



Instruction Manual

for

gSKIN® U-Value Kit

Status: 16th March 2015

1. Overview of gSKIN U-Value KIT content

By post:

- 1 gSKIN® Heat Flux Sensor
- 1 gSKIN® DLOG Data Logger with 2 temperature sensors
- 1 USB cable (PC to data logger)
- 1 adhesive tape



Figure 1: U-Value KIT in transport box

By email:

Installer for U-Value read-out software ([download link](#))

2. General overview of the gSKIN® U-value software

The gSKIN® U-value software is built upon a home screen with 7 functional buttons (See Figure 2):

5 buttons in the centre of the home screen.

1. **Real time measurement:** This button allows the user to review in real-time all data points measured by the sensors of the U-value KIT (temperature, heat flux, calculated U-value). With this menu-screen, one cannot start a new U-value measuring process, it can only be used for reviewing once all sensors are working and to show their real-time values
2. **Start logging:** From here, you can start your measuring process. Before starting, please select the frequency at which you would like to log your data points (e.g. every 10 min) and when you want to start the measurement process (e.g. immediately)
3. **Read record:** Via this button, you can select measurement files which have been saved on your logger for further analysis (e.g. export raw data, print PDF reports, etc.)
4. **Analyse record:** Here, you can search for other logger protocol files (*.msr) which have been saved on your desktop
5. **Exit:** This button will close the program



Menu-button “File” on the top left corner of the home screen can be used to end the program (“Exit”) and to export data while you review data points in the “Read record” tab

Menu-button “Logger” on the top left corner of the home screen can be used to stop your measurement process and to delete all measurement files from the data logger (“Delete all stored data!”)

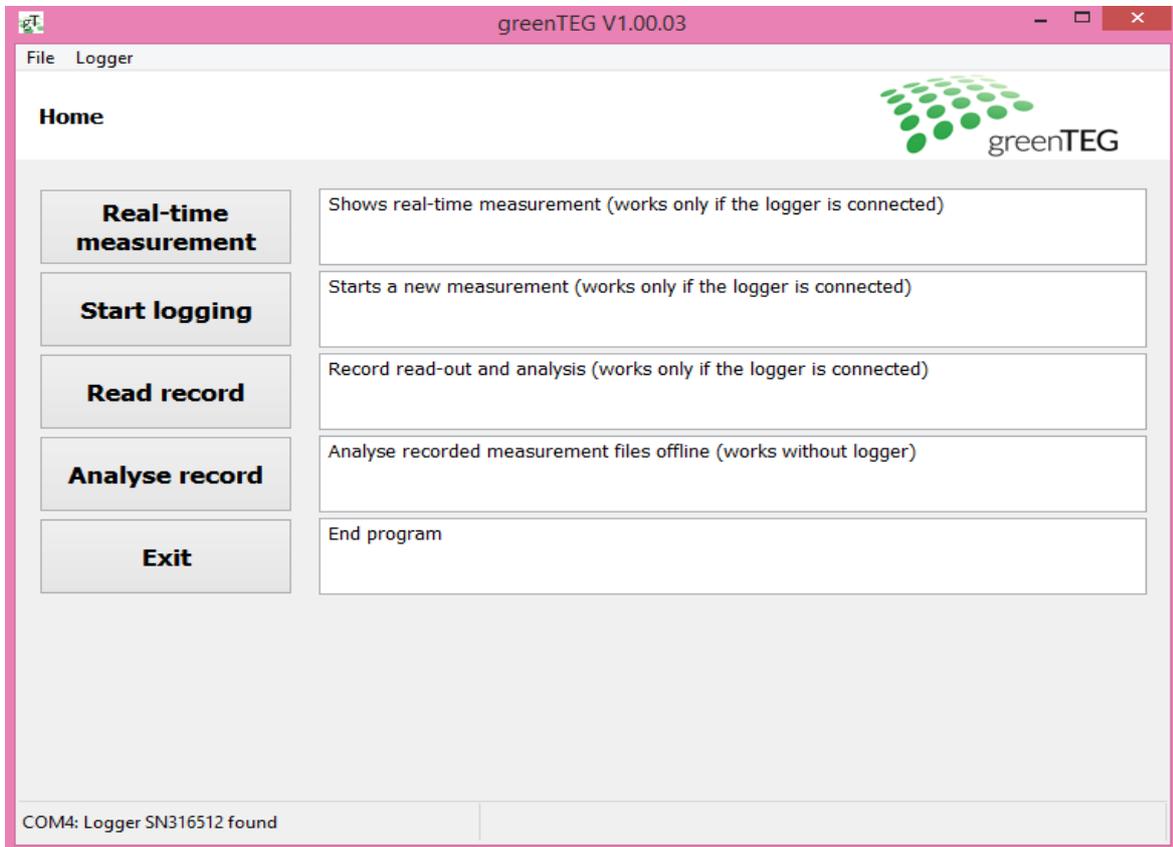


Figure 2. Home screen view with data logger connected to your laptop

3. Ready to measure in 5 minutes by following these steps

1. Connect the data logger to your computer via the delivered USB cable
2. Allow all drivers to be installed
3. The necessary read-out software was sent to you by email or can be downloaded from <http://www.greenteg.com/contact/software-u-value-kit/> (use the password provided to you by greenTEG). Follow the instructions to install the software onto your computer. You need to have admin rights to follow all necessary steps (right click on option "Execute as Administrator")
4. When you open the software the home screen will appear (See Figure 2). Under “File” > “Language” you can change the language settings from English to German or vice versa.
5. Please verify that all sensors (temperature and heat flux) are displayed correctly by reviewing their graphs under “Real-time measurement“. Here you can also directly review the approximate U-value (the U-value will still fluctuate but some early indications can be reviewed already)
6. Place the heat flux sensor onto the surface you would like to investigate. For detailed instructions on mounting the gSKIN® Heat Flux Sensors, see the case study and the application note which can be found at www.shop.greenteg.com. In the following section, we will briefly describe the mounting process.



Short guideline on how to mount the sensors:

- I. Heat Flux Sensor placement
 - a. Install the heat flux sensor on the indoor surface with the side showing the gSKIN logo facing towards you. Ensure that the sensor is protected from direct heating, convection, and solar radiation. Adhesive tape to fix the sensor is included in your starter kit
 - b. Optional: For mounting the heat flux sensor, use thermally conductive paste (can be purchased in our online shop. Caution: hard to remove from walls)
 - c. Optional: Use thermographic imaging to help identify representative/interesting spots for the heat flux sensor placement on your building element
 - d. Optional: Cover the heat flux sensor with the same material as its surrounding material
 - e. Optional: Use several sensors to obtain an average value for highly inhomogeneous building elements
- II. Temperature sensor placement
 - a. Place two sensors at roughly opposite sides of the building element at the position where the heat flux sensor is placed
 - b. For U-value measurements, make sure that the ambient air temperature is measured (i.e. by measuring the temperature 2-10 cm away from the building element)
- III. Data acquisition (according to ISO 9869)
 - a. Minimum measurement duration: 72 h
 - b. Requirement to end the measurement: the U-value does not deviate more than $\pm 5\%$ from the value obtained 24h earlier (automatically calculated in software)
 - c. Typical recording frequency: 1 data point per 0.5 – 1 h (1 data point per 10 minutes can easily be handled with a full battery inside the data logger – the battery will be charged automatically via the USB cable when connected to your laptop). Ensure that you have connected the data logger to your computer before you start with your first measuring trial, as for longer measuring times you need to have a fully loaded battery

Continued software installation and analysis guide

7. On the home screen, push the "Start logging" button. Before starting with your U-value measurement process, you can adapt the sensitivity of your sensor by selecting the "calibrate" function. Please make sure that the sensitivity shown here matches the sensor's sensitivity on your product sheet. Please change these settings only if you use another heat flux sensor; the value stored here should match with the sensor's sensitivity shipped to you. Please select the frequency for data logging (under "Sampling rate", e.g. 10 min or 30 min), as well as your start time (under "Start mode", e.g. "immediately"). In the comment section you can mention measurement details, e.g. specifications about measurement location. After you push the "Start measurement" button, your data logging process begins. In the lower part of your screen, you will see the text switches from "save settings.." to "Measurement running.."
8. After logging data for 72 hours, you should receive an exact U-value according to ISO 9869. You can stop the measuring process by selecting the "Logger" tab and there the "Stop measurement" function. We recommend that you first review your current measurement process (as indicated in step 8) before you stop your ongoing measurement
9. You are now ready to analyse your logged data. To do so, please select "Read Record" (on home screen). In the next window, you need to select the data set you want to have displayed and analysed (the latest data set will be preselected, all data sets are ordered by the measurement start time)
10. By selecting the latest logging file, you can review the logged data set. In the newly opened window named "Analyse record", you will find the last measured data points. "Last measured values", shows you the last temperatures, heat flux and total time of data logging and next to it under "U-value summary", you can read the measured U-value, standard deviation for both the whole measurement period and the last 24 hours. A graphical review is given for all measured and calculated values: blue line for heat flux, red for indoor temperature (T1), yellow for outdoor temperature (T2), and green for the calculated U-value (See Figure 3). Note that the "comments" section shows the comments made regarding your latest measurement activity (see step 7). In order to save this comment, you need to save the report as a pdf (see step 11), otherwise this comment will be overwritten by your next comment. So, be aware that if you are reviewing an old data set, it

doesn't show the original comments anymore. You can correct this again by simply revising the text in the box after "comments" (see figure 3).

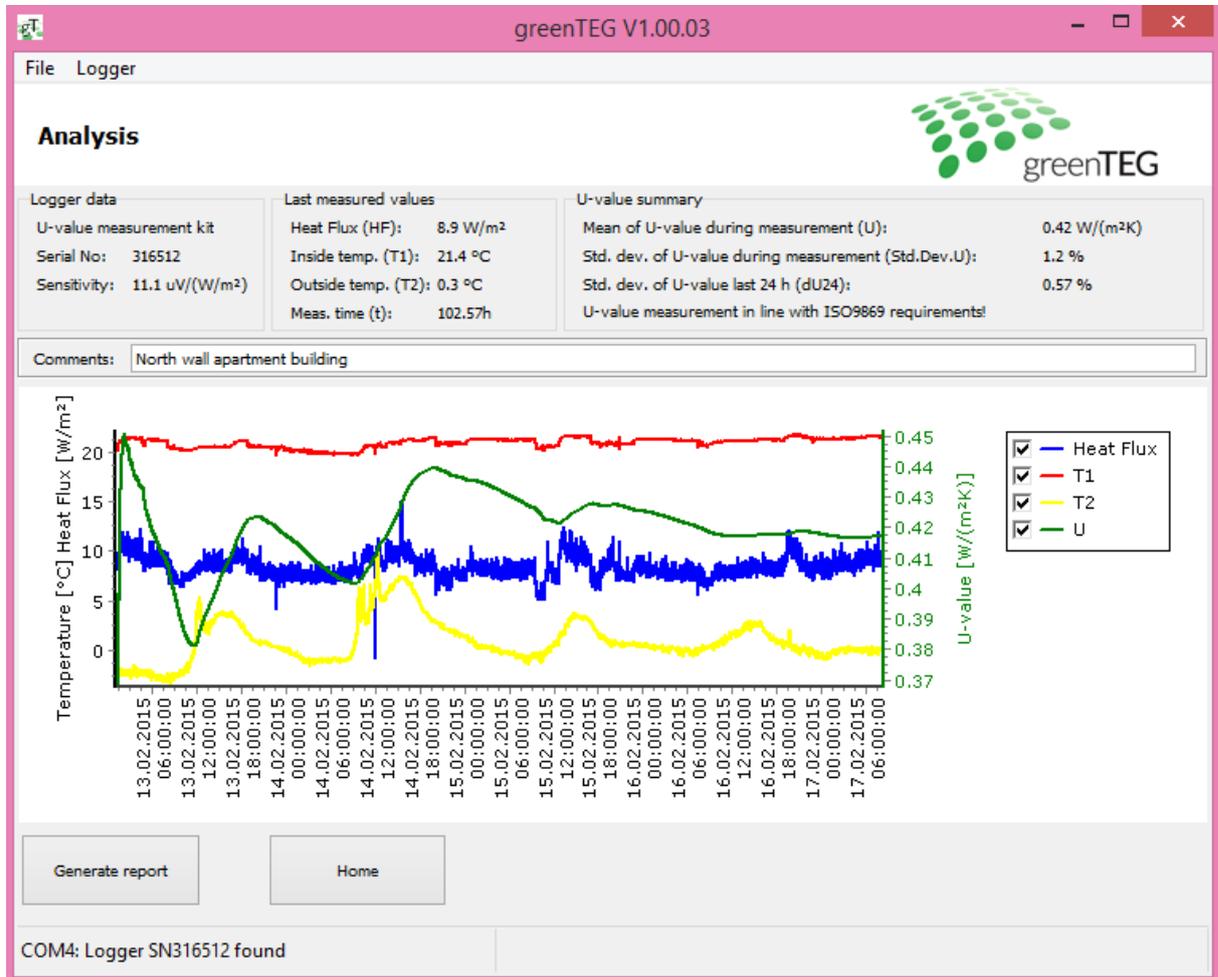


Figure 3. Analysis window showing U-value output and sensor data graphs

- To save the graph as a PDF or printing it directly, push the "Generate report" button (see Figure 4). The "Generate PDF" button generates a PDF file, "Print" leads you to your printing settings.

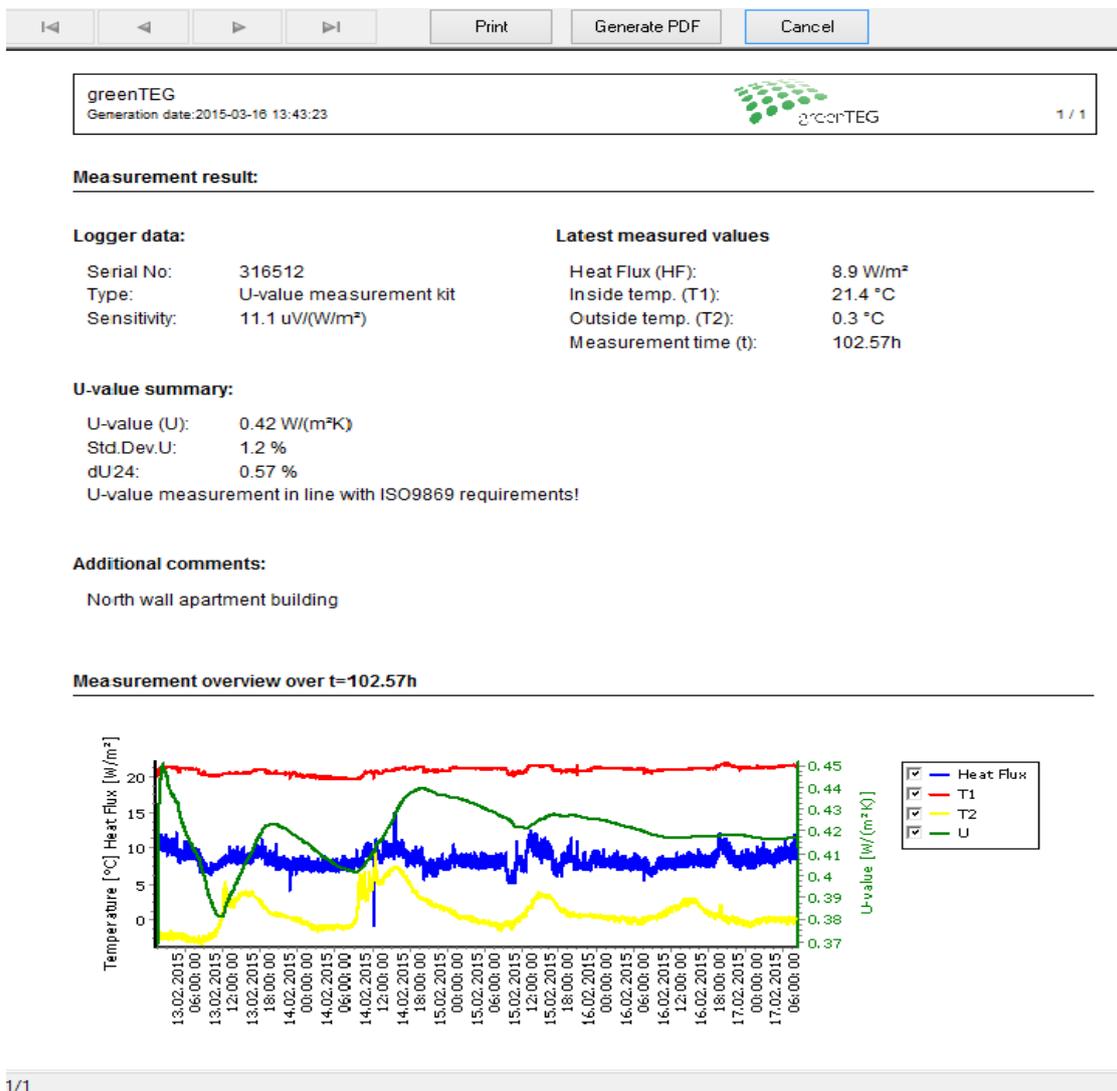


Figure 4. Software screen for saving data as a PDF file

12. On the "Read Record" > "Analysis" window, you can select under the "File" menu to "Export data..." and save the raw data as a CSV file to your laptop (Note: for Windows 8 users open the file in google-docs, notepad, or open-xls system due to formatting errors)
13. To review other data logger files stored on your laptop, you can select these files via your **home screen** by using the "Analyse record" button (See Figure 1)
14. For erasing stored data on your data logger, you can ONLY erase/delete all data saved on the data logger by selecting in the top menu "Logger" and "Delete all stored data!". There is no option to retrieve deleted data, unless you have stored it before as a CSV file on your desktop (See step 12).
15. To close the U-value software, you can select the "Exit" button on your home screen or the tab "File" and "Exit" function. In case you have already started an U-value measuring process, this activity will not be stopped. Only by selecting the "Logger" function on your home screen and there selecting "Stop measurement" can one end a U-value measuring process (See step 7)



Please note that we are currently still improving minor layout and functional aspects of this software. Let us know if you have any suggestions for improvements. We will send you all software updates and a detailed installation guideline by email and free of charge.

Disclaimer

The above restrictions, recommendations, materials, etc. do not cover all possible cases and items. This document is not to be considered to be complete and it is subject to change without prior notice.

Revision History

| Date | Revision | Changes |
|-------------------|-------------------|---|
| 30. October 2014 | 0.1 (preliminary) | Initial version |
| 25. November 2014 | 1.0 | Full-software package, incl. new PDF functions |
| 5. December 2014 | 1.1 | Enhanced pictures |
| 15. December 2014 | 1.2 | Additional information on saving files |
| 5. January 2015 | 1.3 | Additional information software version 1.00.01 |
| 5. February 2015 | 1.4 | New software screenshots, small updates |
| 25 February 2015 | 1.5 | Text revision |
| 16 March 2015 | 1.6 | Screenshots for full English version |