Graphical Tester for Otoplastics

With "Classic" Bluetooth® Control

**Additional information for use on
the Windows Universal Platform**

2023

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1 INTRODUCTION

1.1 Purpose

This additional manual walks you through the process of using a Bluetooth® leakage tester from the Universal Windows Platform. This platform is an exclusive part of Windows 10 OS a.k.a. Universal App Platform (UAP). An app on this platform has the same look and feel whether it runs on a desktop or a Windows smartphone (Windows 10 Mobile). This paper describes how to pair the tester with your device (desktop or smartphone) and how to use the *app* (OtoBLT). It is generally assumed that the user is sufficient familiar with the Windows 10 platform and that the controlling *app* 'OtoBLT' already has been downloaded from the Microsoft Store and installed. You will find a brief explanation on how to download and install the *app* from the Store in §1.2.

1.2 Microsoft Store

To get the *app* to run on your device you have to visit the Microsoft Store that will automatically select the right *app* for the device (desktop or smartphone) with which you are accessing the Store.
In order to carry out the installation it is necessary that you have a Microsoft-account, that is just the way it goes. If you are not already the owner of such an account you can sign-up and sign-in in the process.
The app resides in "Utilities & Tools", search for 'OtoBLT' or click this secure link:
https://www.microsoft.com/store/apps/9nblgggz57n5

2 PAIRING

2.1 General

The leakage tester needs a one-time sign-up (Bluetooth® pairing) with your Windows platform.
The *app* runs on Windows 10, Desktop (32- and 64-bit) and Mobile (Surface Go).
The paring procedure for Windows 10 is described in §2.2.

2.2 Procedure

In general the sign-up procedure runs as follows:

- Switch on the leak tester
- click **Start** ⊞ **button** > ⚙ **settings** > 🖳 **Devices** > **Bluetooth & other devices**
- if necessary, slide the Bluetooth® switch to **On**
- at the top, click **+** Add Bluetooth or other device
- click ᚵ Bluetooth and select the name of your device
- since the introduction of the Secure Simple Pairing (SSP) mechanism, there is no need to enter a code.

This completes the sign-up process

3 MEASURMENT

3.1 Selecting device

Switch on the tester and activate the software program, in this order. A pop-up window will appear with a list of Bluetooth®-devices *paired* and *compatible* on your Windows platform, it might look similar to the one below:
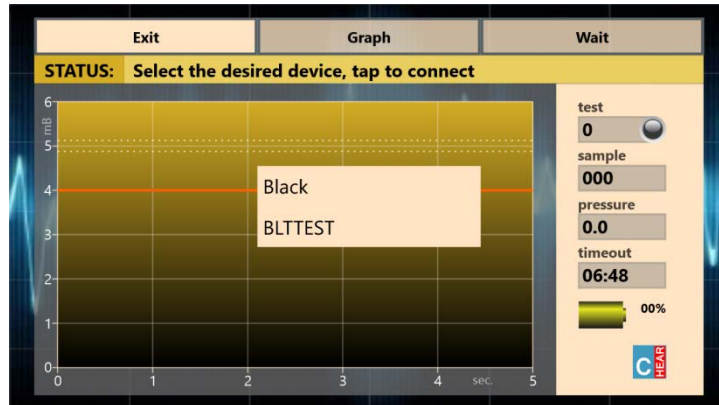

Picture 3.1.1: device selection window

Tap your leakage tester (here: BLTTEST) in the list. Subsequently the program will try to establish a connection with this device. **Attention**: on tablets he user-defined timeout setting for entering the *lock screen* will be temporarily overruled during the use of the app.

**3.1 Standard measurement**

When a connection has been established the screen will look like the picture below. From this screen all measurements will be performed.
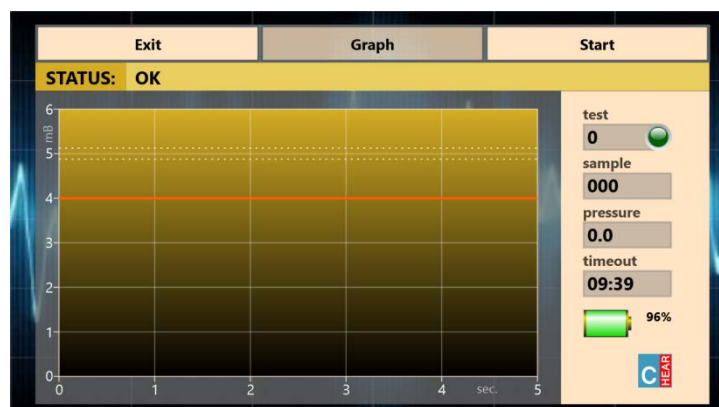
Picture 3.2.1: measurement screen with battery indicator

To start a test, tap the **Start** button, the air pump in the tester will increase the pressure in the tester in a few seconds to 5mB. The actual leak measurement will take five seconds. In this period, ideally the pressure must remain at 5mB; a margin of 4mB is adhered to indicate that a lower value is to be interpreted as insufficient fitting of the earpiece. The picture below shows a possible result of a measurement.
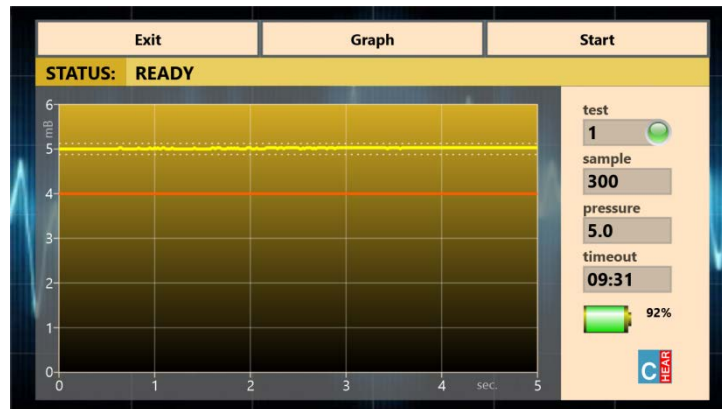
Picture 3.2.2: measurement result

3.3 Archiving

After each test the user has the opportunity to save the resulting graph to a file for later handling.
Tapping the **Graph** button will pop-up a window that allows you to enter a filename as shown below.
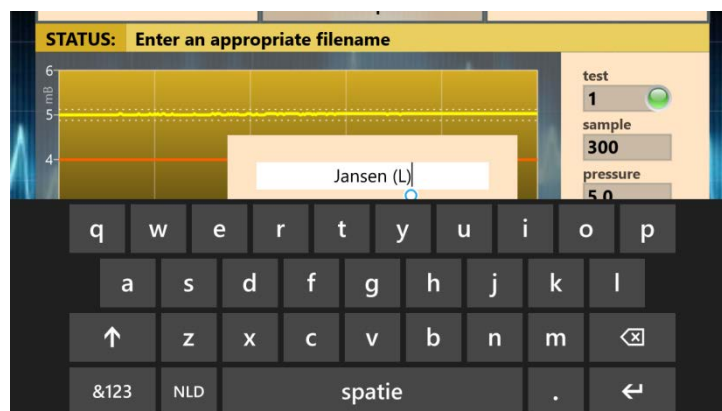
Picture 3.3.1: saving a graph on a Windows 10 tablet

The graph will be filed in the so-called 'Portable Network Graphics' file format, therefore the *extension* name reads **.png**. One should not enter this extension name: the extension will be automatically added.
To prevent *file pollution* one can enter a valid filename one time only. Touching the screen outside this pop-up window terminates the filing procedure, but can be restarted again until the next measurement. A date/time stamp is always added to the graph. Two storage procedures are possible.

3.3.1 storage procedure 1

Enter the name directly (max. 48 characters) in the pop-up window and then exit with [ENTER].
Two files are saved: one in color as visible in the app (average size 70kB) and a transparent b&w version (average size 40kB). The graphs on e.g. a desktop with a EN Windows 10 setting are stored under: **C:\ Users\ <...>\ Pictures\ OtoBLT\ Leakage Test** *name(_b&w)***.png**.
Although the quality depends somewhat on the chosen screen size of the app, the saved graph has a fixed size. From here you can edit the graphs, email them etc. or transfer them to a PC where the reporting is completed.

3.3.2 storage procedure 2

Click on the pop-up window, the so-called *placeholder* disappears and press [ENTER] in the empty field. Windows then opens a dialog where you can determine the name and location yourself. This also creates the possibility to save the graphs in 'OneDrive' so that others can immediately start working with the results. The default file name is formed from the [date/time stamp].png.
The colon (:) is not allowed in file names and is therefore replaced by the underscore (_).
To prevent it from becoming a 'fill in the blanks' only the graph is saved as it is visible in the app, so no black and white version. **Note**: never change the extension .png

3.4 Screen legend

3.4.1 control

Three buttons are visible at the top of the screen:

- **Exit**: if no measurement is being taken the program will be terminated and the leakage tester will be put in low power stand-by mode
- **Graph**: the graph will be filed to: *filename[.png],* the maximum *filename* length is 48 characters
- **Start**: a new measurement will start, the button name changes to **Wait** and for the **Exit** button to **Stop this test**: the running test will be terminated

3.4.2 graph

The graph shows a unit on each axis:

- **mB**: the y-axis shows the relative pressure in millibar [mB] with respect to the ambient air pressure, the measurement will be made at a pressure of 5mB; the orange line indicates the (4mB) lowest limit that still meets the specification. SI unit for pressure: Pascal [Pa] (5mB ≡ 500Pa).
- **sec.**: the x-axis shows the total measurement time in seconds; the measurement time can only start when the initial pressure (5mB) is reached

3.4.3 information panel

Details are displayed to the right of the graph that provides information about the progress of a measurement:

- **led lamp**:   [green]: last measurement completed, result within specs
                    [orange]: last measurement completed, but result does not meet specs (< 4mB)
                    [red]: measurement started, but terminated or ended erroneously
- **test**: the number of tests done during the current session after program start
- **sample**: the number of measurement moments (= samples) during the running test
- **pressure**: the instantaneous measured pressure, or the last measured pressure (in mB)
- **timeout**: the time (m:ss) remaining until the automatic stand-by mode will be entered (9 minutes)
- **battery%**: the charge condition, in percentages, of the batteries *in* the leak tester

3.4.4 status

The status of the leak tester is shown at the right of '**STATUS**:' on the status line (which is displayed immediately above the graph). The leak tester has a number of states; the most important of these are discussed in the next chapter.

4 STATUS MESSAGES

4.1 Device connection

When Bluetooth® has not been activated yet, your device will ask to activate it in a separate screen; after activation restart the software. After selecting a device, the software tries to establish a Bluetooth® connection with the tester. Problems during connection that occur during this phase are shown on the status line. An overview of the most important error messages:

- **Select the desired device, tap to connect**: choose your device from the list of paired devices
- **Device *devicename* compatible, but no response**: a correct Bluetooth® protocol has been detected, but there was no response at all*
- **Device *devicename* is not compatible, or switched off**: the '*devicename*' is no leak tester**, or device is (still) switched off
- **Connecting to *devicename***: the '*devicename*' has been selected; status should change to "**OK**" soon and the charge percentage of the battery should be determined
- **CHECKSUM ERROR (RETRY xx)**: the operating settings in the tester have not been received or processed correctly; a maximum of ten attempts will be performed
- **Bluetooth link to leak tester has been lost.**: the Bluetooth® connection has been lost, most likely because of switching off the device; the software will terminate automatically

*   leads to **Exit (only)**: terminate app, restart it and switch tester (off and) on again

**   after having selected devices other than leak testers, e.g. those needing permission, may take more time

4.2 Measurement

Normal messages while a test is running:

- **OK**: the leak tester is ready for the first test
- **AIR IN**: the air pump will try to pressurise the system
- **STABILIZING PRESSURE**: the target pressure has been reached and the system will check for a short time whether it is stable enough; after this phase, when the leakage is relatively high, the pressure line might enter the graph below 5mB
- **MEASURING**: the actual measurement runs, the graph will be drawn real time
- **DONE**: the last sample has been delivered
- **FINISHED**: the test has been completed and the system will be depressurized, while the system is depressurizing one can already start filing the graph, saves some time
- **TERMINATED**: tapping "**Stop this test**" causes this message, thereupon:
- **READY**: the test has been completed, the leak tester is ready to take a new measurement

Error messages while a test is running:

- **TARGET PRESSURE (5mB) NOT REACHED**: the system looses so much air that the pressure cannot be increased sufficiently. Before drawing any conclusions, the system should always be checked for leaks without an otoplastic. Also check whether the air pump operates and if the otoplastic is placed correctly.
- **PRESSURE UNSTABLE OR OBSTRUCTION**: a stable test-pressure cannot be acquired, or air cannot or only difficult leave the system; check tubes etc., if this message remains service is required
- **CONNECTION WITH '**_devicename_**' LOST**: the existing Bluetooth®-connection went down*
- **OK, BUT VERY LOW BATTERY POWER!**: the batteries in the tester are exhausted, replace batteries**
- **Unexpected internal error, restart app**: the program halts for an unknown reason*

*   leads to: **Exit (only)**: terminate app, restart it and switch tester (off and) on again

** this is an indicator only: think that a transitional situation can occur where the tester will start normally, but will not have sufficient power to operate the pump

4.3 Archiving

Common messages during archiving:

- **This filename already exists**: the _filename_ already exists, (re-)enter a different name
- **Enter at least one character**: the _filename_ may not be empty
- **Illegal character in filename (?)**: de _filename_ contains characters in the range ["\", "/", "*", "?", ":", "<", ">", "\\", "|"] that Windows does not allow
- **Graph has been saved**: the file '_filename_.png' has been filed with time/date stamp