Replacements ... 70
9.5.1 Measurement Unit ... 70
9.5.2 Accessories ... 70
9.5.3 Checking Tile Replacement ... 70
9.5.4 Service Departments ... 70
9.6 Technical Data ... 71
9.6.1 Measuring Data ... 71
9.6.2 Charging Data ... 72
9.6.3 General Data ... 72
9.7 Service Points ... 73

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

Before operating the instrument the first time, please read the operating instructions and take particular notice of the safety instructions. If you use the instrument and the accessories properly, there are no hazards to fear.

This product is equipped with safety features. Nevertheless, read the safety instructions carefully and use the product only as described in these instructions to avoid accidental injury or damage.

No claims of product liability or warranty can be honored if the device is not operated in accordance with the operating instructions.

1.1.1 Meaning of the Symbols

Throughout this document the following symbols and terms are used.



WARNING

This symbol warns of the danger of injuries. The term WARNING warns of **severe** injuries and material damage. Different symbols can be used - if applicable.



CAUTION

This symbol warns of the danger of injuries. The term CAUTION warns of **slight** injuries or damage. Different symbols can be used - if applicable.



NOTICE

This symbol points out additional information - which can be important for the operation of the instrument.

1.1.2 Warning - Possibility of Injuries



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.

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



WARNING: Injuries possible due to defects and extraordinary loads

If safe operation can no longer be presumed, shut down the device and secure it against unintended operation.

The device must be presumed unsafe to operate:

- If visible damage is evident,
- if the instrument is no longer working,
- if it has been stored for long periods under adverse conditions or
- after harsh treatment during shipping.

WARNING: Safety advices for rechargeable battery packs

Do not crush or dismantle, do not heat, or incinerate, do not immerse in any liquid, do not place in or near high temperature places or in direct sunlight. Batteries can explode or release harmful substances.

Ensure batteries have no short circuit on the contacts (for example due to damaged insulation). Metallic objects must not come in contact with the bare contacts. Immediately discontinue use if batteries appear abnormal in any way.

Use only the battery pack included with delivery. Use only the power supply included with delivery. Do not use battery pack or power supply for other devices.

WARNING: Do not try to repair your instrument on your own

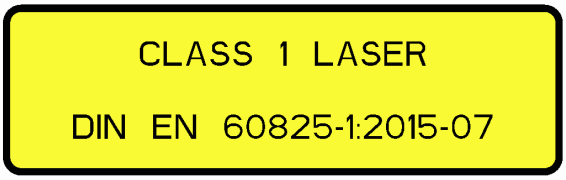
Do not perform any repairs on the instrument. The measurement unit must be opened by BYK-Gardner authorized repair locations only.

Devices returned to BYK-Gardner for repairs or service / recertification must be shipped **without** battery pack in the case / 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.

The instrument is a class 1 laser product. To indicate the risks following label is placed on the housing and / or on the base of the instrument.



WARNING: Severe material damage

The instrument consists of sensitive optical and electronic precision parts. Prevent it from being dropped, bumped, or shaken!

Avoid exposure to continuous humidity and condensation. Avoid splashing with water, chemicals, or other liquids.

Please use only accessories that are available for the unit.

Only devices meeting the requirements for low voltage safety may be connected to the USB interface.

The charger in the docking station is only to be used to charge the battery packs delivered with the instrument.



CAUTION: Material damage

Do not allow any foreign objects to get into the measurement opening.

Do not expose the unit to direct sunlight for extended periods of time. Do not store it in a hot or dusty environment. Use the instrument case for storage.

Rechargeable Li-Ion battery packs: Do not charge at temperatures below 0°C. The allowed temperature range is 10 to +40°C for operation and 0° to 60° for storage.

Do not use any acetone for cleaning the unit! The unit housing is resistant to many solvents. For cleaning you should use a soft, moist cloth. Excessive dirt and dust can be removed with ethanol or cleaning alcohol.

In case you intend not to use the instrument for a longer period of time, take out the batteries.



NOTICE: Disconnecting from any power source

To disconnect the instrument: Remove the battery pack and / or the USB interface cable.

To disconnect the docking station: Disconnect the plug from the power supply and / or the USB interface cable.

To disconnect the power supply: Disconnect the power cable from the power supply and / or from mains socket.

Please make certain that the power supply plug is easily accessible. Use only the power supply included with delivery.



NOTICE: Using the instrument

You will find the technical data for all system components on the respective manufacturer's plates and in the section "Technical Data".

1.2 Disposal



Disused electrical equipment such as this instrument and its batteries 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.

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.

© Copyright 2026 BYK-Gardner GmbH

All rights reserved.

1.5 Declarations

1.5.1 EU Declaration of Conformity

Hereby,

BYK-Gardner GmbH

Lausitzer Strasse 8

D-82538 Geretsried

declares, that the products of type

- **wave-scan 3**
- **wave-scan 3 dual**

comply with the requirements of the following directives of the European Union (EU):

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

The following harmonized standards were applied:

- EN 60825-1:2014/A11:2021 - Laser Requirements
- EN 61010-1:2010/A1:2019 - Safety Requirements
- EN IEC 61326-1:2021 - EMC Requirements

Geretsried, December 4, 2024



Dr. Jörg Krames

President • BYK-Gardner GmbH

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 **wave-scan 3** (7403) is designed to measure Orange Peel & Distinctness-of-Image (DOI) on high-gloss surfaces. The **wave-scan 3 dual** (7400) includes an additional Infrared Super-Luminescent Diode (IR-SLED) to support an extended measurement range; it can also measure on semi-gloss surfaces.



By placing the base plate of the unit onto the surface, pressing the **Operate** button on the front and moving the instrument over the surface, it measures the properties of the surface and processes, stores and displays the measured data.

The instrument can be connected via USB or WiFi to a PC to read or write data. The capacitive display allows an easy configuration and usage of the instrument.

2 System Description

The **wave-scan 3 / 3 dual** is a portable surface analyzer that measures Orange Peel and the Distinct of Image (DOI) on high-gloss surfaces. The instrument is controlled by the **Operate** button on the front side and the touch-screen display on the top. 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.

2.1 Delivery Content

The system comes complete with: Measurement unit, docking station, external power supply unit with power connection line, two rechargeable Li-Ion battery packs, USB interface cable, protective cover, test tile(s), certificate, safety instructions and short instructions.

2.1.1 Transportation Case



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

1	Safety instructions, short instructions, and retraceable certificate	5	Transportation case with padding
2	Measurement unit with protection cover and rechargeable battery pack #1	6	Docking station
3	Standard plate with cover - includes checking tiles #1 and #2	7	Internal charger with rechargeable battery pack #2
4	Below the plate: Hand strap, power cable and USB interface cable	8	Power supply

2.1.2 Names and Functions of Parts

The basic system consists of the measurement unit and the docking station. The docking station is used to exchange data and to charge the rechargeable battery pack.

NOTICE

When the instrument is not in use, place it in the docking station. This way the rechargeable battery pack will be charged, and the instrument will always be ready for measurements.

The measurement unit consist of the following parts.



1 Capacitive display	5 Insertion place for primary battery pack
2 Signal LED	6 Hand strap
3 USB connector for data communication	7 **Operate** button to turn device on / perform measurements
4 Protection cover	8 Measurement aperture and docking station connectors
	9 Reserve battery pack from docking station

The instrument comes with a protection cover. Remove it before operation and attach it after operation. Also attach the cover before placing the unit in the transport case.

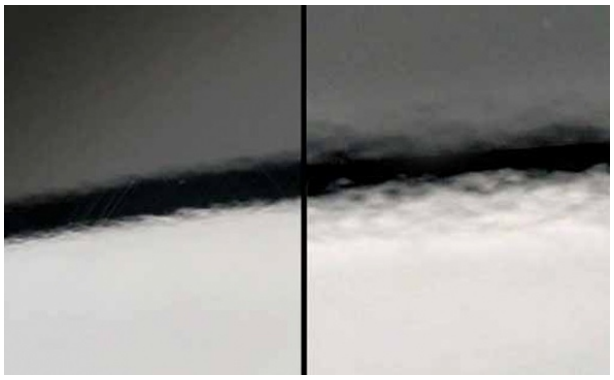
The button **Operate** and the display are used to control the system. Pressing **Operate** turns the unit on and causes the instrument's dashboard (main menu) to be displayed. All settings within the menus are made by the display.

In measuring mode pressing the button **Operate** performs measurements. In configuration mode it has the same function as the symbol **Back**.

System operation is supported by an auto-diagnosis test, comments, and error messages. Measurement values and comments appear in the display.

2.2 Measurement Principle

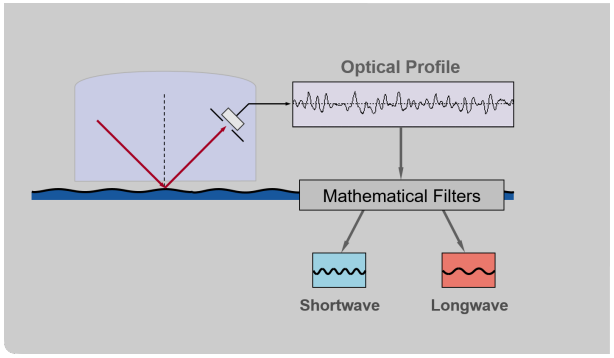
The **wave-scan 3** is the objective eye for a brilliant finish. It provides quality control and troubleshooting for class A surfaces.



Surface appearance changes with the size and distinctness of wavy structures. The wave-scan analyzes waviness intensity with 5 wavelength ranges (0.1 mm - 30 mm) and evaluates the brilliance of the surface. The results form a "structure spectrum" and help to analyze and optimize the surface quality based on material and / or process parameters.

2.2.1 Measurement of Waviness

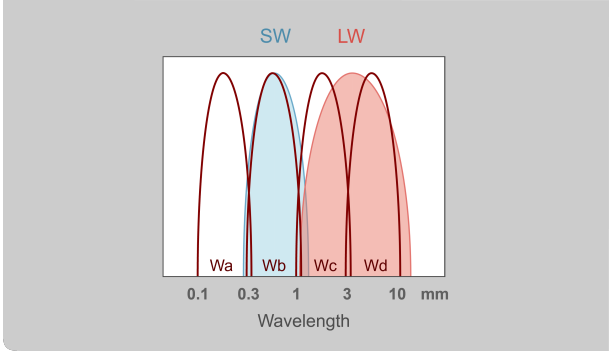
The wave-scan simulates visual perception. Like our eyes, the instrument optically scans the wavy light / dark pattern. A laser point light source illuminates the specimen at a 60° angle and a detector measures the reflected light intensity at the equal but opposite angle.



The instrument is rolled across the surface and measures point by point the optical profile of the surface across a defined distance. The wave-scan analyzes the structures according to their size. To simulate the human eye's resolution at various distances, the measurement signal is divided into several ranges of wavelength using mathematical filter functions.

2.2.2 Wavelength and Scales

Standard scales for wavelength are the classic SW and LW and the modern W_a .. W_e.



The "classic" scales have following ranges:

- Shortwave (SW) = 0.3 ... 1.2 mm
- Longwave (LW) = 1.2 … 12 mm

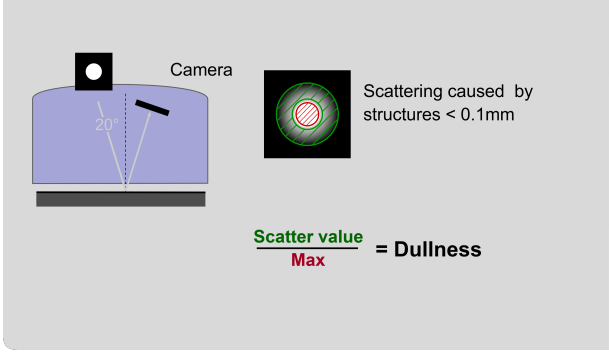
The "modern" scales have following ranges:

- W_a = 0.1 … 0.3 mm
- W_b = 0.3 ... 1 mm
- W_c = 1 ... 3 mm
- W_d = 3 ... 10 mm
- W_e = 10 … 30 mm

These scales (and many more) can be activated in the instrument.

2.2.3 Measurement of Dullness

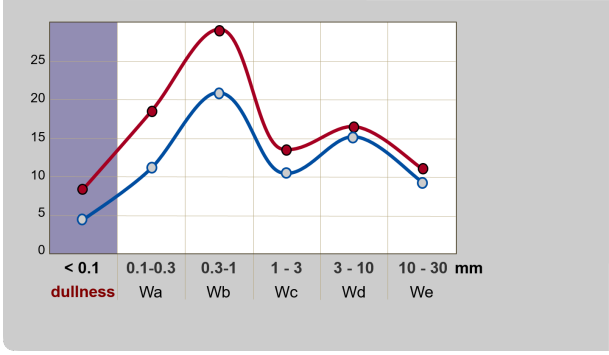
Structures smaller than 0.1 mm influence visual perception, therefore the wave-scan uses a CCD camera to measure the diffused light caused by these fine structures.



This parameter is referred to as "dullness".

2.2.4 Structure Spectrum

The values of dullness and W_a to W_e form a complete "structure spectrum".



This allows a detailed analysis of orange peel and its influencing factors, being material or application parameters.

2.3 List of Documents

For the **wave-scan 3 / 3 dual** the following documentation is provided.

Document Type	Document No.	No. of Languages
Safety Instructions	301 200 082	26
Short Instructions	301 200 083	8
Operating Manual	301 200 085	English

The documents can be downloaded from our website:

- For wave-scan 3 dual: https://www.byk-instruments.com/p/7400
- For wave-scan 3: https://www.byk-instruments.com/p/7403

2.4 Desktop Software

All critical color and appearance parameters can be saved and analyzed with one software package, "smart-process". This includes the measurement of Orange Peel and Distinctness-of-Image (DOI) with the instruments of the **wave-scan 3** family.

2.4.1 Download

For the **wave-scan 3** family the software is available as following package:

- **smart-process**: Offers the setup of organizers for clear sample identification and a menu guided operation on the instrument.

To download the software package, go to following web-site:

- https://www.byk-instruments.com/wave-scan
- https://www.byk-instruments.com/software#wave-scan

Via this link you can easily open and view the software package with your preferred browser application. It is recommended to save the package on the hard drive of your PC before installation.

2.4.2 Installation

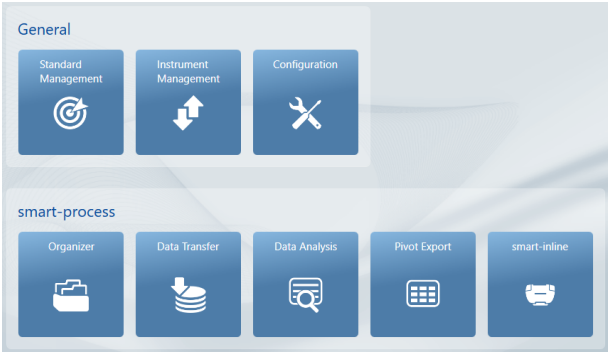
NOTICE

You need administrator privilege on the PC in order to install the software package.

To install the software package - provided as a ZIP archive:

1. Save the file on your hard drive into a new folder.
2. Extract the complete ZIP archive.
3. In the extracted folder, right mouse click on the file "**install.exe**".
4. Select "**Run as administrator**".
5. Follow the setup instructions on the screen.

Using the software, you can create organizer files with complex measurement series and download to the instrument.



After upload of the measured data to the database in your PC you can use the software for data analysis and statistics.

NOTICE

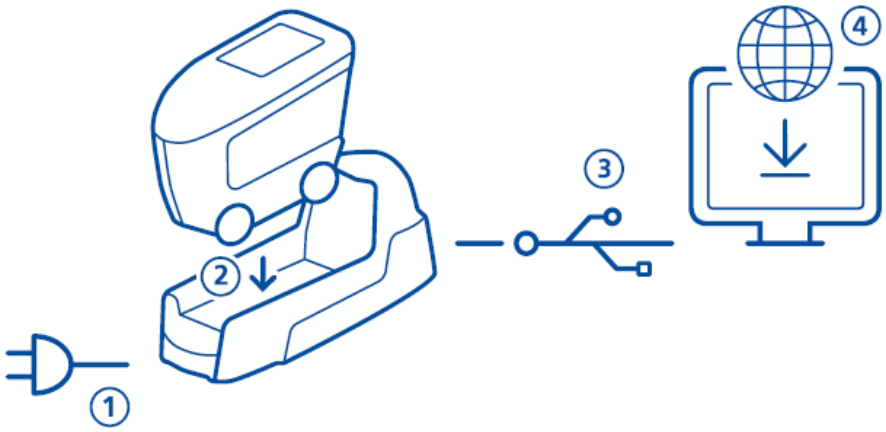
After download and installation, the software package can be used for **30 days** free trial. Thereafter, you need to register your software package. The standard delivery includes two PC licenses for the selected software package.

3 Getting Started

Before operating the instrument for the first time, please read the operating manual completely and take particular notice of the safety instructions. Unpack the instrument and check the delivery for completeness, see Delivery Content.

3.1 System Diagram

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



To assemble the measurement system, place the instrument in the docking station and power the docking station.

- Connect docking station with power supply **(1)**.
- Power is provided to the instrument by the rechargeable battery pack; charged in the docking station.
- The delivery comprises a second rechargeable battery pack; you can use one of them while recharging the other one.
- Place instrument in the docking station **(2)**.
- The docking station automatically charges the battery pack in the docking station and in the instrument.
- Connect docking station with PC via USB cable **(3)**.
- Download and install the software "smart-chart" **(4)**.
- Turn instrument on by pressing the **Operate** button.

The instrument switches off automatically, if not used. To switch it off manually, select **Configuration > Shutdown**.

3.2 Powering the Instrument

The measurement unit can be operated with the rechargeable battery pack included in the delivery. Depending on the specific brand, the capacity of the battery pack is sufficient for up to 1,000 measurements.

3.2.1 Rechargeable Battery Pack



To place the instrument in service, the rechargeable battery pack must be inserted until it locks in place. The second battery pack is inserted in the docking station. The battery pack can only be attached when it is in the correct position.

WARNING: Removal of rechargeable battery pack

Do not remove the rechargeable battery pack while the instrument is switched on. Always perform regular shutdown before opening the instrument's housing.



When inserting the rechargeable battery pack, ensure that its contacts are aligned with those of the instrument.

NOTICE: Using rechargeable battery packs

To ensure uniform utilization, the rechargeable battery packs should be exchanged regularly between instrument and docking station. The recommendation is a weekly exchange.

The rechargeable battery pack should be fully charged in regular intervals to maintain its full capacity. The recommendation is at least once every 6 months.

3.2.2 Charging the Instrument

The charging takes place via the docking station:

1. Connect the docking station to the power supply.
2. Remove the protection plate from the instrument.
3. Put the instrument into the docking station.

Both battery packs are charged. The battery pack in the docking station is charged faster than the one in the device.



Three charge LED indicate the current state:

- Left: Docking station is powered.
- Middle: Battery pack #1 in the instrument is charged.
- Right: Battery pack #2 in the docking station is charged.

For the charge LED following rules apply:

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

With green LED light the device is fully charged and can be put in operation. Keep the device in the docking station if it is not in use.

3.2.3 Battery Warning

When the battery voltage falls below the required operating voltage in the course of operation, the following message appears on the display.



To ensure that the instrument is always ready for operation, it is recommended to have the second battery pack handy, especially when performing measurements in the field.

3.2.4 Switching On

The instrument is turned on via the **Operate** button on the left side. After turning on the instrument the display on the top shows the main menu.

The instrument is operated completely via the display and the **Operate** button.

The instrument turns off automatically, if not used, see **Configuration** > Display Time. For manual turn off select **Configuration** > Shutdown.

3.3 Attaching the Hand Strap

The instruments provides a mounting option for the safety wrist strap.



Use the hand strap as protection against dropping the instrument.

3.4 Using the Main Menu

The instrument comes with a capacitive display. To select the items on the screen you can tap with the finger on the display. Alternatively, you can use a pen (sold separately). The pen should have a size of min. 6 mm in order to work on the display. For each main function a separate icon is available.



1 **Quick check** Take a fast measurement using the default parameters.	2 **Measure** Take measurements. Results are saved automatically.
3 **Browse** View and delete measurement data.	4 **Configuration** Change measurement parameters or instrument settings.
5 **Organizer** Appears after downloading at least one organizer from “smart-chart”.	

Additional Symbols

On the top additional symbols are displaying the current system status:

- **WiFi**: A wireless connection can be used in addition to the default USB connection.
- **Time**: Current system time, see **Configuration > Date / Time > Set time**.
- **Power**: Current charge level of battery pack in the device.

3.5 Inclination Sensor

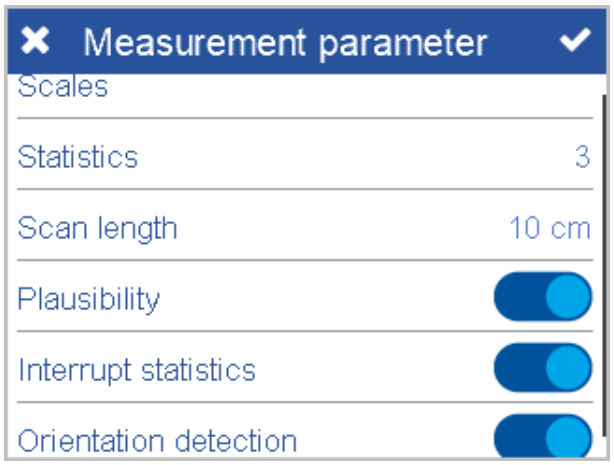
The angle of holding the instrument is observed by the integrated sensor. Depending on the current angle the display is automatically flipped.



To flip the display back change the angle of holding until the sensor detects the difference and flips the display again.

3.6 Starting Measurements

You can directly start taking measurements. The instrument is working with default parameters.



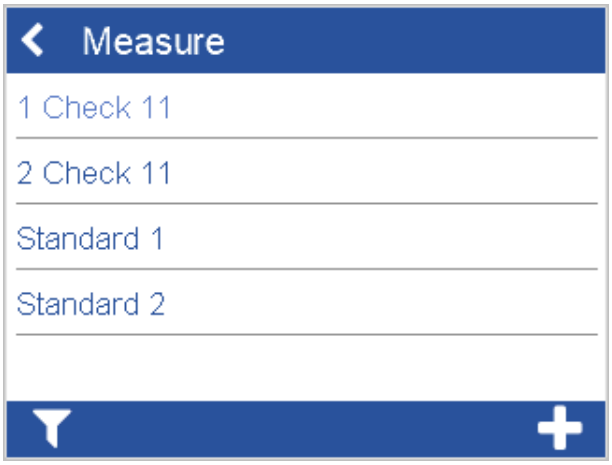
Select **Configuration** > Measurement Parameters to change these settings.

3.7 Testing the Instrument

Due to the underlying measurement principle, no calibration of the instrument is required. It is recommended, however, to check the functionality of the instrument at regular intervals. The recommendation is **once every three months**. The checking tiles included with delivery are provided for this purpose.



These tiles are fix assigned to your instrument. Select **Measure** > **Standards** and select the checking tile which you want to measure, see Checking Tiles for more details.



Place the instrument on the corresponding checking tile and perform a measurement. Your instrument measures correctly, if the measured data is within given range of the current checking tile. The range is stored in the system memory and printed on the checking tiles.

NOTICE

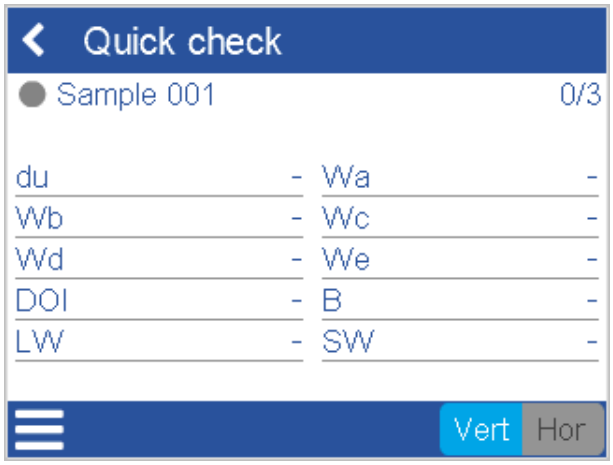
The **wave-scan 3** (7403) has one high-gloss sample included to test the instrument. The **wave-scan 3 dual** (7400) has two samples included: For high gloss and semi-gloss.

4 Quick Measurements

With this function you can easily perform one or more measurements. For example: You can measure a standard and a sample probe and compare the results manually. Make sure the parameters are set, see Measurement Parameters.

4.1 Measuring

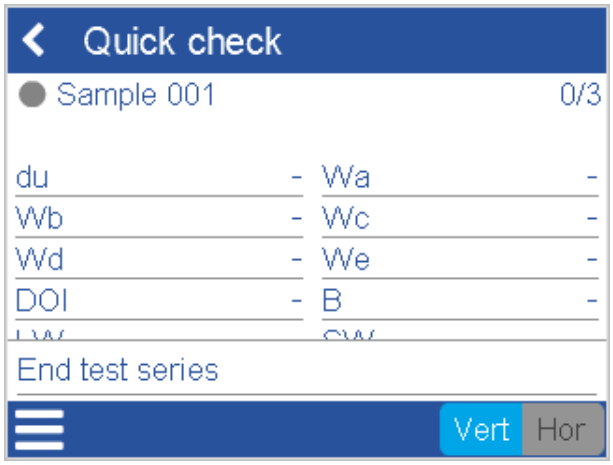
Click on icon **Quick check**. The measuring screen is displayed; showing the first sample to be measured.



The instrument is ready to measure.

4.2 Initial Menu

At this state the context menu contains the single option **End test series**.

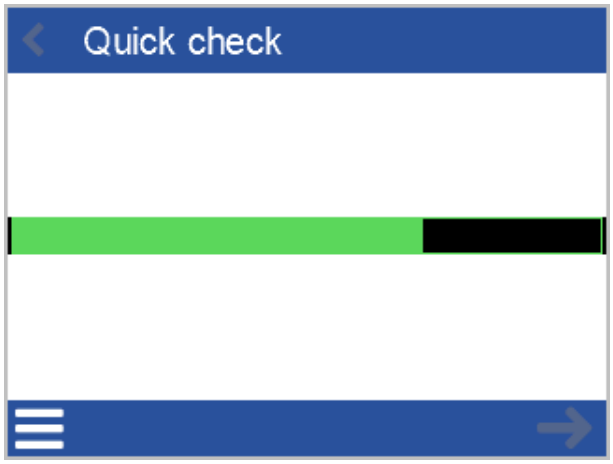


Via this option you can go back to the main menu. This is also possible vio the icon Back in the upper left.

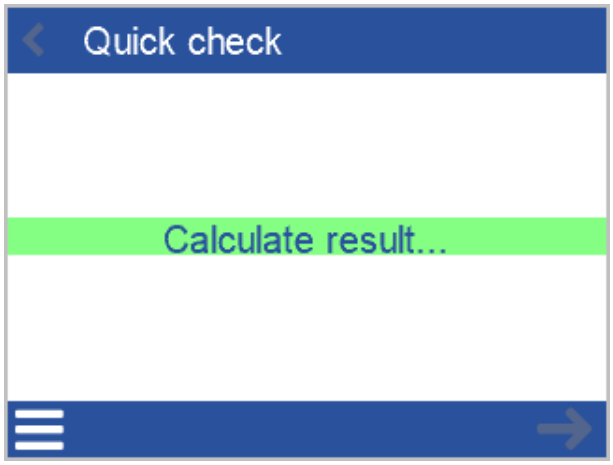
4.3 Procedure

In **Quick check** mode perform the following steps:

1. Place instrument on first sample to be measured.
2. Press and hold the **Operate** button to measure the sample.
3. Move the instrument evenly and slowly from the right to the left (or vice versa) over the sample's surface. During the measurement a progress bar is shown.



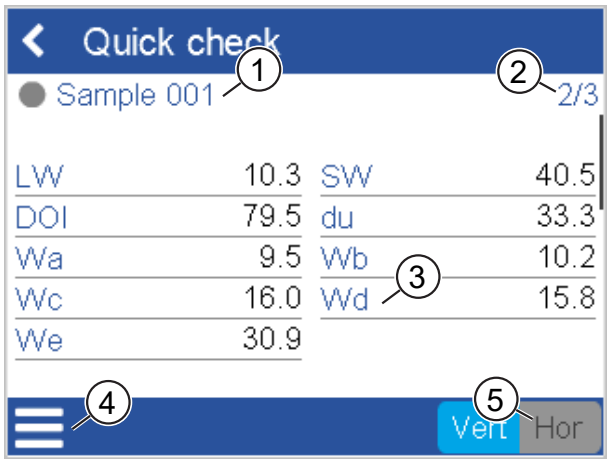
The sample is measured; the measured data is evaluated.



The results of the evaluation are shown in the display, see below.

4.4 Results

After successful measurement the result screen may look like this.



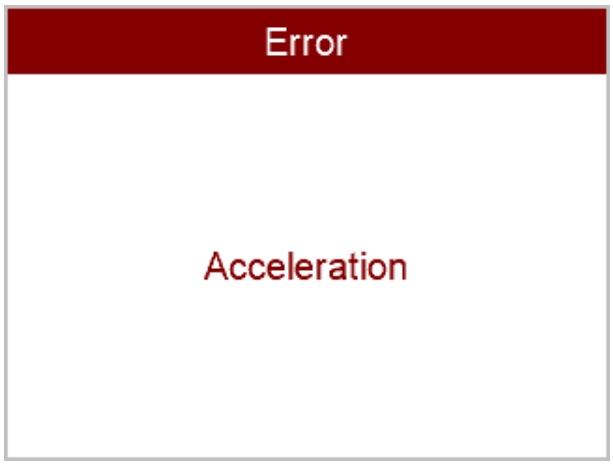
The items on the screen have the following meaning.

1 **Name** The name of the sample currently measured, see also Standard Measurements [▶ 30] > Overview [▶ 30].	2 **Statistics** Measures taken and measures to be taken, see Statistics.
3 **Scales** Scales can be configured in the measurement parameters, see Scales.	4 **Context Menu** Contains the measurement options currently available, see Final Menu [▶ 29].
5 **Orientation** Can be switched to the correct value, if required, see Orientation Detection.	

After required number of measurements on the current sample place instrument on the next sample and measure it.

4.5 Messages

Performing a successful measurement requires some practice. Error messages indicating the type of error may appear during the first trials.

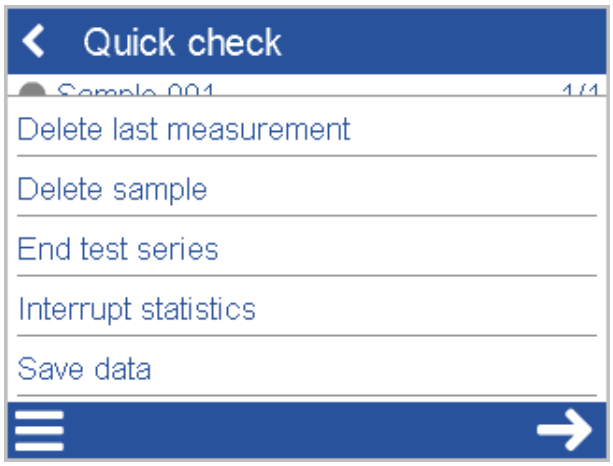


The LED light on the instrument turns to red and a warn signal is given out, see [Configuration-2023] > **Sound**. Check the message and repeat.

NOTICE

Different messages are possible; depending on the current state of instrument or measurement, see System Messages.

4.6 Final Menu



The context menu now contains additional entries:

- **Delete last measurement**: Enables you to repeat the last measurement.
- **Delete sample**: Enables you to repeat all measurements on the current sample.
- **End test series**: Enables you to repeat the complete test series.
- **Interrupt statistics**: Interrupts the measurements on the current sample before reaching the preset number of measurements, details see Statistics.
- **Save data**: This option is reserved for a later release.

You can continue to measure further samples or stop the quick check via the **Back** symbol.

NOTICE

In **Quick check** mode the measurements are not saved. If you go back to the dashboard, your measurement data is dropped. Use **Measure** mode to store data.

5 Standard Measurements

This function allows to perform various test series with different samples and variable number of measurements. The results are stored automatically. If more than one measurement is done on a sample, statistics are evaluated. Make sure the parameters are set, see: Measurement Parameters.

Prerequisite: You are familiar with the Quick Measurements [▶ 26] mode.

NOTICE

Standards can be created in the instruments and can be downloaded from “smart-chart”. Downloaded standards cannot be deleted in the instrument, but only via the software.

5.1 Overview

You are able to manage your measurements as shown in the following example.

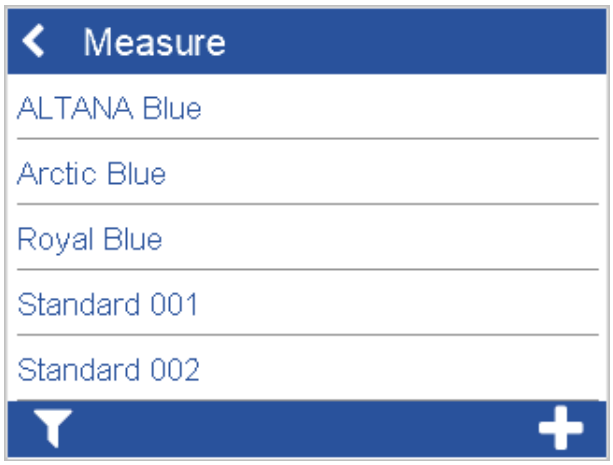
```
Standard 001
--- Test series 001
--- --- Sample 001
--- --- --- Measurement 1
--- --- --- Measurement 2
--- --- --- …
--- --- --- Measurement n
--- --- Sample 002
--- --- …
--- --- Sample n
--- Test series 002
--- …
--- Test series n
…
Standard 2
…
Standard n
```

The objects listed above are to be administrated in the following way:

- **Standard**: Contains different **Test series**. Create and fill in **Measure** mode. Renaming is not supported. View and delete in **Browse** mode – only if filled with data.
- **Test series**: Contains different **Samples**. Create and rename in **Measure** mode. Delete in **Measure** mode or in **Browse** mode. View in **Browse** mode.
- **Sample**: Contains different **Measurements**. Create and rename in **Measure** mode. Delete in **Measure** mode. View in **Browse** mode. Number of **Measurements** see **Configuration** > **Measurement Parameters** > **Statistics**.
- **Measurement**: Contains different **measurement data**. Create and rename in **Measure** mode. Delete in **Measure** mode. View in **Browse** mode. Data displayed see **Configuration** > **Measurement Parameters** > **Scales**.

5.2 Measuring

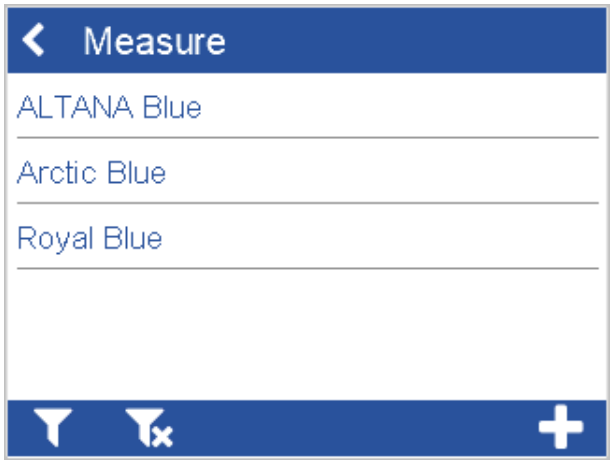
Click on icon **Measure**. The list with existing standards is displayed.



The items in the list can be filtered. Click on the filter icon.



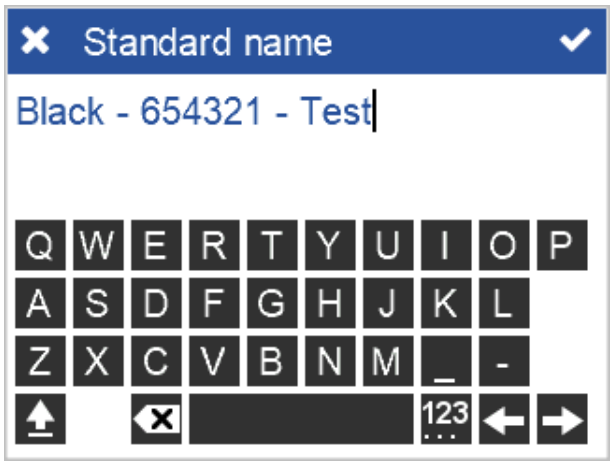
Enter the filter criteria and click on the accept icon.



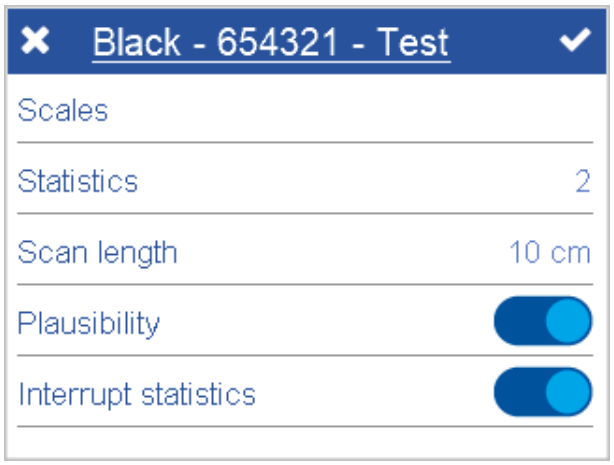
The list of items only contains the standard matching the filter criteria.

5.3 Standards

Select an existing **Standard** or create a new one > with the **Plus** symbol. You can use the default name or enter a new one.



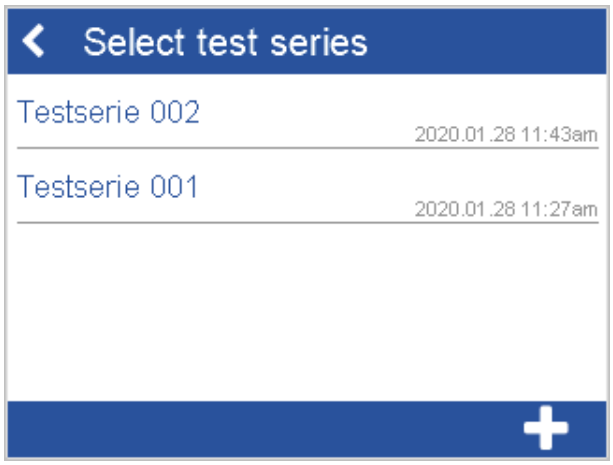
After confirmation you can check and change the default measurement parameters for the current standard.



After confirmation you are ready to measure.

5.4 Test Series

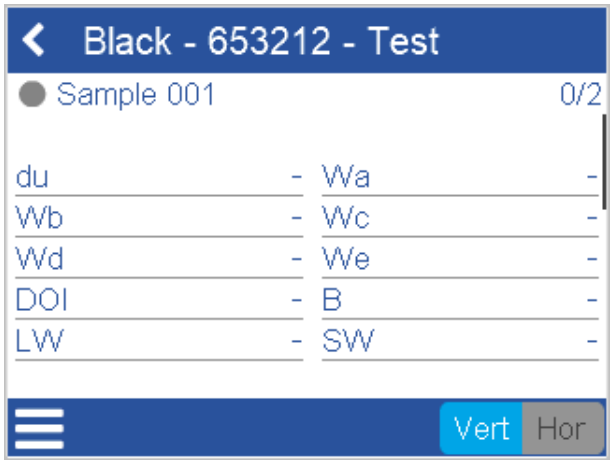
After selecting an existing **Standard**, the screen **Select test series** is displayed. In case of new standard the first test series is created automatically.



Select an existing **Test series** or create a new one > with the entry **Plus** symbol.

5.5 Samples

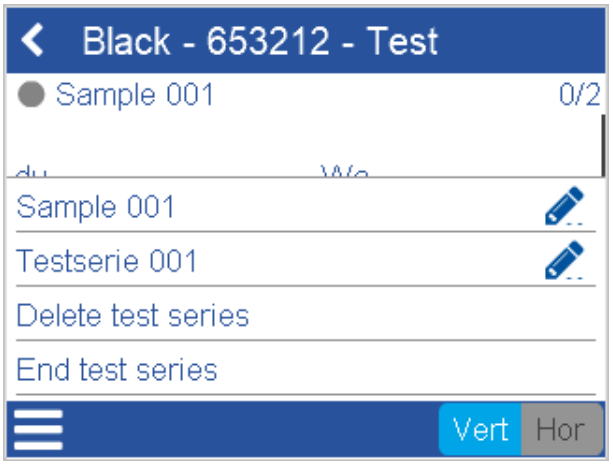
After creating a new **Test series**, the measurement screen for **Sample 001** is displayed. In case of an already existing test series the next sample to be measured is displayed.



The instrument is now ready to measure.

5.5.1 Initial Menu

At this state the menu contains following options.



The available options are:

- **Sample** > **Edit**: You can rename the sample.
- **Test series** > **Edit**: You can rename the test series.
- **Delete test series:** Enables you to repeat all measurements in the current test series.
- **End test series**: Brings you back to the test series selection screen.

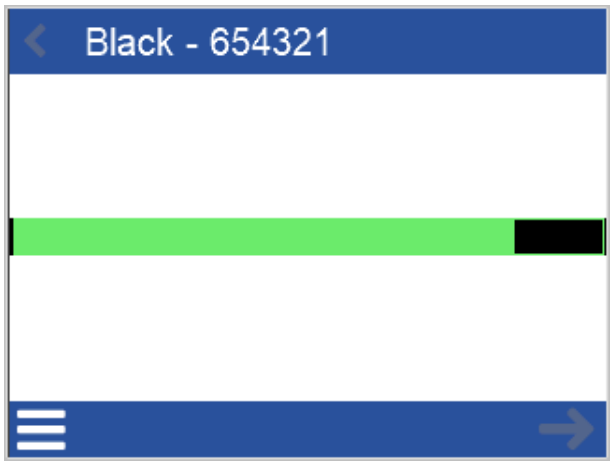
Use the pencil symbol to rename the objects according to your needs.



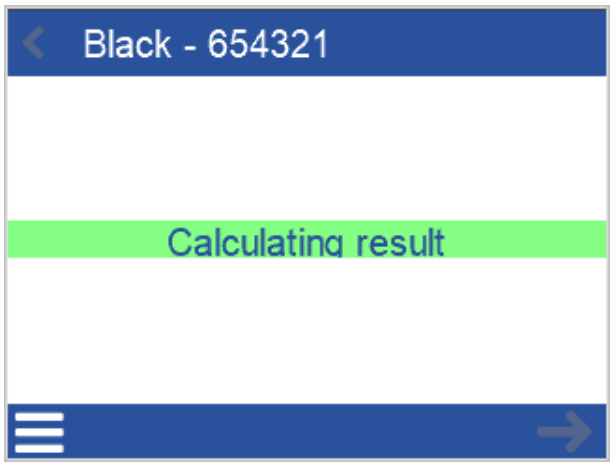
Now you can start measuring.

5.5.2 First Measurement

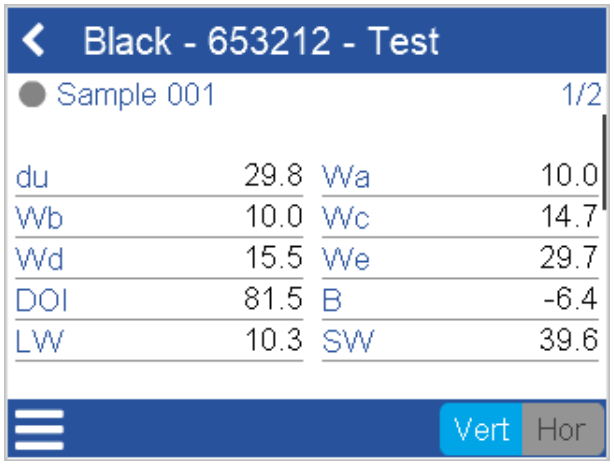
Perform the first measurement on the first sample. The procedure is the same as in the Quick Measurements [▶ 26] mode. During the measurement a progress bar is shown.



Afterwards the instrument calculates the results.



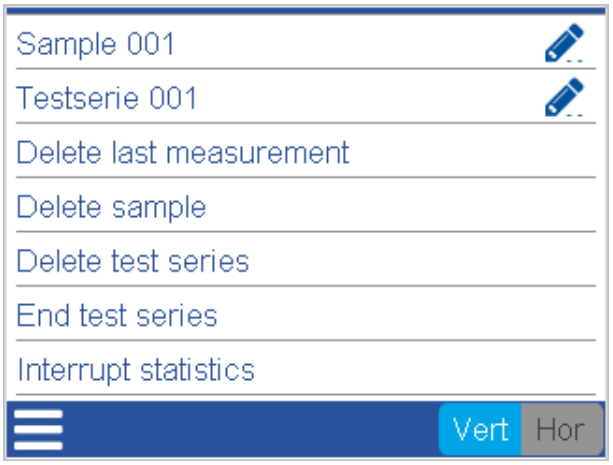
The results are shown in the display.



You can now proceed with the next measurement.

5.5.3 Final Menu

After a successful measurement the menu contains following options.



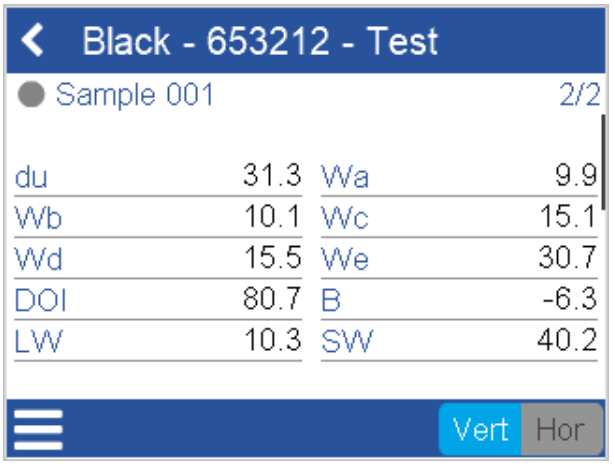
The available options are:

- **Sample** > **Edit**: See above.
- **Test series** > **Edit**: See above.
- **Delete last measurement**: Enables you to repeat the last measurement.
- **Delete sample**: Enables you to repeat all measurements on the current sample.
- **Delete test series**: Enables you to repeat the complete test series.
- **End test series**: Enables you to stop the current test series. You can continue later.
- **Interrupt statistics**: Interrupts the measurements on the current sample before reaching the preset number of measurements, details see Statistics.

Perform the next measurement and all other required measurements on the first sample.

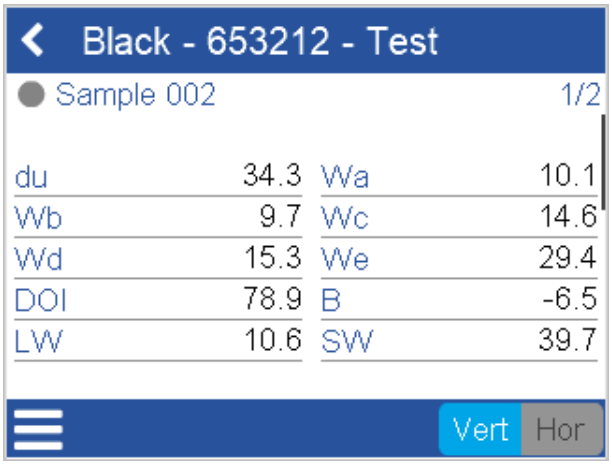
5.5.4 Next Measurement

When all measurements according to the current statistics settings are done, the next measurement will be automatically assigned to the next sample.



Proceed with the following steps:

- Perform the next measurement until the current sample is completed.
- Measure the next sample until the current test series is completed.
- Repeat this procedure for all other test series until the current standard is completed.



You can now proceed with the next standard to be measured.

5.6 Aborting

You can abort the measurement procedure at any time via the menu option **End test series** and return later to continue.

NOTICE

The modus **Measure** always shows the next measurement to be done. If you want to view or manage results, please use the **Browse** function in the main menu.

6 Organizer Measurements

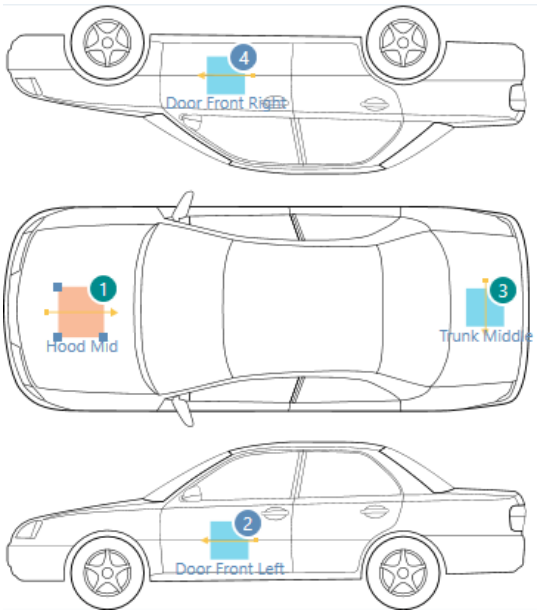
The instrument can be connected to the software suite “smart-chart”. Using the software standards and organizers can be downloaded into the instrument.

Measurement results can be uploaded and evaluated later on. Organizers contain complex series of measurements and help you to organize your measurement process.

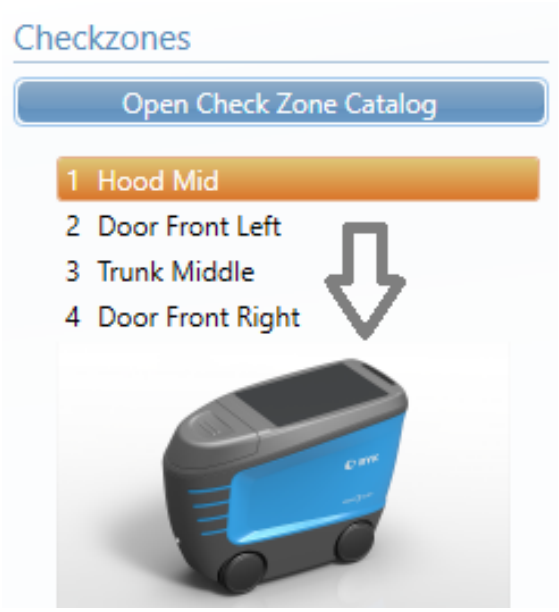
6.1 Organizer Files

Definition of Check Zones

Depending on the application, the system can be used in various ways, from single measurements in R&D up to routine quality control procedures (e.g., automobile industries).



In order to guarantee a flexible data analysis, it is essential to allocate the data to a clearly defined object (identification).



Download to Instrument

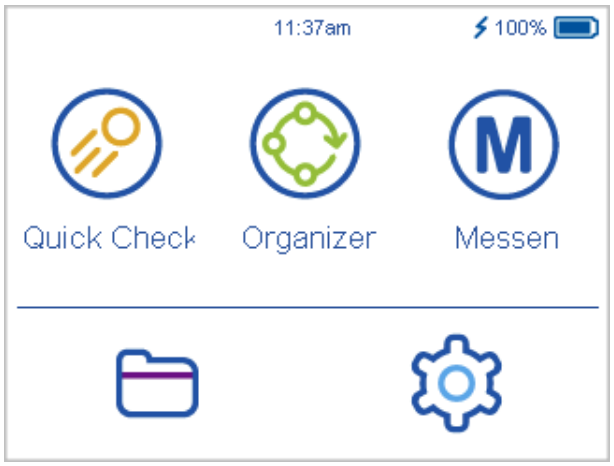
An organizer file clearly defines the object to be measured. The organizers need to be created in the software “smart-chart”.



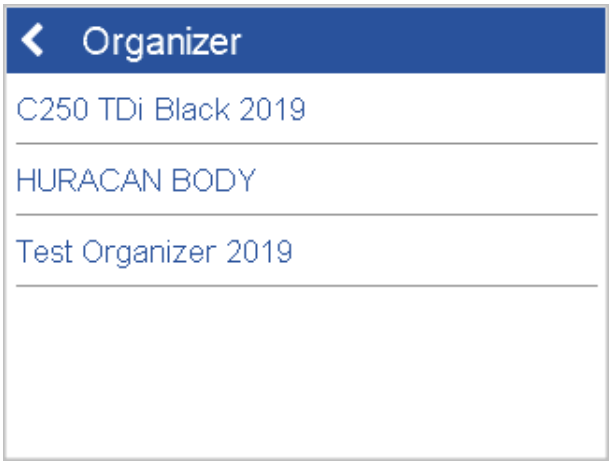
Each organizer defines the measurement sequence (sampling procedure). This organizer is transferred to the instrument. It is used to guide you as the user during the measurement procedure.

6.2 Organizer Process

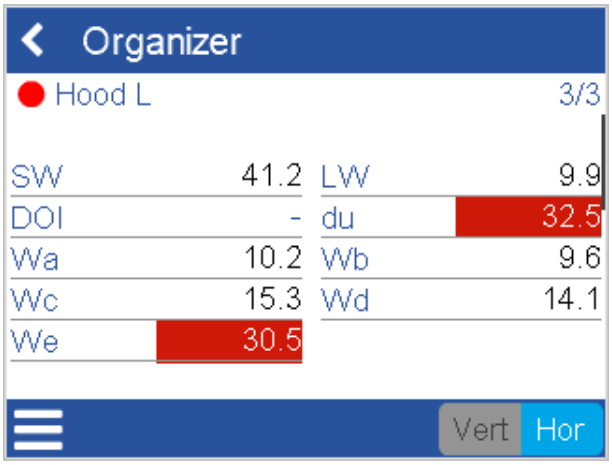
If at least one organizer file has been downloaded into the instrument, the corresponding icon appears in the main menu.



Clicking this icon displays the list of organizers in the instrument.



By using an organizer all required check zones can be clearly identified.



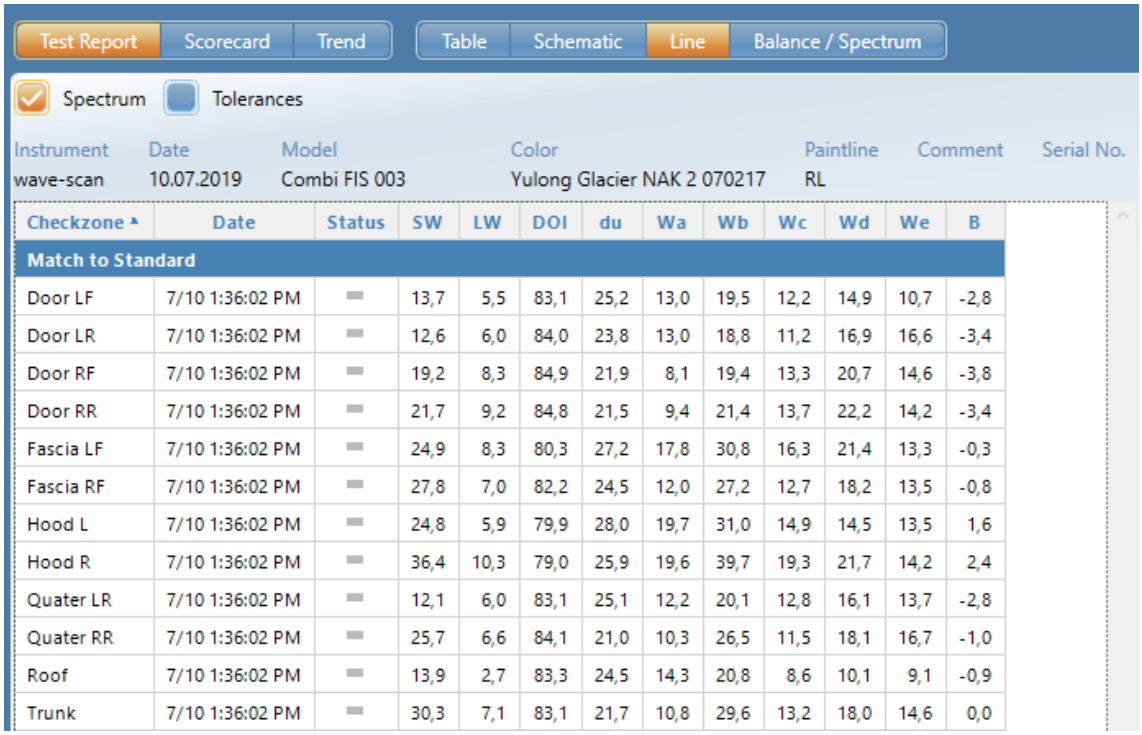
In the example shown above each check zone requires three measurements. With the next measurement the following check zone in the organizer will be selected automatically. This allows fast processing of all check zones defined in an organizer.

6.3 Upload to Database

The saved results are transferred to the PC and displayed as a QC report. The data is saved in a database for further analysis over time. Pre-prepared test reports in the software "smart-chart" assist in analyzing the data.

Storage Structure

Each measurement series contains a header and the individual measurements with their name (check zone) and the measured values.



Checkzone	Date	Status	SW	LW	DOI	du	Wa	Wb	Wc	Wd	We	B
Match to Standard												
Door LF	7/10 1:36:02 PM		13,7	5,5	83,1	25,2	13,0	19,5	12,2	14,9	10,7	-2,8
Door LR	7/10 1:36:02 PM		12,6	6,0	84,0	23,8	13,0	18,8	11,2	16,9	16,6	-3,4
Door RF	7/10 1:36:02 PM		19,2	8,3	84,9	21,9	8,1	19,4	13,3	20,7	14,6	-3,8
Door RR	7/10 1:36:02 PM		21,7	9,2	84,8	21,5	9,4	21,4	13,7	22,2	14,2	-3,4
Fascia LF	7/10 1:36:02 PM		24,9	8,3	80,3	27,2	17,8	30,8	16,3	21,4	13,3	-0,3
Fascia RF	7/10 1:36:02 PM		27,8	7,0	82,2	24,5	12,0	27,2	12,7	18,2	13,5	-0,8
Hood L	7/10 1:36:02 PM		24,8	5,9	79,9	28,0	19,7	31,0	14,9	14,5	13,5	1,6
Hood R	7/10 1:36:02 PM		36,4	10,3	79,0	25,9	19,6	39,7	19,3	21,7	14,2	2,4
Quater LR	7/10 1:36:02 PM		12,1	6,0	83,1	25,1	12,2	20,1	12,8	16,1	13,7	-2,8
Quater RR	7/10 1:36:02 PM		25,7	6,6	84,1	21,0	10,3	26,5	11,5	18,1	16,7	-1,0
Roof	7/10 1:36:02 PM		13,9	2,7	83,3	24,5	14,3	20,8	8,6	10,1	9,1	-0,9
Trunk	7/10 1:36:02 PM		30,3	7,1	83,1	21,7	10,8	29,6	13,2	18,0	14,6	0,0

In the header, up to 5 parameters can be defined for object identification, for example:

- 1: Model
- 2: Color
- 3: Paint line
- 4: Comment
- 5: Vehicle-ID

Parameters #1 to #3 are defined in the organizer file, parameters #4 and #5 can be entered before storage in the database. Additionally, date and time of the measurements are stored.

This structure determines the data organization in the instrument and in the database. In addition to the definition of parameters **before** the measurements using organizers, the parameters and check zones can also be entered **during** the measurements, see Standard Measurements [▶ 30].

7 Browse Measurements

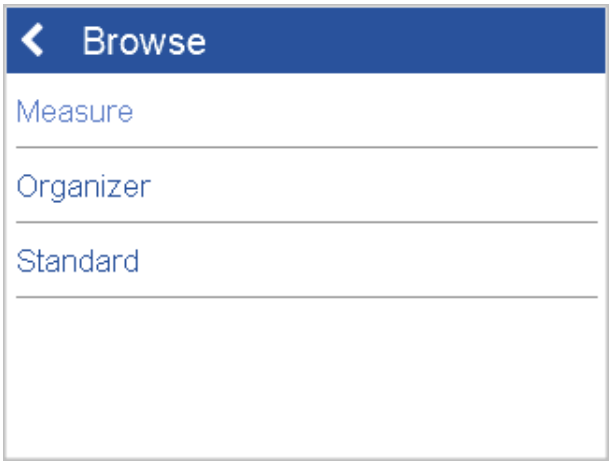
Measurement data and objects can be viewed and deleted directly at the instrument and in “smart-chart”. Below the administration at the instrument is described.

The **Browse** function allows you to view your existing measurements and to delete existing **Standards** and / or **Test series**, if necessary.

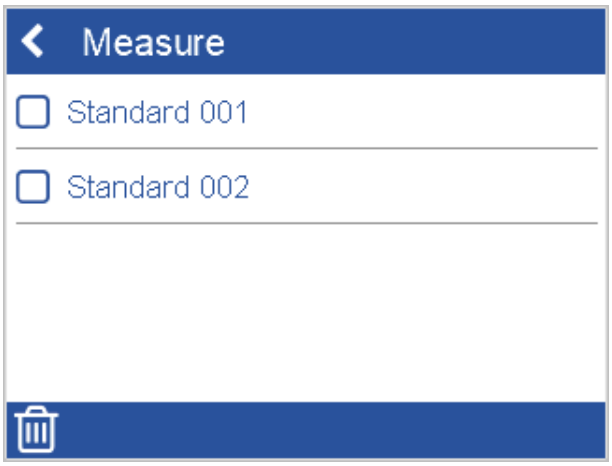
Prerequisite: At least one measurement is stored.

7.1 View Data

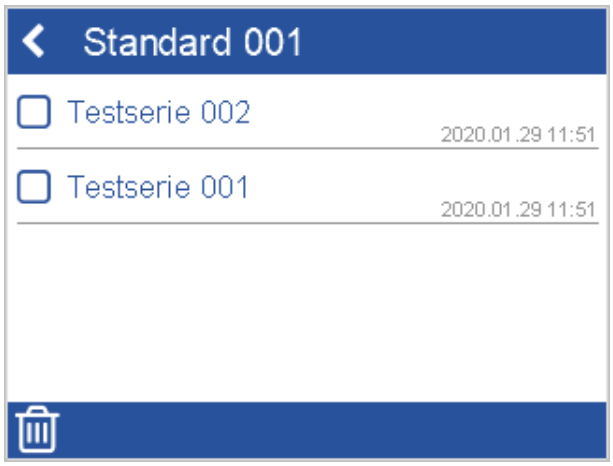
Click on icon **Browse**. The list with all types of measurements is displayed.



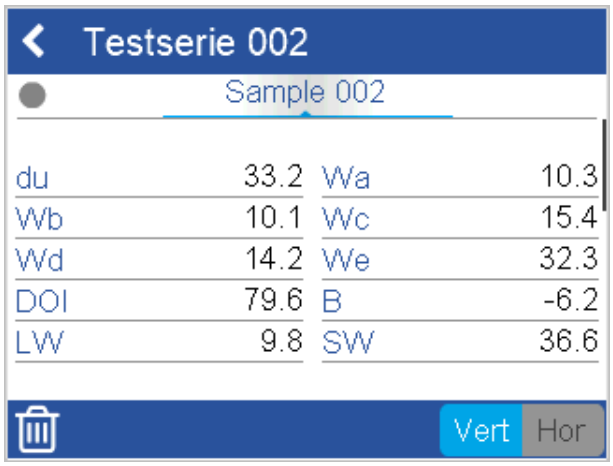
Click on the desired measurement type, e.g., on **Measure**. The list with all dedicated measurements appears.



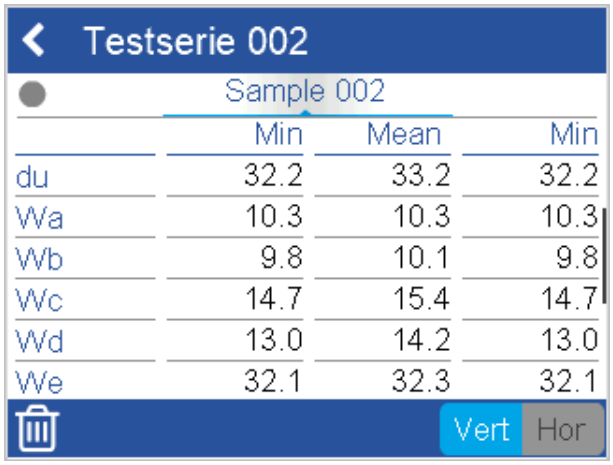
Click on the desired object. The list with all dedicated test series appears.



Click on the desired test series. The details for this measurement appear. Now you can view the samples measured in this test series.



You can turn the item "Sample xxx" to the left and to the right. For each sample the average data is displayed. Scroll down to view the statistical data.



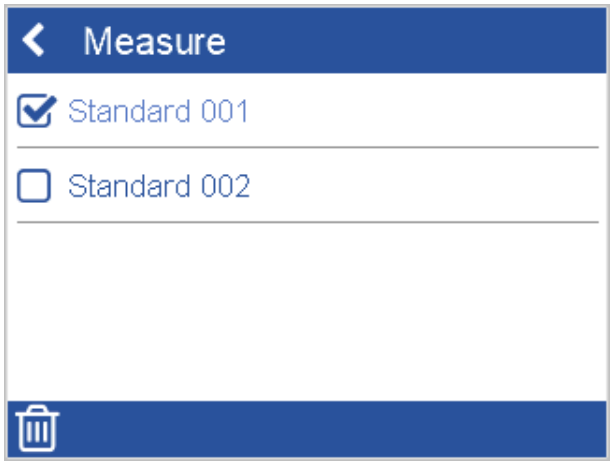
This can be activated under [Configuration-2023] > Measurement Parameters > Statistics.

7.2 Delete Data

You can delete complete measurements and/or complete test series.

Delete Measurement

To delete a complete measurement, select it from the list. You can also make a multi-selection here.



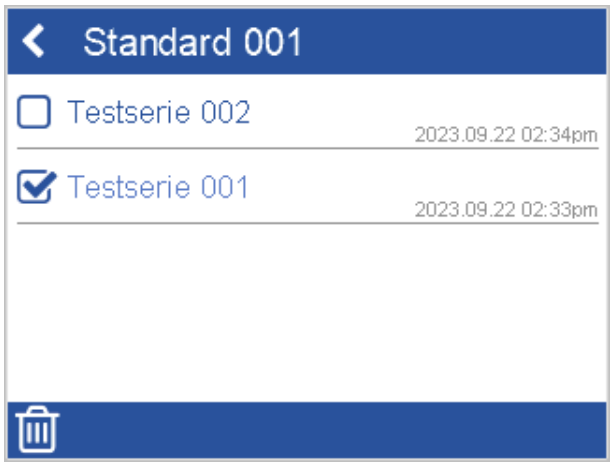
Click on the **Trashcan** icon. A confirmation message is displayed.



Confirm with the checkmark. The measurement is deleted.

Delete Test Series

To delete a complete test series, select it from the list. You can also make a multi-selection here.



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



Confirm with the checkmark. The test series is deleted.

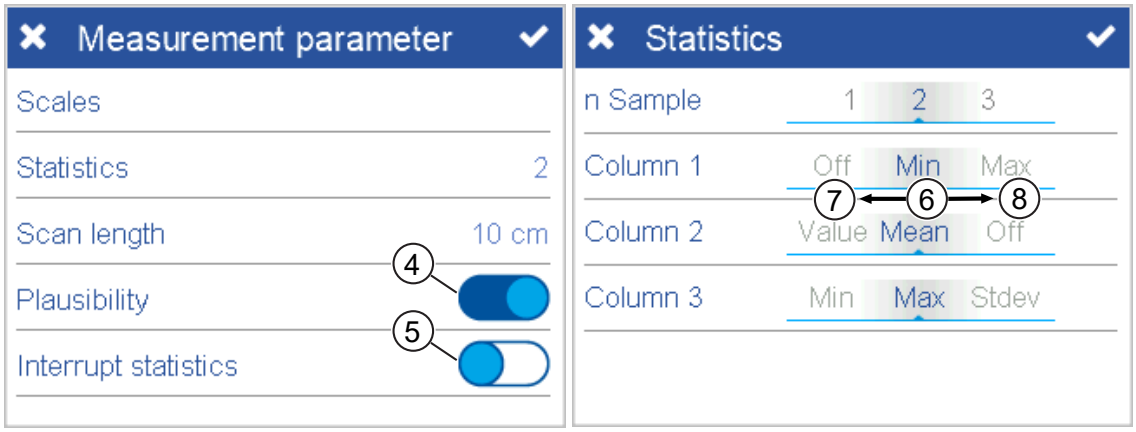
8 Configuration

With this function you can configure the system according to your needs. There are different types provided to change the configuration of the system.

Click on icon **Configuration**. The configuration screens provide buttons for easy navigation. The current settings can just be viewed or changed and saved.



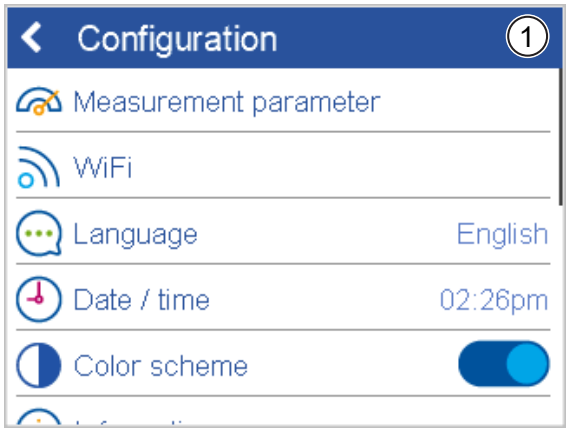
Some options can be activated via a so-called toggle button. Some options can be configured via a rotating menu. This menu is working like a wheel.

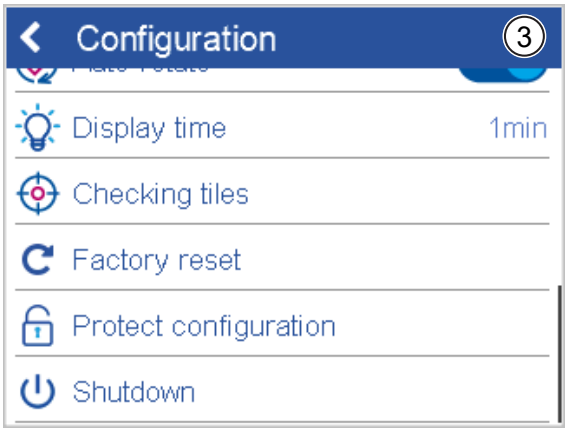


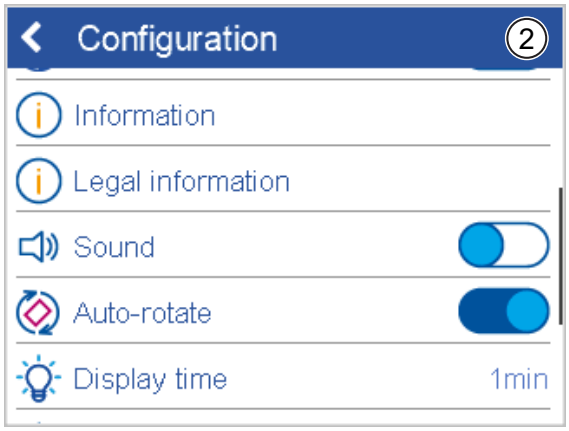
These options have following meaning.

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

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.



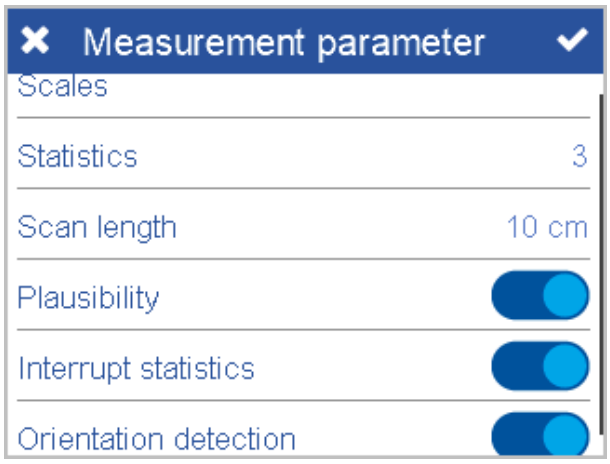




Measurement Parameters: Check and change the default settings, see Measurement Parameters [▶ 48].	**Sound**: Activate or deactivate the internal beeper here; useful for pass-fail measurements.
WiFi: Establish a wireless connection, see WiFi Connection (Option) [▶ 53]	**Auto rotate**: Switch the automatic display rotation on or off, see Auto-Rotation [▶ 57].
Language: Set instrument language here.	**Display time**: Define the interval for automatic shutdown here, see Display Time [▶ 57].
Date / time: Set system time, time zone and daylight-saving time here.	**Checking tiles**: Add these tile(s) to the list of standards in the system memory, see Checking Tiles [▶ 58].
Color scheme: Adjust screen brightness to day and night conditions.	**Factory reset**: Reset instrument to factory settings here, see Factory Reset [▶ 59].
Information: Shows system, network, and legal information, see System Information [▶ 56].	**Protect configuration**: Password is required to open the configuration screen, see Protect Configuration [▶ 60].
Legal Information: Shows license information for free and open-source software.	**Shutdown**: Perform manually switch off to safe battery power or replace battery pack here, see Shutdown [▶ 61].

8.1 Measurement Parameters

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



These options have following meaning.

1 **Scales**: Selected scales are displayed after measurement, see Scales [▶ 49].	2 **Statistics**: No. of readings to be taken per sample. Statistics are evaluated, if n > 1, see Statistics [▶ 49].
3 **Scan length** Distance the device is to be moved to complete a measurement, see Scan Length [▶ 50].	4 **Plausibility** Compares corrected and uncorrected measurement value, see Plausibility [▶ 51].
5 **Interrupt statistics**: Test series can be interrupted before reaching the defined no. of readings, see Interrupt Statistics [▶ 52].	**Orientation detection**: Automatically detects orientation of device > vertical or horizontal, see Orientation Detection [▶ 53].

To set measurement parameters:

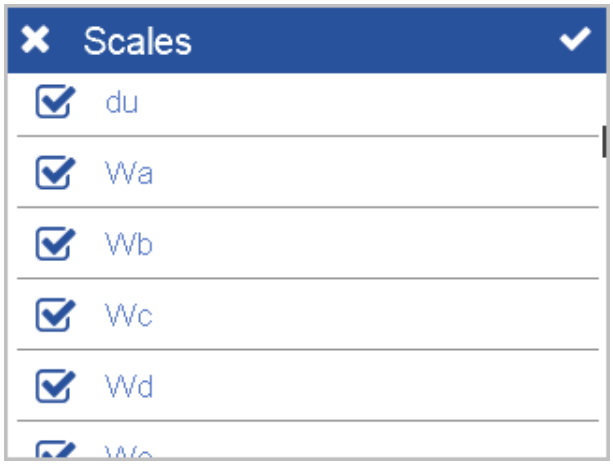
1. Click on the parameter you want to set. The list with selectable parameters appears.
2. Choose the required parameter and confirm by clicking on the check mark in the upper right corner.
3. Repeat this procedure until all your desired parameters are set.
4. Confirm by clicking on the checkmark in the upper right corner.

NOTICE

If you change the measurement parameters, e.g. the no. of measurements: These changes become valid for new configurations / test series. Existing objects will not be changed.

8.1.1 Scales

Via this function you can decide, which data is to be displayed in the measurements results.



Following entries are default scales:

- Dullnes (du)
- Wavelength - Range A (Wa)
- Wavelength - Range B (Wb)
- Wavelength - Range C (Wc)
- Wavelength - Range D (Wd)
- Wavelength - Range E (We)
- Longwave (LW)
- Shortwave (SW)
- Structure Balance (B)

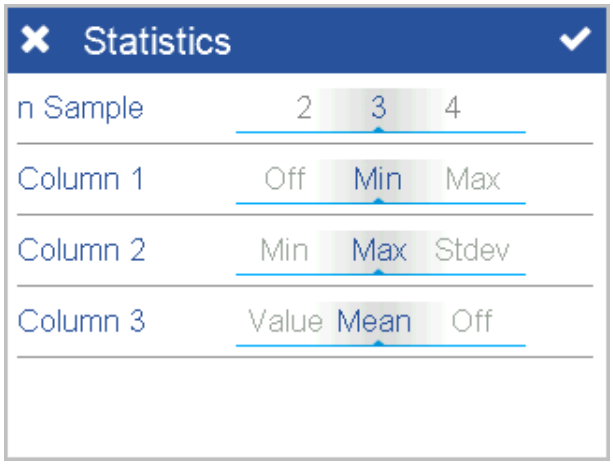
All other scales are project-specific. Consult your project documentation for more information.

NOTICE

Measurement data will be saved for all scales. The activation of a scale has no impact on the data to be saved; it just toggles the display of a scale while measuring.

8.1.2 Statistics

If the number of measurements is set to a value greater than 1, statistics values are shown in the display after measurement.



You have following options:

- **n Sample**: Defines how many measurements are to be taken.
- **Column 1 .. 3**: For each column you can decide, which value is to be displayed.

The statistic function comprises following data:

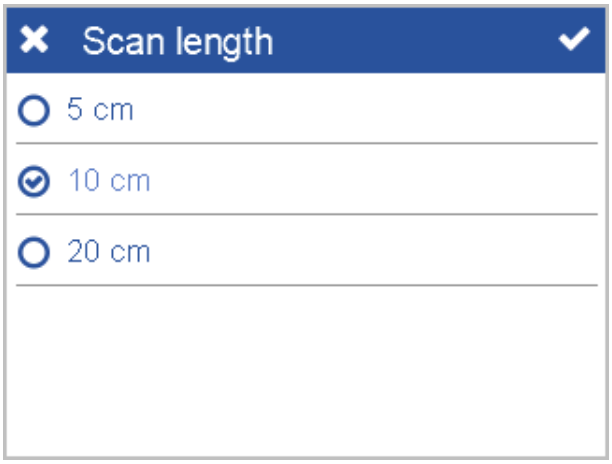
- **Off**: Column w/o data
- **Min**: Minimum value
- **Max**: Maximum value
- **Stdev**: Standard deviation
- **Range**: Measurement interval
- **Value**: Actual value
- **Mean**: Arithmetic average

NOTICE

To switch off statistics you must set **n = 1**. To save this setting it is required, to set all columns to **Off**.

8.1.3 Scan Length

You can define the distance the device is to be moved across the surface of the sample in order to complete a measurement.



You have following options:

- **5cm**
- **10 cm**
- **20 cm**

NOTICE

The selected scan length has impact on measurement accuracy. Using a short scan length will result in strong statistical skewing of measurement values for large wavelengths. Thus, when using the Wd scale with a scan length of 5 cm, at least 3 measurements should be made per sample to ensure representative values.

8.1.4 Plausibility

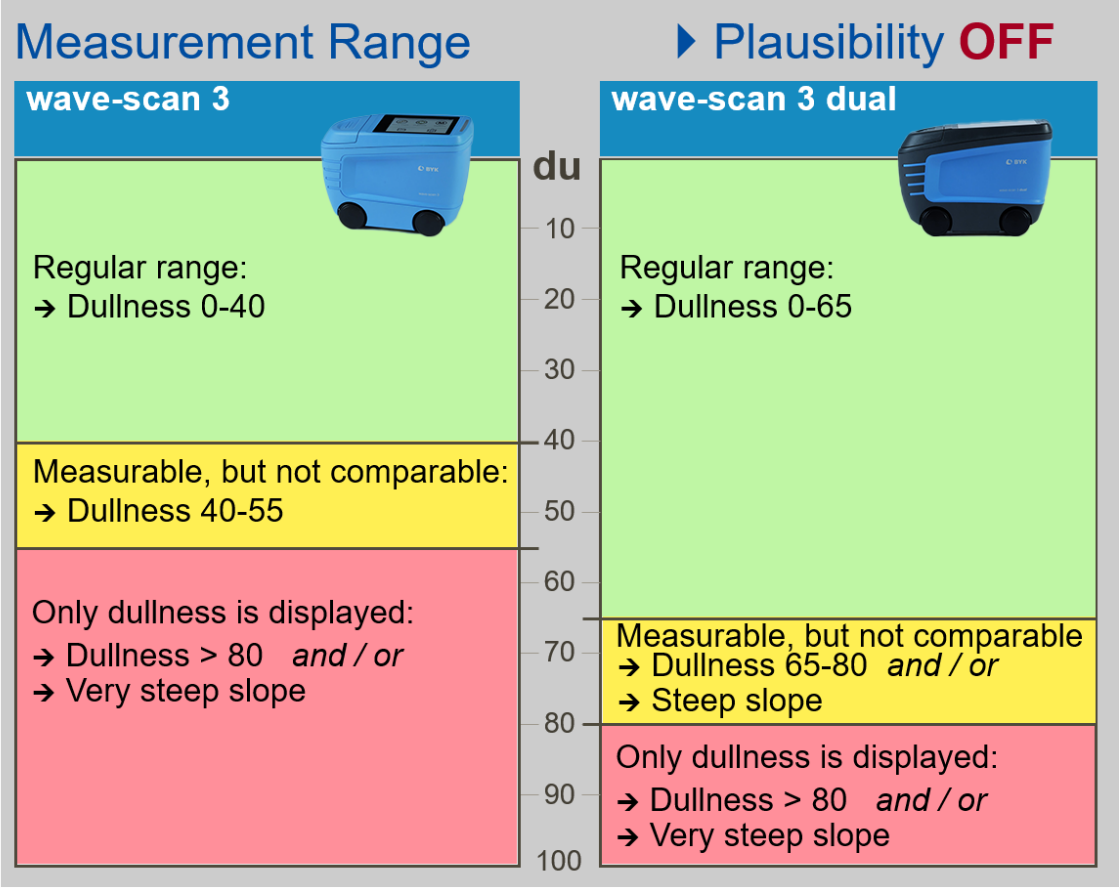
Defects on the sample surface, such as scratches or craters, can cause major errors in measurement values. The instrument automatically corrects these errors: The affected scan areas are cut out and the measurement values are calculated from the corrected data.

If **Plausibility** is active, the instrument compares the corrected and uncorrected measurement value. The greater the difference between the corrected and uncorrected data, the more critical is the surface defect.

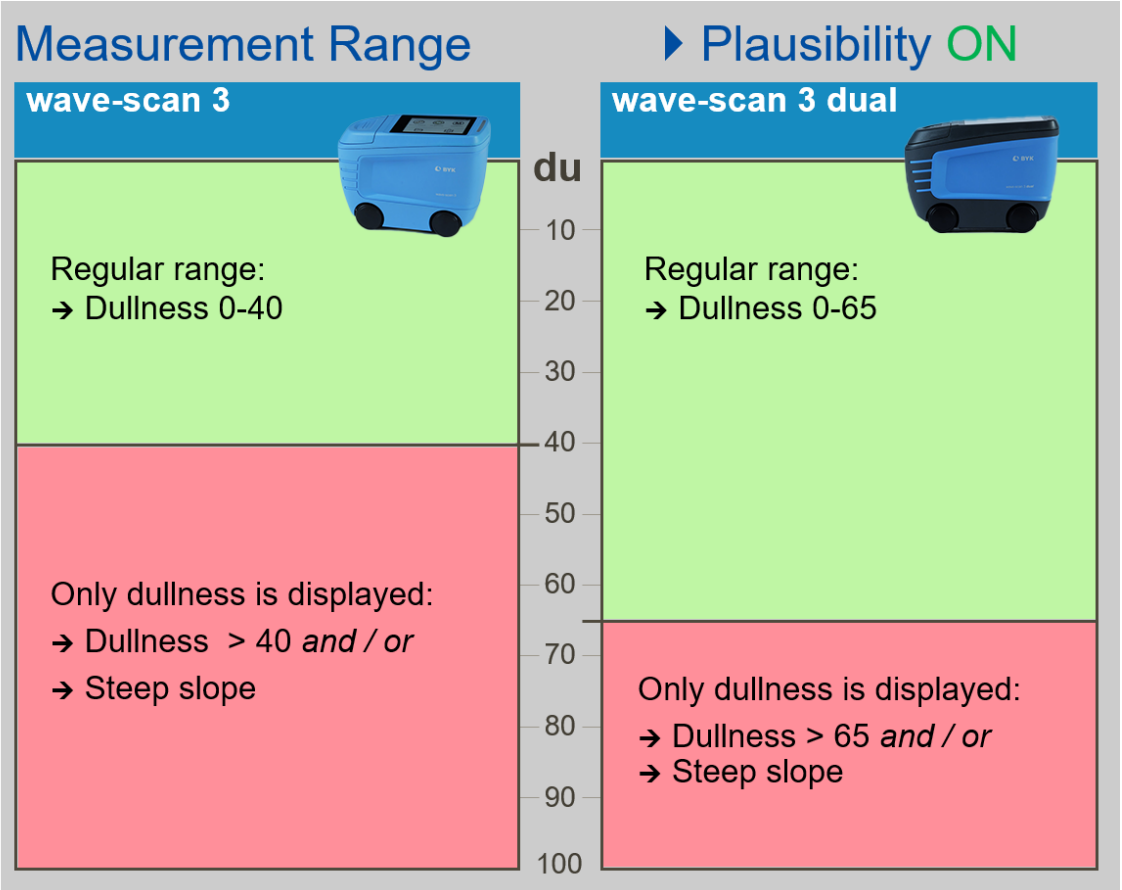
NOTICE

If the difference is greater than 20%, the measurement will be evaluated as a faulty measurement and an error message appears. In this case a new measurement is needed.

The following image shows the measurement range, if **Plausibility** is inactive (switched off).



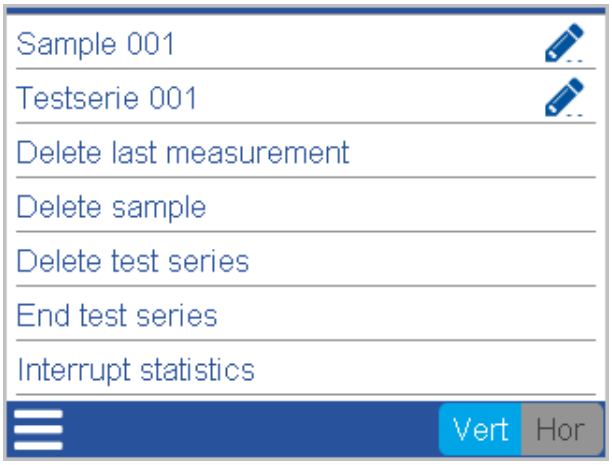
The following image shows the measurement range, if **Plausibility** is active (switched on).



As shown in the images the measurement range can be expanded by activating the option **Plausibility**.

8.1.5 Interrupt Statistics

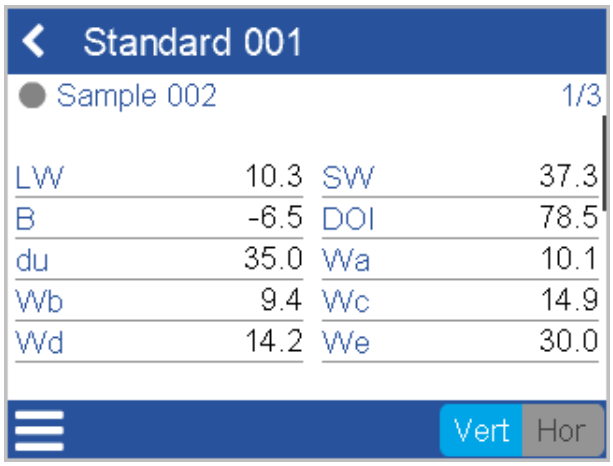
If this option is activated, the corresponding entry appears in the context menu during measurements.



By selecting this entry during measurements, you can interrupt the measurements on a sample before reaching the number of measurements set in the statistics.

8.1.6 Orientation Detection

If ON, the instrument automatically detects the device orientation (vertical or horizontal) during the measurements.



The result of the detection is shown in the measurement screen. You can also alter the orientation manually by selecting **Vert** or **Hor**.

8.2 WiFi Connection (Option)

The instrument is equipped with a WiFi adapter. You can use the WiFi connection alternatively to the USB connection. WiFi is an optional feature, the catalog no. is 7419.

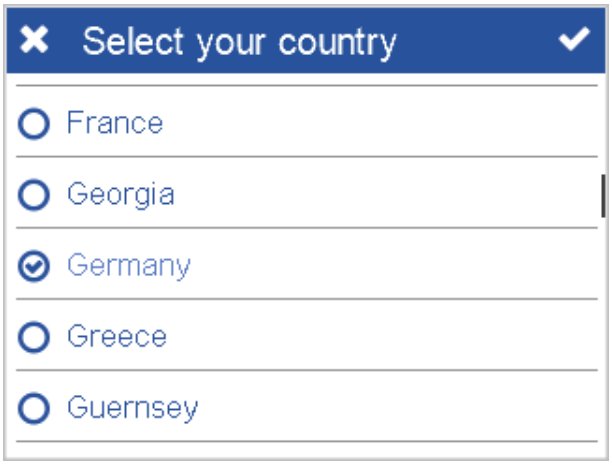
To connect to a WiFi network, click on the WiFi symbol. To activate WiFi, enter the activation key or contact the BYK-Gardner support team to obtain the key.



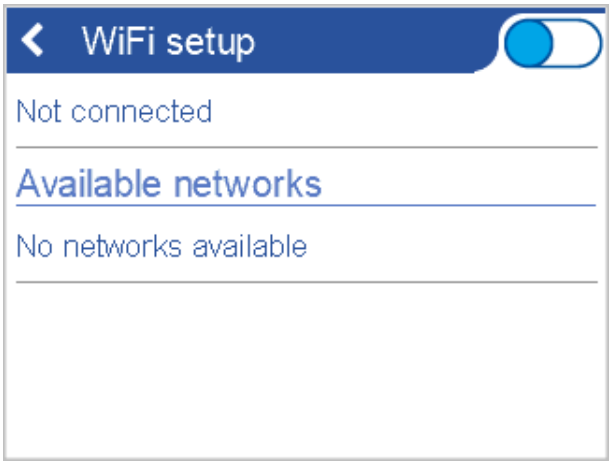
Confirm with the checkmark to enter the key.



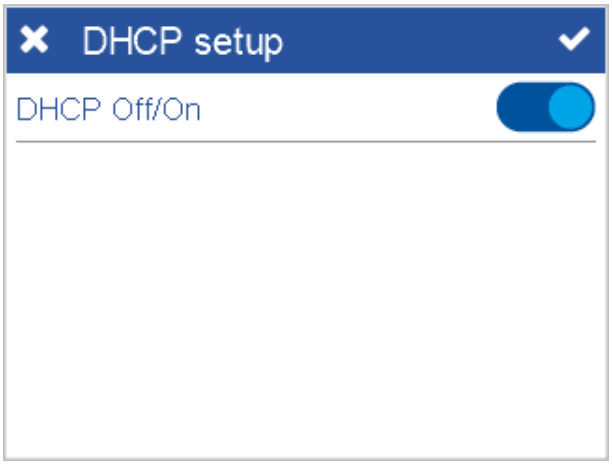
Confirm with the checkmark to apply the key. Depending on your country the selection dialog can appear.



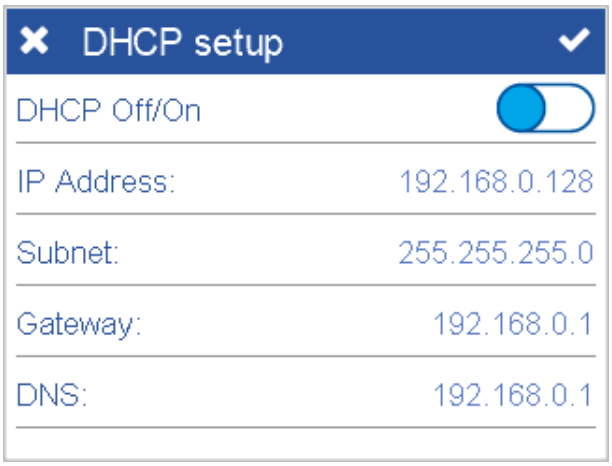
Select your country and confirm to continue with the network selection.



Activate the WiFi with the toggle button and select the desired network from the list. 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.



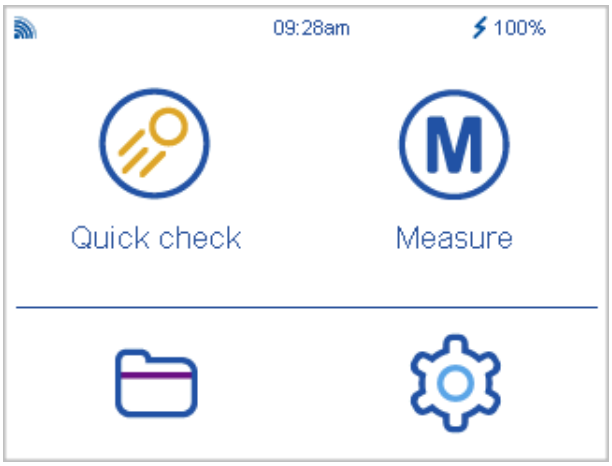
Accept your changes to enter the WiFi key; required if the network is secured.



The instrument connects to the network. A confirmation message is displayed.



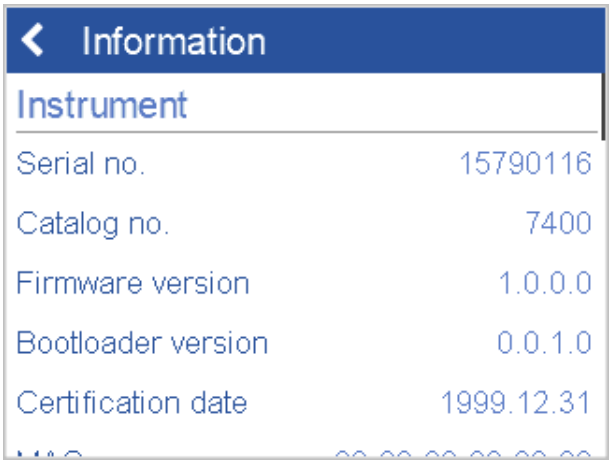
Accept the message. You are connected to the network. In the dashboard the WiFi symbol is shown indicating the current field strength.



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

8.3 System Information

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



Following data is displayed:

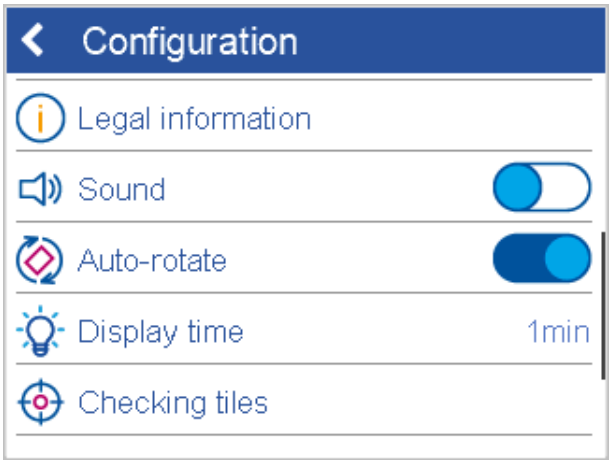
- Serial Number: The unique ID of your instrument.
- Catalog Number: The order number in our products catalog.
- Firmware Version: The current version of the system software.

- 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.

8.4 Auto-Rotation

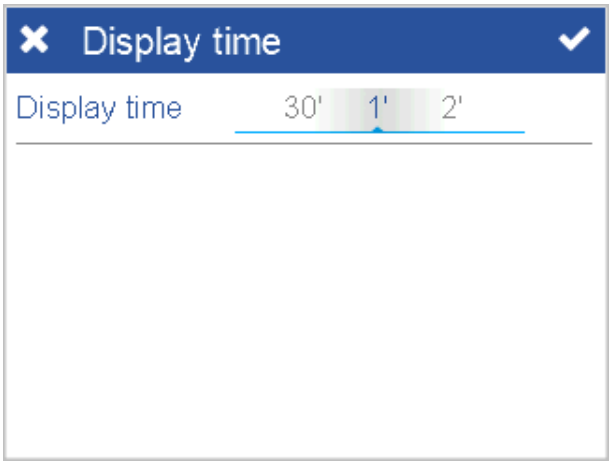
This option can be used to switch off the automatic display rotation.



When switching to OFF, the current orientation is saved and remains.

8.5 Display Time

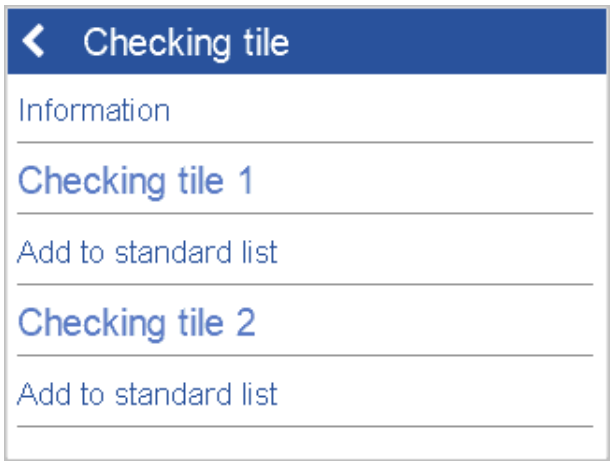
You can configure the time interval for the automatic shutdown of your instrument.



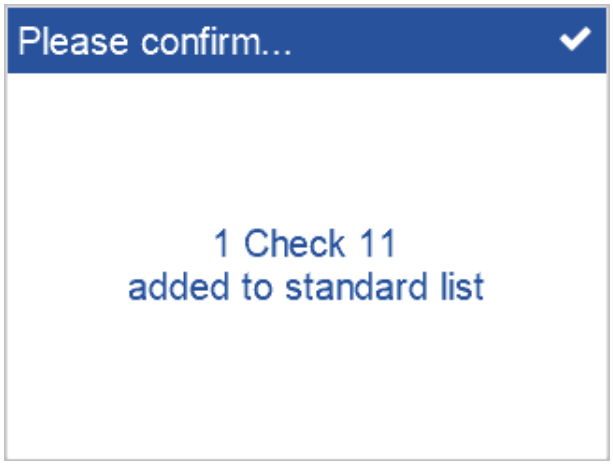
Following values are possible (in minutes): 1, 2, 5, 10, 15, 30.

8.6 Checking Tiles

To document the correct measurement status of your instrument, you can save the checking tiles in the system memory. Select the option **Add to standard list**.



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



Now you can use the function Standard Measurements [▶ 30] to check the tolerances. Details see Testing the Instrument [▶ 25].

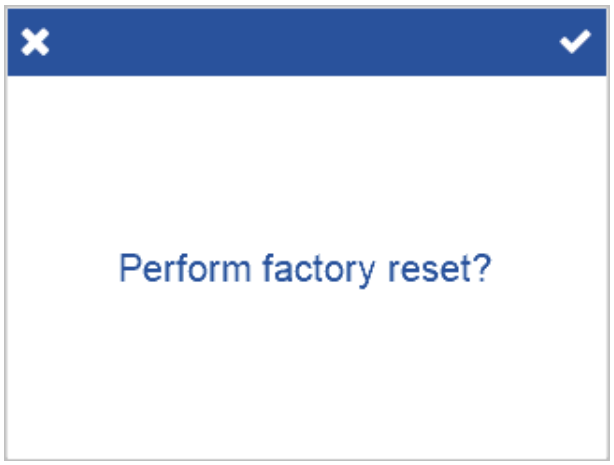
If the differences are within your tolerances, you can continue to measure with your instrument. Otherwise clean the standards and repeat, see Cleaning Instructions.

NOTICE

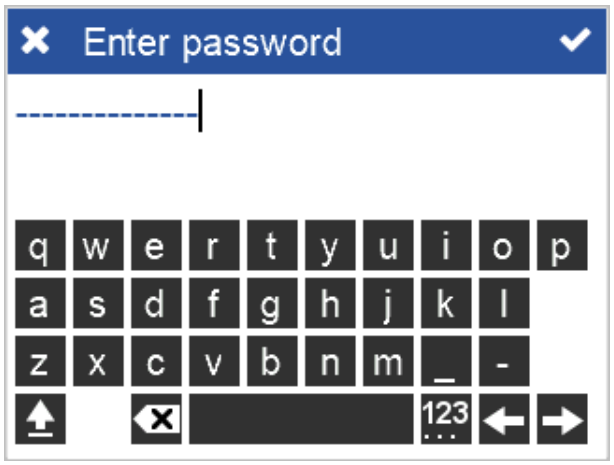
All measurements on the checking tiles are stored in the instrument. Transfer the measurement data to “smart-chart” to document all test case performed.

8.7 Factory Reset

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



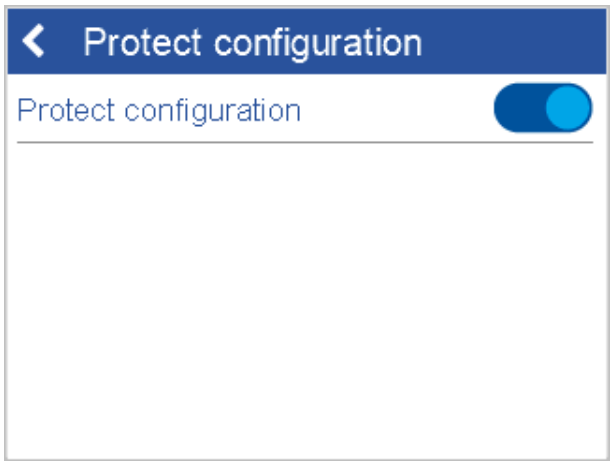
Confirm the security message to perform the fallback. You must enter the password “byk-instruments”, see also Technical Data > section **General Data**.



After fallback all your personal configuration and measurement data in the device will be lost. The instrument starts in a fresh state.

8.8 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 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 dashboard by entering the password.

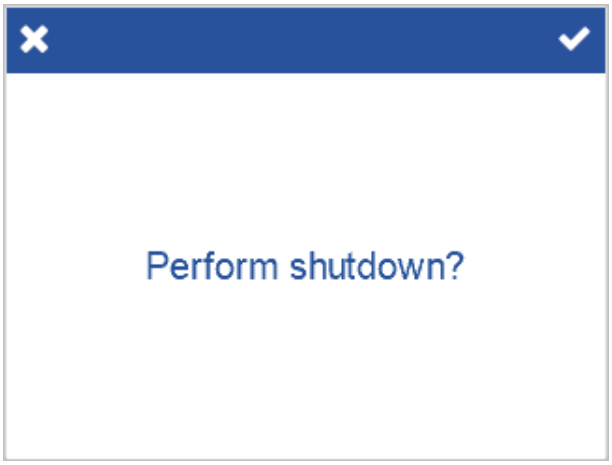
NOTICE

Save 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.

8.9 Shutdown

The instrument is switched off automatically after the time interval configured, see Display Time [▶ 57].

Select **Shutdown** to switch off the instrument manually – e.g., before you remove the rechargeable battery pack.



The instrument switches off after confirmation.

9 Appendix

9.1 Application Hints

This section lists the common measurement tasks and the recommended procedure.

9.1.1 Single Measurements

For occasional sample-measurements:

- Take readings, see chapter Quick Measurements [▶ 26].
- Transfer results directly to “smart-chart”.

9.1.2 Regular Test Series

Here test sequence / identification can be standardized - e.g., batch control:

- Take readings, see chapter Standard Measurements [▶ 30].
- Transfer results directly to “smart-chart”.

9.1.3 Objects with several Test Zones

Here test sequence / identification can be standardized - e.g., automobile or add-on parts:

- Create an organizer in “smart-chart”.
- Transfer organizer to the instrument.
- Take readings, see chapter Organizer Measurements [▶ 38].
- Transfer results to “smart-chart” and store in database.
- Perform data analysis in “smart-chart”.

9.1.4 Occasional Test Series

Here test sequence / identification cannot be standardized - e.g., projects:

- Generate new measurement configuration.
- Take readings, see chapter Standard Measurements [▶ 30].
- Transfer results directly to “smart-chart”.

9.2 Cleaning Instructions

For a professional cleaning of your instrument see:

- www.byk-instruments.com/preventive-maintenance

WARNING: Disconnect from power

Before cleaning, the instrument and accessories must be disconnected from the power supply as described in section Safety Instructions [▶ 7].

CAUTION: Stay away from measurement aperture

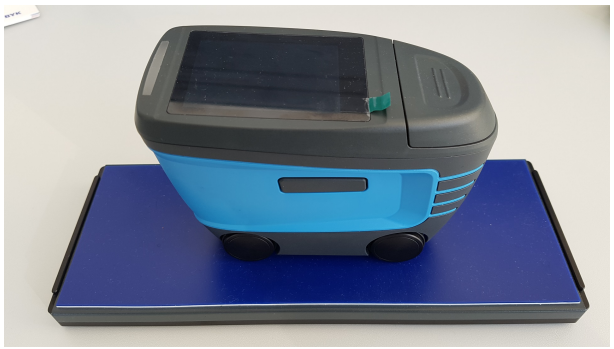
Do not insert any objects into the measurement aperture for cleaning. The instrument could get damaged, affecting a proper and safe operation.

WARNING: Do not use any acetone!

The instrument housing is resistant to a number of solvents but cannot be guaranteed to withstand all chemicals. You should therefore use a soft, moist cloth for cleaning. For cleaning excessive dirt, use propanol.

9.2.1 Cleaning the Instrument

A cleaning mat to clean the wheels measurement unit is situated on top of the cover for the reference tiles.



To clean the wheels, roll the measurement unit several times over the blue mat and then over a clean sheet of paper. Dirt will stick to the mat and can be removed with clear water.



Check if the cleaning was sufficient and repeat the procedure if required.

9.2.2 Cleaning the Test Tiles



WARNING: Do not use any acetone!

The accuracy of the measurement can be significantly impacted by using dirty or damaged standards.

Since the surfaces of the standards are highly sensitive, cleaning must be undertaken with great care.

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 liquid. Then wipe the surface with a dry optical cloth.



NOTICE

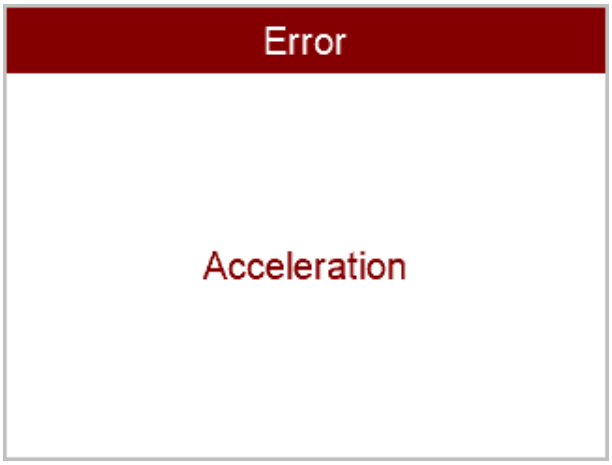
Exact calibration is not possible unless the standard is in perfect condition. If the condition of the standard seems doubtful because of its appearance or measurement errors, we will be happy to check it for you.

9.3 System Messages

Measurement errors are indicated by type. Confirm with button **Operate**.

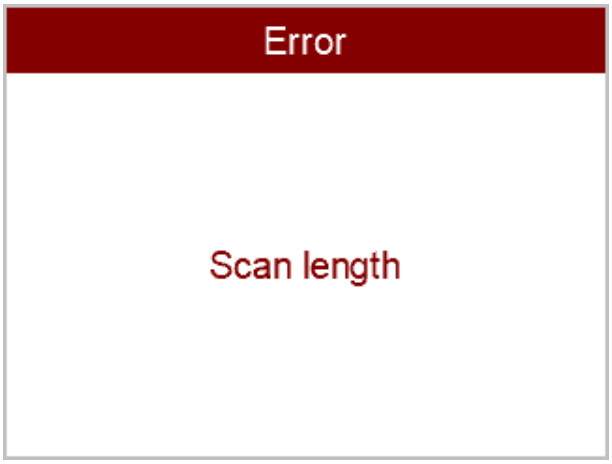
Acceleration

The instrument was accelerated too fast across the sample, or the scan direction was changed too fast. Repeat the measurement.



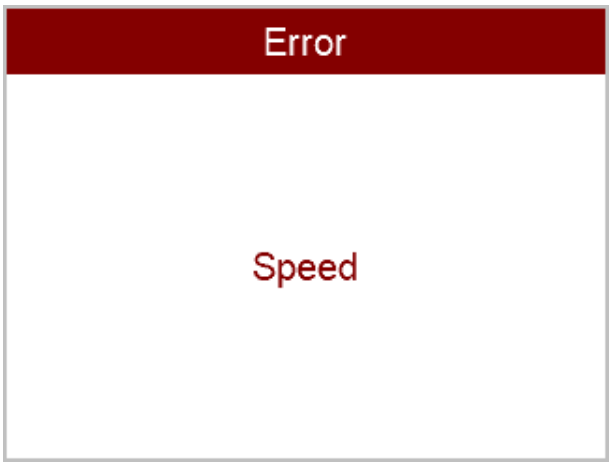
Scan length

The required scan length has not been reached completely. Repeat until a short audio confirmation is heard. Small areas can be measured by moving the instrument back and forth.



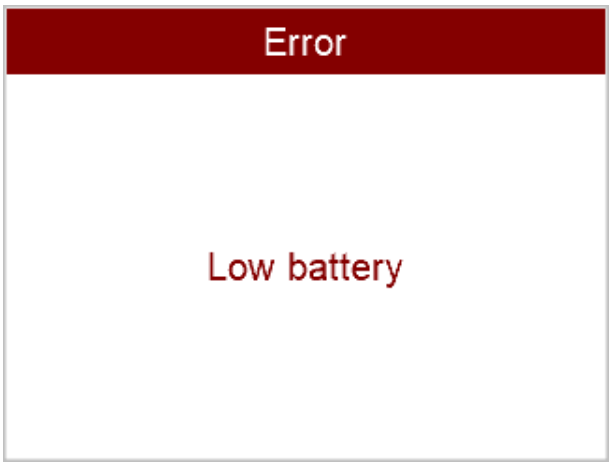
Speed

You have moved the measurement unit too quickly or unevenly over the sample. Repeat the measurement.



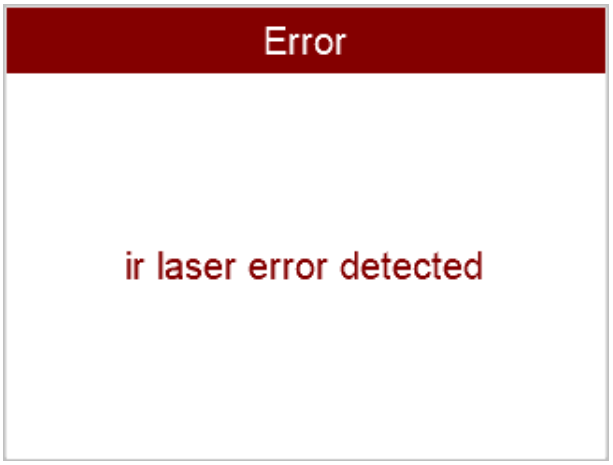
Low battery

The rechargeable battery back has insufficient capacity left to power the instrument. Charge or replace battery pack.



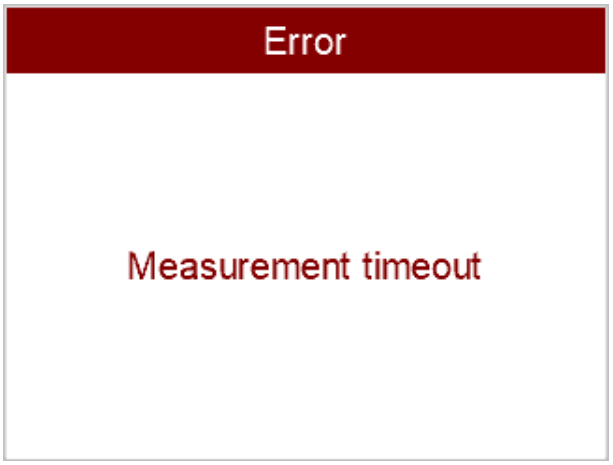
Infrared laser

The infrared laser in the instrument is not working correctly. Repeat the measurement. If the error remains, try cleaning the instrument. If this does not help, contact your local service center.



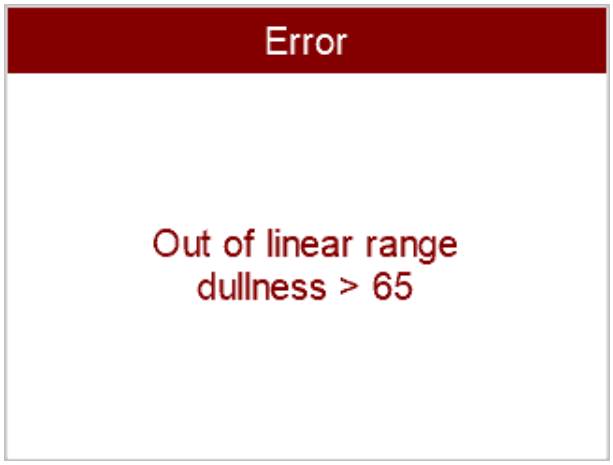
Measurement timeout

The device stopped for more too long. Repeat the measurement.



Linear range - dullness

The measurement was performed on a surface with low image forming qualities.



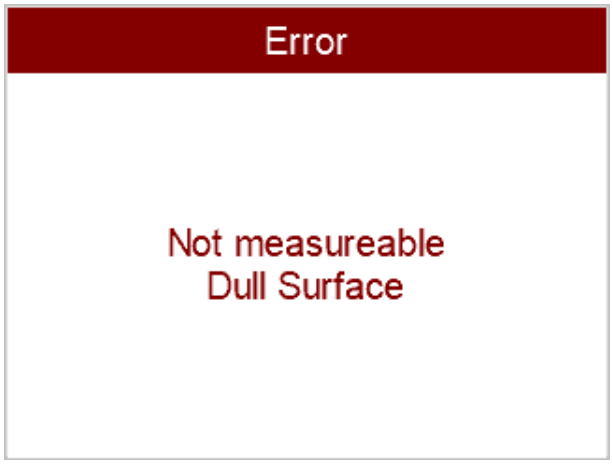
High dullness

The measurement was performed on a too matt surface.



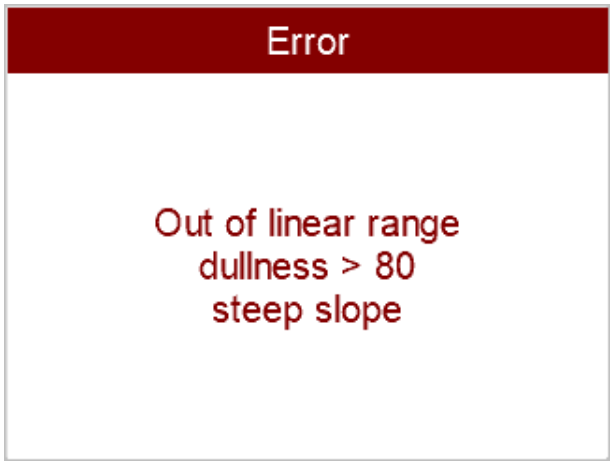
Dull surface

The measurement was performed on a too matt surface. No measurement values can be displayed.



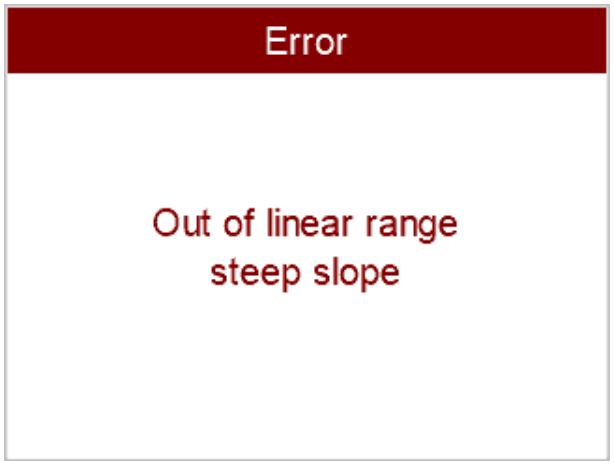
Linear range - steep slope

The measurement was out of the linear range.



Steep slope

The measurement was performed on a surface with steep structure slops.



Very steep slope

The measurement was performed on a surface with very steep structure slops. Samples with different image forming quality are not comparable!



9.4 Global Services

Besides the repair of your instrument, we offer the following additional services.

9.4.1 First Diagnosis on the Telephone or by E-mail

Call us or send us an e-mail and we will try to solve your problem. If this is not successful, please send us the instrument for repair.

9.4.2 Preventive Maintenance, Calibration, and Recertification

For precautionary reasons we recommend regular preventive maintenance. We carry out this preventive maintenance automatically when you send us your instrument for maintenance and recertification.

We clean the optics, check all functions, test and, if required, adjust the measured values by using reference standards.

You will receive a certificate, which can be retraced to international standards. Details see:

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

9.4.3 Provisioning of Loaners

During the period of repair, we furnish you with a loaner on request and availability.

9.4.4 Maintenance Agreement

In case you want to make sure that the necessary maintenance is being done on a regular basis and on time, we recommend a maintenance agreement.

9.4.5 Extended Warranty Contracts

Furthermore, you can request an extended warranty contract for additional 12 months. Ordering Information:

- SE-4840 Extended Warranty

9.5 Replacements

Following accessories and replacements can be ordered.

9.5.1 Measurement Unit

- **7400**: wave-scan 3 dual
- **7403**: wave-scan 3

9.5.2 Accessories

- **4831**: Software smart-process
  Software for professional analysis and documentation of color and appearance.
- **7401**: Docking station
  Incl. USB cable and power supply 100 - 240 V - self adapting.
- **7402**: Li-Ion battery pack
  Rechargeable battery for automatic charge in the docking station.

9.5.3 Checking Tile Replacement

Please contact your local service department for replacement of your checking tile.

- **7404**: Checking tile for wave-scan 3 dual
- **7408**: Checking tile for wave-scan 3

9.5.4 Service Departments

To find your nearest local service department refer to:

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

See also section Service Points [▶ 73].

9.6 Technical Data

9.6.1 Measuring Data

Light source	Laser diode (LED) and infrared super-luminescent diode (IR-SLED)
Laser diode	Laser class 1, P ≤ 390 µW, λ=670 nm, DIN EN 60825-1:2015-07
Measurement range	For wave-scan 3: High-gloss surfaces: Dullness < 40, linear range For wave-scan 3 dual: High to semi-gloss: Dullness < 65, linear range
Structure spectrum	Dullness (du): < 0.1 mm Wavelength a (Wa): 0.1 to 0.3 mm Wavelength b (Wb): 0.3 to 1.0 mm Wavelength c (Wc): 1.0 to 3.0 mm Wavelength d (Wd): 3.0 to 10.0 mm Wavelength e (We): 10.0 to 30.0 mm
Scan length	5 cm 10 cm 20 cm
Repeatability	For wave-scan 3: Dullness < 40: 4% or > 0.4 (standard deviation) For wave-scan 3 dual: Dullness > 40: 6% or > 0.6 (standard deviation)
Reproducibility	For wave-scan 3: Dullness < 40: 6% or > 0.6 (standard deviation) For wave-scan 3 dual: Dullness > 40: 8% or > 0.8 (standard deviation)
Object radius	> 500 mm
Smallest sample size	35 mm x 150 mm
Resolution	375 pixel per cm
Battery capacity	Up to 4,000 readings; depending on duty cycle and display-on time
Memory capacity	10,000 readings 4,000 standards 1,000 test series 50 organizers

9.6.2 Charging Data

Rechargeable battery pack	3.6 V ⎓ ; 2350 mAh ; 8.46 Wh
Charging	4.2 V ⎓ ; max. 2.0 A
Docking station	Power supply: 12 V ⎓ ; max. 2.0 A (power supply) 5 V ⎓ ; max. 0.5 A (USB-B) Dimensions (LxWxH): 205 x 78 x 88 mm Weight: Ca. 800 g
External power supply	Input: 100 - 240 V ~ ; 50/60 Hz ; max. 1 A Output: 12 V ⎓ ; 3 A ; 36 W Dimensions (LxWxH): 50 x 100 x 33 mm Weight: Ca. 180 g

9.6.3 General Data

Temperature range	10° C to 40° C for operation 0° C to 60° C for storage
Rel. humidity	Up to 85% non-condensing at 35° C
Weight	Ca. 700 g
Dimensions (LxWxH)	147 x 111 x 69 mm
Interface	USB 2.0
Password for factory reset	byk-instruments

You can find more details about your product on our website:

- For wave-scan 3 dual: https://www.byk-instruments.com/p/7400
- For wave-scan 3: https://www.byk-instruments.com/p/7403

9.7 Service Points



Global service centers with ISO / IEC 17025 accredited laboratories

Headquarter

BYK-Gardner GmbH

Lausitzer Strasse 8, 82538 Geretsried, Germany

Service Point USA c/o BYK-Gardner USA 9104 Guilford Road, Suite H, Columbia, MD 21046, USA	**Service Point Austria, Hungary, Slovenia** c/o Friedrich W. Bloch GmbH Wagramerstrasse 201, 1210 Vienna, Austria	**Service Point France** c/o Eckart France S.A.S. 27 Allée du Chargement, 59650 Villeneuve d'Ascq, France
Service Point Spain c/o Actega Artística S.A.U. Calle Balmes 8, Suite: 3º 2ª, 08291 Ripollet, Spain	**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	**Service Point India** c/o IMCD India Private Limited 1101-03, B-Wing, ONE BKC, Bandra Kurla Complex, Bandra East, Mumbai, MH. Pin.: 400 051. India
Service Point Japan c/o Tetsutani Co. Ltd. Chuo-ku, Osaka, Tokui cho 2-2-2, Japan	**Service Point South Latin America** c/o MAST Comercial e Importadora LTDA Rua Itaporanga, 340-B, Bairro Paraiso, Santo André - SP, 09190-640, Brazil	

Complete list: https://www.byk-instruments.com/global-service-centers
Authorized agents: https://www.byk-instruments.com/contact-infos

A member of ALTANA

Download your manuals from:
https://www.byk-instruments.com/global-search/7400

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

BYK-Gardner GmbH
Lausitzer Strasse 8
82538 Geretsried
Germany

Tel +49 08171 3493-0
Fax +49 08171 3493-140

info.byk.gardner@altana.com
www.byk-instruments.com

BYK

301 200 085 E 2608