GlassBuddy Plus®

Bohle

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Thank You

for purchasing the Glass*Buddy* Plus, a top quality measuring device for analysing flat glass. Regardless of whether you analyse single-pane, laminated or insulated glass units, fitted or not, you deal with monolithic glass, or 1-gap or 2-gap insulating glass – with the press of a button the laser technology in the device will provide you with information about glass thickness, the composition of the glazed units, coatings, interlayers and their position, all with only one measurement and an accuracy of +/- 0.1 mm. Please read the operating instructions carefully to familiarise yourself with the operating procedures and allow you to get the most out of your new Glass*Buddy* Plus.

Intended Use

The Glass*Buddy* Plus is an optical measuring device for determining the thickness of monolithic glass compounds, 1-gap and 2-gap insulating glass, even when already installed. Additionally, up to three highly reflective coatings can be detected. Especially in the case of coatings which do not interact sufficiently with the used laser wavelength or in case of glazed units which strongly deviate from the standards, erroneous results may occur in individual cases (weakly reflective/absorbent coatings). Therefore, the measurement results should always be checked with due expertise. The Glass*Buddy* Plus also recognises some of the coatings currently available on the market. Fire resistant glazing with intermediate layers of fire protection gel as monolithic glazing or as double insulating glazing (see also chapter 05). The maximum measurable glass thickness in relation to the space between the panes (SZR) is 100 mm (see also chapter 12). The Glass*Buddy* Plus is not suitable for detecting and measuring plastic panes (acrylic glass, polycarbonate, etc.), neither as glazed unit nor as individual panes. The Glass*Buddy* Plus is a high-precision device which can determine the thickness and the composition of glazed units by means of an optical evaluation of laser beam reflections and light refraction. This procedure requires that the Glass*Buddy* Plus is previously set to detecting certain specifications. Additionally, coatings and their position, as detected with the laser used, can also be displayed. We strive to regularly update the software with new compound types in order to guarantee a reliable measuring result. The Glass*Buddy* Plus is designed for interior use.

Safety Instructions

This manual must be printed and kept in the vicinity of the device for the entire duration of its service life. The manual forms part of the device and must be handed over to every subsequent owner or user. The device and its accessories are exclusively intended for commercial use and must be kept out of the reach of children (especially toddlers). The operator must be conversant with the relevant procedures to be observed according to the prevalent accident prevention regulations. Every person entrusted with operating the device must have read and understood this instruction manual and especially the safety instructions. All safety instructions contained in this manual and the safety instructions on the device must be observed. The device must only be operated in an impeccable condition. Modifications of the construction of the device are inadmissible. Opening the device terminates all statutory warranty entitlements. Only Bohle AG is entitled to perform repair works on the device. Please contact your dealer. For determining the glass thickness, the Glass*Buddy* Plus uses a class 2M laser source (<1mW). Please bear in mind the prevalent accident prevention regulations. Never look directly or with optical instruments into the laser beam. Make sure when using the device that no person(s) in the immediate surroundings is (are) harmed by the laser beam or its reflections.
The device must always be stored in the supplied carrying case. The rigidly installed accumulator must only be charged with the supplied USB C. Charge current: 5V, 500mA. Disconnect the cable as soon as the battery is completely charged.

Disposal

Waste electrical equipment must not be disposed of together with the standard, unsorted municipal waste for reasons of environmental protection and in order to enable a high recycling rate of electronic waste. Please arrange the professional disposal of the Glass*Buddy* Plus and its accessories at the end of their service lives. You can send the parts back to Bohle AG for proper disposal. Please contact your dealer. WEEE Reg. No. DE33122269

UK CA Declaration of Conformity

Bohle AG, Dieselstr. 10, D-42781 Haan

Authorised Representative for the Compilation of Technical Documentation:
Edgar Höhn, Bohle AG, Dieselstraße 10, D-42781 Haan, Germany

We hereby declare that the delivered models of the following products:

Glass*Buddy*	BO 5164755
Year of manufacture	starting from 2022

comply with the relevant provision:
Electromagnetic Compatibility Regulations 2016

Haan, May 2022

Dr. Thorsten Böllinghaus, Bohle AG Chief Technology Officer
Dieselstraße 10, D-42781 Haan, Germany

Intended Use

The GlassBuddy is a device to analyse different layers of monolithic flat glass and insulated glass.

All other applications are excluded.

Bohle does not accept liability if:
· The GlassBuddy is used improperly.
· The GlassBuddy is modified or altered without authorisation.
· Components or spare parts of other manufacturers are used.
· The GlassBuddy is used incorrectly or by non-authorised persons.
· The GlassBuddy is not serviced regularly.
· The warnings, instructions and regulations of this manual are not observed.

⚠ Warning

The device might present a danger if not used as intended!

· The GlassBuddy must be used exclusively according to its intended use.
· All procedures described in these operating instructions must be adhered to.

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Applicable harmonised standards:
DIN EN 61326-1:2006 „Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements"
EN 55022:2010 "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement"

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01 Contents of the Box

- 1 x Glass*Buddy* Plus
- 1 x Carrying case
- 1 x USB-C connection cable

02 Features of the Glass*Buddy* Plus

- Destruction-free analysis of glass, even when installed
- Measuring monolithic glass with a thickness between 2.6 mm and 19 mm
- Analysing laminated glass, multiple laminated glass, fire protection glass, double and triple insulating glass panes (only without fire protection function)
- Measuring up to a total build-up of 100 mm, see also chapter 12
- Recognition of PVB films (up to a max. of 8 films per compound), indication of their thickness and position
- Recognition of up to 3 coatings and determination of the coating position
- Accuracy: 0.1 mm, tolerance: 1% on measuring range
- Storage of up to 250 measuring results
- USB interface
- Simple and self-explanatory menu operation, graphic display
- High quality Li-ion battery for up to 8 hours of continuous operation

03 The Keypad

Despite the numerous functions of the Glass*Buddy* Plus, only a few keys are needed. The user interface is intuitive and can be learned quickly and easily. This chapter explains the functions of the individual keys.

Press

- to switch the Glass*Buddy* Plus on
- to start measuring

- to save the results after the measurement
- to confirm input

- to delete the current result
- to quit the menu
- to interrupt the deletion of saved data
- to delete error messages

- to go to the menu

- to scroll through the measuring results
- to scroll through the menu
- to adjust date and time
- to switch on the light

04 The Display

Explanation of the symbols used

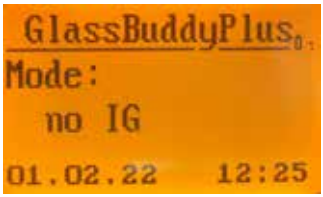
4 or 4.2	Glass thickness, film thickness or air gaps between panes in mm or inch or as inch fraction
« or »	Coating position, the direction of the arrow indicates the position
!	Signal indicating that not all properties could be detected unequivocally.
G1, G2, …	Glass pane with position
G 1.1, G 1.2	Glass pane with position in laminated compound
SZR1, SZR2	Air gap and its position
Film 0.38	Thickness of the film used within the compound
Gel 1,4	Thickness of the fire protection gel used within the compound
Layer 4,3	Thickness of the interlayer used within the compound

05 First Steps

Basic Information about Working with the Glass*Buddy* Plus

Press and hold for approximately 2 seconds to switch the Glass*Buddy* Plus on. Choose the glass type you wish to analyse on the four-line illuminated display (see also sub-item “GLASS TYPE”).

After choosing, the Glass*Buddy* Plus will inform you about today’s date, the time and the selected glass type.



For energy-saving reasons, the display lighting will switch off after approximately 60 seconds; however, it can be switched on again by pressing or . The Glass*Buddy* Plus will switch off automatically after about 10 minutes if no keys have been pressed.

Explanation of the Menu Items

The menu can be accessed via ; or allow you to select between the various menu items: The respectively active menu item is located in the centre and bordered by arrows to the right and left sides. For selecting a menu item, press the button.

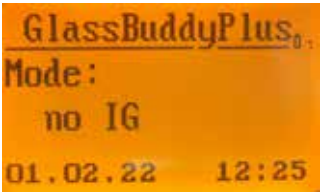
Off

This button will switch the Glass*Buddy* Plus off.

Glass Type

Here you can select the type of glass you wish to analyse by pressing the keys. Confirm your selection with .

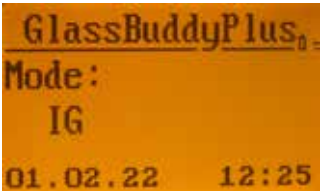
- No insulating glass (menu display: no IG)
  – for the analysis of 2.6 mm to 19 mm monolithic glass
  – for the analysis of monolithic laminated and laminated safety glass (lam and lam-safety)
  – for the analysis of monolithic multi-laminated glass (multi-lam), with the exception of fire protection glass



Note: If you measure other glass types with this setting, this can lead to erroneous measuring results.

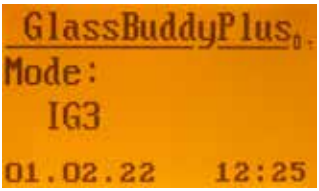
EN

- Insulating glass (menu display: **IG**)
  – for the analysis of 1-gap insulating glass made of 2 x monolithic glass
  – for the analysis of 1-gap insulating glass with laminated glass
  – for the analysis of 1-gap insulating glass with laminated safety glass
  – for the analysis of 1-gap insulating glass with multi-laminated glass, with the exception of fire protection glass



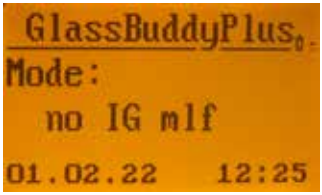
Note: If you measure other glass types with this setting, this can lead to erroneous measuring results.

- IG3 glass (menu display **IG3**)
  – for the analysis of 2-gap insulating glass made of 3 x monolithic glass
  – for the analysis of 2-gap insulating glass with laminated glass
  – for the analysis of 2-gap insulating glass with laminated safety glass



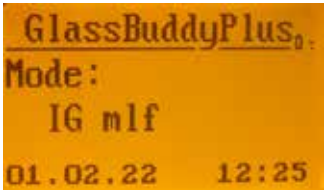
Note: If you measure other glass types with this setting, this can lead to erroneous measuring results.

- Not IG fire protection glass
  (Menu display: **not IG mlf**)
  – for the analysis of monolithic multi-laminated glass (multi-lam) as fire protection glass



Note: If you measure other glass types with this setting, this can lead to erroneous measuring results. Only fire protection gels from 1.4 mm - 3.2 mm are displayed as "Gel". Fire protection gels from 3.9 mm - 7.0 mm are displayed as "Layer". Build-ups deviating from this cannot be measured correctly.

- IG with fire protection glass
  (Menu display: **IG mlf**)
  – for the analysis of 1-gap insulating glass with multi-laminated glass as fire protection glass



Note: If you measure other glass types with this setting, this can lead to erroneous measuring results. Only fire protection gels from 1.4 mm - 3.2 mm are displayed as "Gel". Fire protection gels from 3.9 mm - 7.0 mm are displayed as "Layer". Build-ups deviating from this cannot be measured correctly.

The selected glass type setting is displayed in the menu.

Note: The GlassBuddy Plus *will automatically return to the default settings once the device is switched*
off. When switching it on again, you must select the glass type again.

Average

In order to carry out an average measurement, you must first select the correct glass type. You can activate the average measurement in the menu under the menu item "Average". The Ø sign next to the

glass type indicates that the average measurement is activated. Up to 19 individual measurements can be used in order to generate an average measuring result. The individual measurements are carried out one by one by repeatedly pressing and sorted alphabetically. After completing 2 to 19 individual measurements, the arithmetic mean is calculated by pressing . For a better overview, the average measurements displayed in the "Display data" mode are marked with a space after the first two numbers. The individual measurements are named consecutively beginning with "a".

Example:
03a310113_1415
03b310113_1416
03c310113_1417
03_310113_14:18

The first two numbers stand for the number of the measurement. The third item indicates the sequence of individual measurements. The following numbers are reserved for date and time. If the third item has an underscore _, this indicates the calculated average value.

As all individual and average measurements can be saved if desired, unrealistic measured values can still be detected ahead of time.

Settings
You can adjust the following settings here:

Language
Here you can reach the sub-menu by pressing after making a selection. You can change the settings using the or keys. Confirm your changes with .

Note: In order to prevent an inadvertent, permanent change of the language, the GlassBuddy Plus *changes back to the previously chosen language when switching the device on again. In order to permanently change the language, connect the GlassBuddy* Plus *to the PC and then adjust the language as described above.*

Units
Here you can reach the submenu by pressing after making a selection. You can change the settings using the or keys. Confirm your changes with .

Note: To prevent accidental, permanent adjustment of the unit, the GlassBuddy Plus *will revert to the previously set unit when it is switched on again. To permanently change the unit, connect the GlassBuddy Plus to the PC and only then set the unit as described above.*

Version
Displays the serial number of the device and the device firmware version.

Date
Here you can reach the sub-menu by pressing after making a selection. You can change the settings using the or keys. Confirm your changes with .

Time
Here you can reach the sub-menu by pressing after making a selection. You can change the settings using the or keys. Confirm your changes with .

Font Size
Here you can reach the sub-menu by pressing after making a selection. Here you can change the settings using the or keys . Confirm your changes with .

Note: In the symbol language, the font size cannot be changed to a smaller size.

Information About the Device
Display of the device information which can be saved in the device as customised entries such as company name and address. This information can be entered with the aid of the PC software (see chapter 11).

Delete Data
Here you will be asked if you really want to delete all measuring results after pressing . It is not possible to delete only individual measurements. By pressing again, all saved measuring results will be deleted. Press to return to the menu without deleting the data.

Show Data
Here you can display a list of your previously saved measurements by pressing ✓. By pressing the ▲ or ▼ keys you can select the measurement result of your choice and display it by pressing ✓.

06 Analysing Glass with the Glass*Buddy* Plus

The glass must always be clean and dry. Even a fingerprint can cause unwanted refraction and consequently incorrect measurement results. Glass that is laid flat should always be placed on a dark, non-reflecting base (e.g. a black felt cloth) for analysis, as incorrect results can occur on reflective bases. Already installed insulated glass panes should be preferably analysed in the marginal areas.

Switch on the Glass*Buddy* Plus, select the glass type (see point 5) and place it on top of the glass surface in a way that all plastic feet touch the glass and keep the device from slipping. Press ⏻. The light turns off and the following message appears on the GlassBuddy Plus display:

Measuring –
please wait …

Note: The GlassBuddy Plus *should not be moved during the measuring procedure as this could lead to inaccurate measuring results. After 1-2 seconds, the light will turn on again and you can remove the GlassBuddy* Plus *from the glass.*

The measurement result is shown on the display.

Use ▲ or ▼ to scroll through the measuring results. After the rounded individual measurements, the single values (accurate to +/-0.1 mm) are displayed. Afterwards the structure of the glass pane is shown graphically. The graphical display shows the structure from left to right as analysed by the Glass*Buddy* Plus. The measuring results are shown in a scrolling display.

The measuring result can be rejected with ✕.

When pressing ✓, you can choose between the following options:

Save
The current measuring result can be saved in the Glass*Buddy* Plus by pressing ✓. The result is saved under the number shown in the top left of the Glass*Buddy* Plus display together with the result.

Hint: If in individual cases the message "Measurement not possible" appears on the display after measuring, even this result can be saved, also see chapter 8.

Reject
You can delete the current measuring result by pressing ✓. You can always directly delete the result by pressing ✕.

07 Reading the Measurement Results

After the measuring procedure described above, the Glass*Buddy* Plus shows the result on the illuminated display. You can page up and down the measuring results row by row with the ▲ or ▼ keys.

In the first row, the Glass*Buddy* Plus shows the position under which the measuring result is saved (here position 05; there are a total of 250 memory slots available). After this you can see the date and the time of the measurement.

In the second line, the Glass*Buddy* Plus displays the measured total thickness of the measured object.

The details of the pane composition, rounded to trading thicknesses, are displayed starting from the third line. Afterwards the measuring results of the individual layers are displayed, followed by the graphical presentation of the configuration of panes. The measuring results are shown in a scrolling display.

08 Error and Warning Messages

Please make sure that the Glass*Buddy* Plus is able to measure correctly. The Glass*Buddy* Plus uses the reflection of a laser beam for measuring and calculating the result. Everything which has an influence on the individual interlayers, also has an influence on the calculated result.

The Glass*Buddy* Plus uses a number of messages to notify you of errors or warn you about the battery status. All information is shown in plain text and can be deleted by pressing .

- "Measurement not possible"
  – This message appears if the object you are measuring does not generate any reflections which the Glass*Buddy* Plus can convert into a reading.
  – This message also appears if the total thickness of a glass pane is less than 2.6 mm.
  – The message "Measurement not possible" does not mean that the measurement has not taken place. The Glass*Buddy* Plus was just not able to calculate a reasonable result. Therefore, a measurement was carried out. This measurement can also be saved. By sending the file in .gdm format to *glassbuddy@bohle.de*, you can assist us with troubleshooting and further developing the device. Analysing the data records is not possible with the supplied PC programme and can only be done by Bohle.
  – This message appears if the Glass*Buddy* Plus receives an odd number of reflections from the measuring procedure.

Reason: e. g. a tinted pane, where only the surface gives off a reflection and the laser cannot penetrate to the underneath of the pane
Reason: A very light coloured base on which the glass is lying can give off an additional reflection.

Solution: Place the glass for analysis on a dark non-reflecting base.

- Details not available
  – This message appears if the Glass*Buddy* Plus is able to measure the total thickness but cannot determine any further details about the configuration of panes.

- "No IG"
  – This message can appear for the setting "no IG", if you try to analyse a glass structure other than no IG.

Solution: Please check the settings and change them if necessary.

- "No IG"
  – This message can appear for the setting IG, if you try to analyse a glass structure other than IG.

Solution: Please check the settings and change them if necessary.

- "No IG3"
  – This message can appear for the setting "ISO3", if you try to analyse a glass structure other than 2-gap insulating glass.

Solution: Please check the settings and change them if necessary.

- "Battery empty"
  – This message appears if the battery charging status is below 5%.

Solution: Please charge the battery. To be able to continue measuring, charging for 5 to 10 minutes will suffice.

- "Glass too highly reflective"
  – This message can appear when analysing highly reflective glass.

Solution: Not every highly reflective or mirrored glass can be measured. The measurement might be successful from the rear side of the glass.

- "Memory full"
  – This error message appears when all 250 memory slots are full. If you have saved the average measurements, they will occupy several storage locations!

Solution: Before saving more data, you should transfer the saved measurement results to your PC and then delete all data saved in the Glass*Buddy* Plus (see section 5).

- "Glass outside measuring range"
  – This error message appears if the complete structure of the pane exceeds the measuring range of 100 mm.

- "Error"
  – This error message appears if there is an internal error in the Glass*Buddy* Plus.

Solution: If the message Error is repeated, the Glass*Buddy* should be returned to the manufacturer for inspection.

- "No Data"
  – This message appears if there is no data in the memory that can be shown.

09 Charging the Battery

When the battery is fully charged, the device can work permanently for at least 8 hours. When charged, the battery usually lasts for one to two weeks under normal conditions of use. At a battery status of approximately 10%, you will be shown the message "Charge battery". Measurements can still be taken but the Glass*Buddy* Plus should be charged as soon as possible to ensure problem-free operation.

For charging the battery, connect the Glass*Buddy* Plus with the supplied USB cable to a suitable USB port. The USB port used must be able to provide 5V, 500mA.

When the battery is almost empty, it takes approximately 120 minutes to charge it to 100% again (if the Glass*Buddy* Plus remains switched on during charging, the charging time is longer). The Glass*Buddy* Plus will indicate when the charging process is over. The display will then show PC connection - battery is charged, but the Glass*Buddy* Plus has to be switched on for this message to be displayed.

The Glass*Buddy* Plus contains a permanently installed top quality Li-ion rechargeable battery with a very long service life. If the performance of the battery diminishes over the years, Bohle can replace it for a fee.

10 Care and Maintenance

To avoid damage or malfunctions of your Glass*Buddy* Plus, please strictly observe the following:

- The Glass*Buddy* Plus must always be stored in the supplied carrying case as this is the only way to effectively prevent damage.
- To avoid damage, the Glass*Buddy* Plus must only be operated and/or stored at temperatures between +5°C and +40°C.
- The Glass*Buddy* Plus must not be exposed to vibrations or impacts.
- The Glass*Buddy* Plus is neither dust- nor waterproof. Therefore keep it away from the relevant sources of contamination.
- Only clean the display window and casing with a dry, clean and soft cloth. Under no circumstances must cleaning liquids, thinning or abrasive agents be used for cleaning.
- The laser opening and the sensor slit may only be cleaned carefully (!) with a dry, clean and soft brush or with clean compressed air.
- Never remove the plastic feet from the device. If one foot or several feet become loose, the device must be sent to Bohle AG for installing new feet and calibrating the device accordingly. These repair works involve costs. Please contact your dealer.
- Repairs may only be performed by the manufacturer, please contact your dealer.

11 Installation and Operation of the Glass*Buddy* Plus Software

Installation of the Glass*Buddy* Plus software must be done with full administrative rights to the computer. Use with another operating system, eg iOS or Android, is only possible with emulator software.

Download / Installation Software

Please download the GlassBuddy Plus software from our website www.bohle.com under article number BO 51 647 55.
After downloading, start the setup.exe programme in Explorer.

The programme will then be installed onto your computer. After installation you will need to restart your computer.

Programme Start

To start the Glass*Buddy* Plus programme, double-click the Glass*Buddy* Plus programme icon on your desktop.

Programme Description

This programme allows you to transfer data from the memory of the Glass*Buddy* Plus to your computer. To do this, the device needs to be connected to your PC via the supplied USB cable.

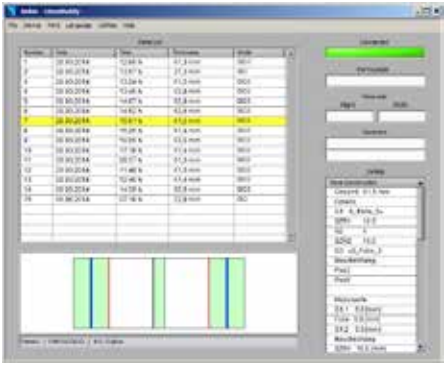
In addition, you can also call up any previously imported and saved data using the programme without a connection to the Glass*Buddy* Plus.

Programme Screen

Once the programme has started, you will see the empty programme screen with the following areas:

Pane List

The measurements transferred from the Glass*Buddy* Plus are listed here according to the sequential number. The date of the measurement, the time, the total thickness of the glass structure as well as the measuring mode are also shown.



The graphic shows you the pane composition of the selected glass in the corresponding list. The results for glass (green), film (blue), fire protection gel (yellow) and layer (purple) are highlighted in different colours.

The field below the graphic shows the following information about the device: name (if applicable), serial number and model number of the device firmware.

Connected

This field is dark green if the Glass*Buddy* Plus is not connected to the programme and light green if the Glass*Buddy* Plus is connected to the programme.

Component Number

Here you can assign a component number for the selected measurement.

Pane Size

Here you can indicate pane width and height for the selected measurement.

Comments

If you have selected a measurement from the pane list, you can add an individual comment to this measurement.

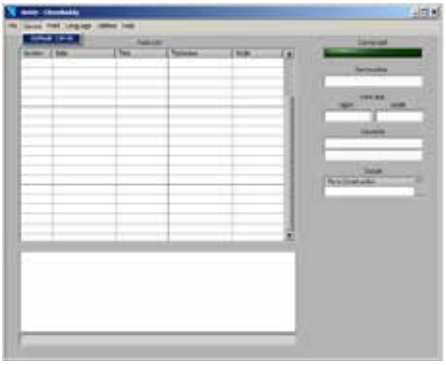
Details

If you have selected a measurement from the pane list, all the results will be shown in detail here.

Data Transfer from the Glass*Buddy* Plus

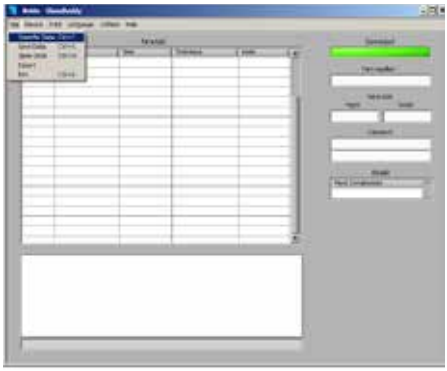
To transfer the data stored on your Glass*Buddy* Plus to your computer, first connect the device to your computer using the supplied USB cable. Use the USB-C port on the Glass*Buddy* Plus and a free USB slot on your PC. Switch the Glass*Buddy* Plus on. The display of the Glass*Buddy* Plus will show "PC connection" and "Battery charging" or "Battery charged". The Glass*Buddy* Plus is now connected to your PC.

Start the Glass*Buddy* Plus PC application. In the programme screen you will see the field "Connected", which is shown in dark green. The programme is not yet connected to the Glass*Buddy* Plus. To connect, please click on the menu item "Devices" and then select "Update" in the drop-down menu.

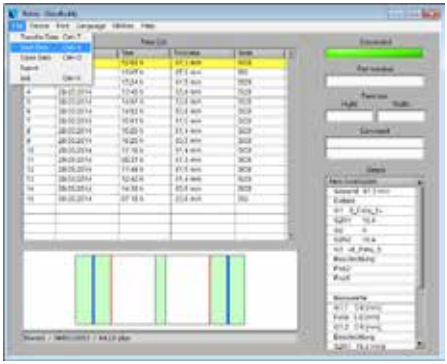


The programme is now connected to the Glass*Buddy* Plus. Once the connection has been established, the field "Connected" in the programme screen will turn light green. If this field does not turn light green, click on "Devices – Update" again.

To transfer the data stored in the Glass*Buddy* Plus, click on the menu item "File" and then on "Transfer Data" in the drop-down menu. After the data has been successfully transferred, the measurement results will appear in the pane list.



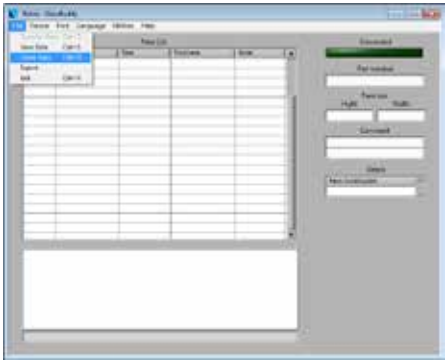
The transferred measurements can be stored on your PC. To do this, click on the menu item "File" and then on "Save Data" in the drop-down menu. You can then save the measurements under a file name of your choice. To finally save the file, please confirm, after entering the file name, by pressing Return or by clicking on "Save". Please use the menu item "Save Data" as standard saving method. A .gdm file is generated which can be called and displayed also by the PC application. Use the menu item "Export" for exporting the data in .csv format. The .csv file can subsequently be edited in a spreadsheet. We recommend saving the data in .gdm format for archiving them.



Calling Up Saved Data

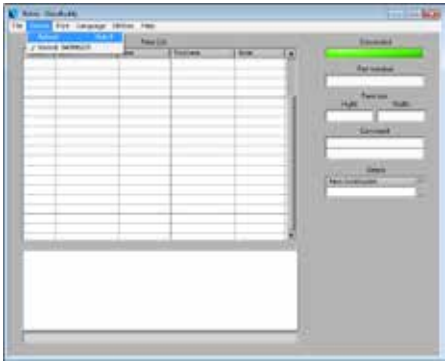
The .gdm files saved on the PC can neither be called nor displayed, nor can a comment or the pane size be added and saved again. To do this, click on the menu item "File" and then on "Open Data" in the drop-down menu. Select a saved series of measure-

ments and double-click on the file name or click on "Open".



Devices

Under the menu item "Devices", you will find the submenu "Update". If you are using several devices, this is a way of switching between the different Glass*Buddys* Plus. Only one Glass*Buddy* Plus can communicate with the programme at a time.

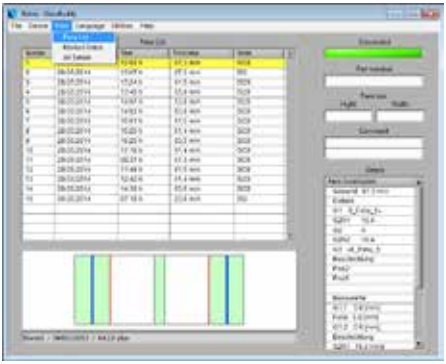


Print

You have a number of options for printing the measurement results. The results are printed on the standard printer which is set in the operating system.

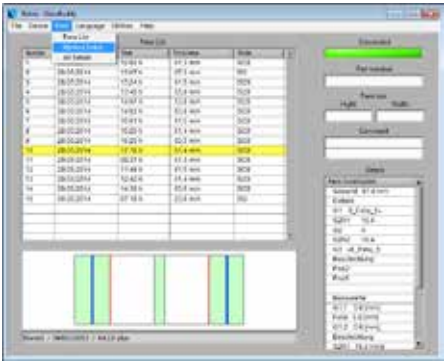
Pane List

Here, all listed measurements from the pane list will be printed as a list.



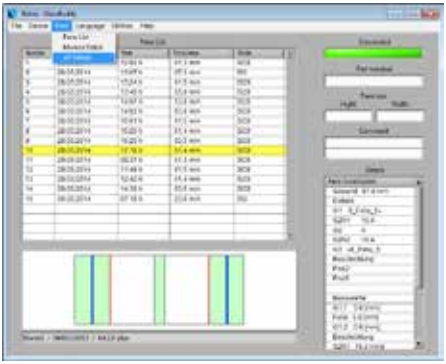
Marked Detail

If you have selected a measurement from the pane list, you can print the details relating to the measurement with any comments and any additional information you might want to add.

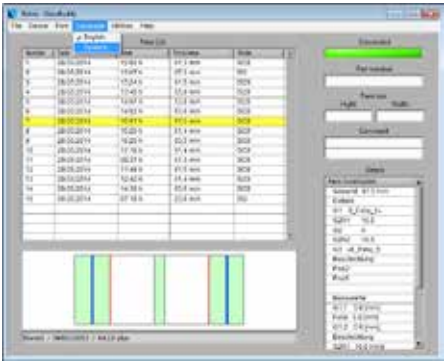


All Details

This option allows you to print all measurements stated in the pane list including the respective details. One page with details and comments and any other information you have added is printed per measurement.

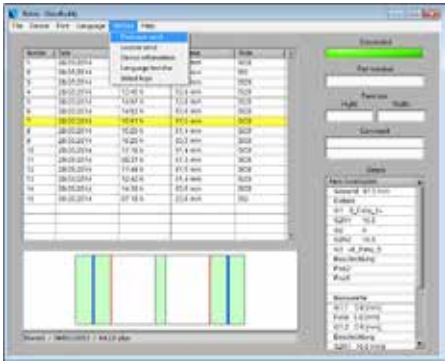


Language
In the “Language” menu you can choose between English and German.

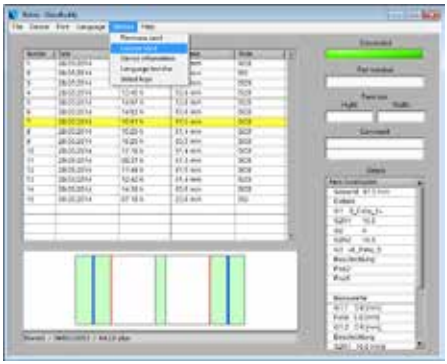


Auxiliary Options
Under the menu item “Auxiliary Options”, you can now find the following entries:

Send Firmware
In this way, the firmware of the connected Glass*Buddys* can be updated (see point 13).

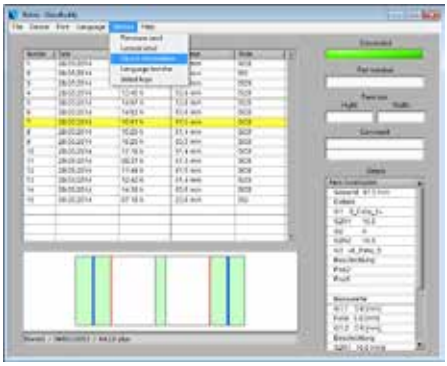


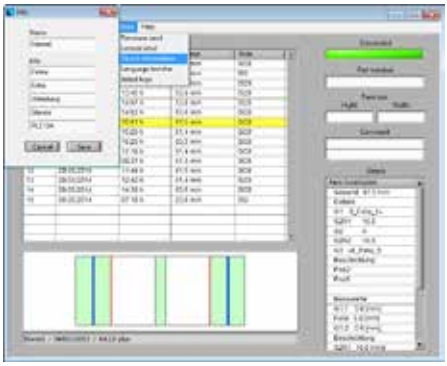
Send Licence
With this menu item, you can send a license file to your Glass*Buddy* Plus in order to carry out an upgrade (involving costs) of Basic to Plus. Please contact us if you are interested.



Device Information
Here the user can customise the Glass*Buddy* Plus settings.

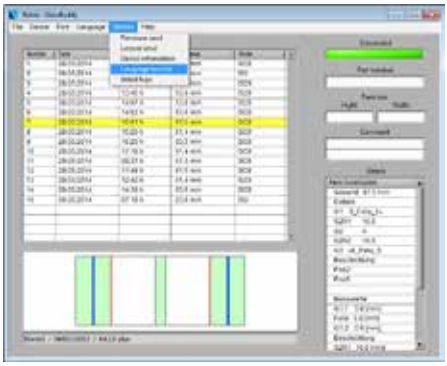
You can enter the desired information into the drop-down menu. This information is then permanently saved to the Glass*Buddy* and can only be changed together with the corresponding PC programme.





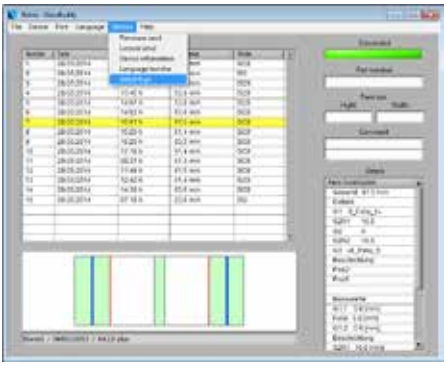
Transfer Languages

With this menu item, the graphical languages (Russian, Corean, Chinese) are transferred from the PC or laptop to the Glass*Buddy* Plus. The corresponding language file must previously be requested from Bohle and saved to your computer or laptop. The graphical languages are not included in delivery. Please contact *glassbuddy@bohle.de* if you are interested.



Select Logo

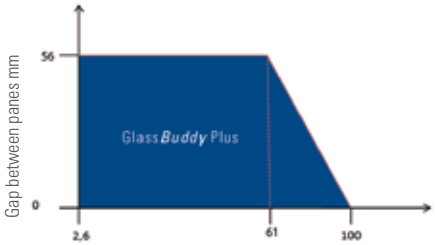
You can replace the standard “Bohle“ logo with your own logo. For this purpose, the new logo must be available as .bmp file with a maximum width of 300 pixels and a maximum height of 90 pixels and saved in a folder on your hard disk.



EN

12 Measuring Ranges

Measuring range depending on gap between panes



Maximum total thickness depending on gap in mm

The following glass types or structures cannot be measured or only to a limited extent:

– Strongly dispersing glass like e.g. satin-finished or sandblasted glass, cast glass
– Strongly absorbing glass such as e.g. laminated glass with matt or coloured interlayers, entirely coloured glass
– Glass with interference coating
– Highly reflective glass like e.g. solar control glass
– All basic glass products deviating from DIN EN 572 Part 2

Notes:
For making a reliable analysis of the structure of the measured object, we recommend taking several measurements at different points and from both sides. In case of dealing with very large measuring units or if the results obtained are very unreliable, we recommend carrying out average measurements on at least 4 spots distributed over the whole surface of the glass pane.

The analysis of glass retrofitted with solar reflective films or splinter protection films can lead to incorrect results.

In the case of insulated glazed units, measurements should always be taken 5 cm away from the edge, as the panes tend to "bend" depending on surface and air pressure conditions, which means that measurements taken from the centre may be inaccurate.

When analysing resin laminated glass, with resin having the same refraction index as the glass, the Glass*Buddy* Plus will calculate the total thickness. If the Glass*Buddy* Plus cannot exactly indicate the pane composition, you will receive the additional message **"Details not available".**

In a very small number of cases, the detailed analysis of laminated or laminated safety glass is not possible. In this event, the Glass*Buddy* Plus displays an exclamation mark in front of the individual result. If the Glass*Buddy* Plus cannot exactly indicate the pane composition, you will receive the additional message "Details not available". In the graphic display of the Glass*Buddy* Plus, results of this kind are indicated by two horizontal lines. In the PC software, these are represented by a vertical row "?". To achieve better measuring results, we recommend a new analysis on the opposite side.

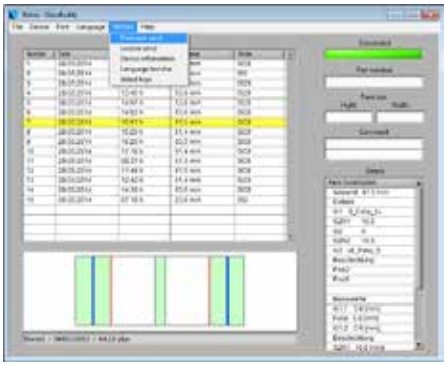
13 Firmware Update

A firmware update is available for Glass*Buddy* Plus.

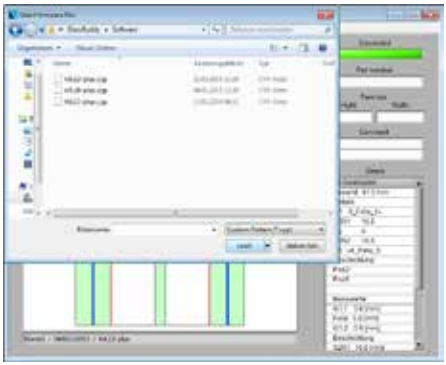
Troubleshooting updates can be carried out by the user. They can be found on our website www.bohle.com in irregular intervals with the article number BO 5164755 for Glass *Buddy* Plus. For this purpose, the updated version found under **Downloads** must be saved on your PC. You can freely choose the storage location on the hard disk of your PC or laptop. Please do not change the file name in order to make sure that the update is correctly recognised.

Please connect your Glass*Buddy* Plus to your PC or laptop and connect the device to the PC software (see point 6).

Click on "auxiliary options" for installing the update and choose the sub-menu "send firmware".



Now you have to choose the previously stored firmware version.



Confirm the completed download to the Glass*Buddy* Plus with **"OK".**

Then disconnect the Glass*Buddy* Plus from your PC or laptop and switch the Glass*Buddy* Plus off. For activating the updates press the  and 

keys simultaneously and hold them for approx. 4 seconds. In this way you reach the boot loader menu.

You can now choose between two firmware versions which are displayed with their respective version numbers. You can choose the desired version by pressing the ▲ or ▼ keys and activate it by pressing ✓.

A maximum of two firmware versions can be saved to the Glass*Buddy* Plus. When transferring a new version to your device, the version which is currently not activated will be overwritten.

14 Technical Data

Type	V5.0
Power supply	Lithium-ion – rechargeable battery
Laser	< 1 mW; class 2M
Laser wavelength	650 nm
Measuring range	Glass*Buddy* Plus up to 100 mm
Accuracy	0.1 mm
Measuring tolerance	1% on measuring range
Display	64 x 128 pixels
Dimensions	180 x 83 x 42 mm
Weight	350 g
Working temperature	+5° C to +40° C

15 Technical Support

Please address any technical questions, comments or suggestions by e-mail to glass*buddy*@bohle.de. If you have questions concerning the measurements you have carried out, please make available the corresponding .gdm file.

16 Tips and Tricks

The Glass*Buddy* Plus works with a laser wavelength of 650 nm. Due to its conceptual design, the Glass*Buddy* Plus cannot detect the characteristics of glass und glazed units which cannot be displayed with this wavelength.

All factors which have an influence on the reflection of the laser beam on different surfaces, also have an influence on the measuring result und thus the evaluation. In individual cases this leads to additional information, such as "!" or "Details not available" to be displayed together with the result.

In some cases, an insufficient reflection on one or several surfaces can generate the message "Measurement not possible". The correct result can usually be obtained by repeating the measurement.

It often already suffices to thoroughly clean the accessible glass surfaces in order to improve their reflection properties.

The weather-related steaming up of the sensor slit, e. g. due to a quick transfer from a cold into a warm environment, can lead to measuring errors. Please wait for a few minutes until the device has adjusted to ambient temperature.

Depending on the light conditions, it might also be helpful to change the position of the Glass*Buddy* Plus on the glass surface. The Glass*Buddy* Plus does not necessarily need to be positioned vertically for achieving correct measuring results. Only make sure that all the four feet rest firmly on the surface to be measured and that the Glass*Buddy* Plus is not moved while performing the measurement.

The Glass*Buddy* Plus is supplied readily calibrated. A new calibration is usually not required. If you detect a permanent malfunctioning of your Glass*Buddy* Plus, a calibration (involving additional costs) might be necessary. Please contact your dealer.

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