

## **Graphical Tester for Otoplastics**

With USB Control

**Additional Manual for Windows 10 with  
the Windows Universal Platform (UWP)**

2023

<b>TABLE OF CONTENTS</b>	<b>page</b>
<b>1 INTRODUCTION</b>	<b>3</b>
1.1 Purpose	3
1.2 Microsoft Store	3
<b>2 INSTALLATION</b>	<b>3</b>
2.1 Desktop	3
2.2 Mobile	3
2.3 Surface Tablets	3
<b>3 MEASUREMENT</b>	<b>4</b>
3.1 Start Off	4
3.2 Standard Measurement	4
3.3 Archiving	5
3.3.1 storage in a <i>fixed</i> location	6
3.3.2 storage in a <i>freely selectable</i> location	6
3.4 Screen Legend	6
3.4.1 control	6
3.4.2 graph	6
3.4.3 information panel	6
3.4.4 status	7
<b>4 STATUS MESSAGES</b>	<b>7</b>
4.1 Device Connection	7
4.2 Measurement	8
4.3 Archiving	8

## 1 INTRODUCTION

### 1.1 Purpose

This additional manual walks you through the process of using a USB leakage tester with the Universal Windows Platform. This platform is an exclusive part of Windows 10 OS a.k.a. Universal App Platform (UAP). This paper describes how to obtain the controlling *app* (OtoUSB), install it and how to use it. You will find a brief explanation on how to download and install the *app* from the Microsoft Store in the next paragraph. It is assumed that the user is sufficient familiar with the Windows 10 platform and that the controlling *app* 'OtoUSB' already has been downloaded and installed.

### 1.2 Microsoft Store

To get the *app* running on your device you have to visit the Microsoft Store that will automatically select the right *app* for the device with which you are accessing the Store. In order to carry out the installation it is necessary that you have a Microsoft-account; it 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 'otousb' or click this secure link: <https://www.microsoft.com/store/apps/9mw8m6q6dk4q>. Depending on your location, the browser chooses the correct language: Dutch, English or German. The *app* runs on Windows 10, (32- and 64-bit) desktop, laptop and Surface tablet.

## 2 INSTALLATION

### 2.1 Desktop

The leakage tester needs a one-time sign-up (USB device detection and install) with your Windows platform. There is an installation guide (USBsolutionsW10\_EN) available on how to do this on Windows 10. You can find and download this manual on the documentation page on our website, the URL reads: <https://www.cursorengineering.nl/en/documentation-usb/>. At the end of this procedure you can check the installation at **Control Panel > All Control Panel Items > Devices and Printers**.

### 2.2 Mobile

De USB installation procedure for Windows 10 Mobile is no longer described, because of Microsoft has declared the Windows 10 Mobile platform as 'end-of-life' by December 2019 and has phased out all support.

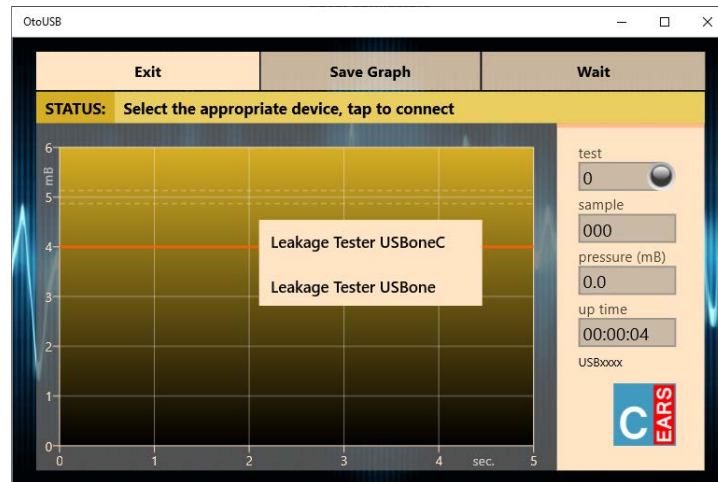
### 2.3 Surface Tablets

As an alternative to Windows 10 Mobile, you can use 'Microsoft Surface Go' tablets. The installation procedure for these Window 10 platforms is similar to the procedure as described in §2.1; follow the instructions given on your device screen. For the physical connection to your USB tester, a cable USB-A (tablet) to USB-C or USB micro-B, is necessary.

### 3 MEASUREMENT

#### 3.1 Start Off

Attach the tester and wait for the LED on the tester to turn **orange**, and then start the *app*, in this order. If multiple USB testers are connected, a *pop-up* window will appear with a list of devices, so a selection has to be made and it might look similar to the example screen below:

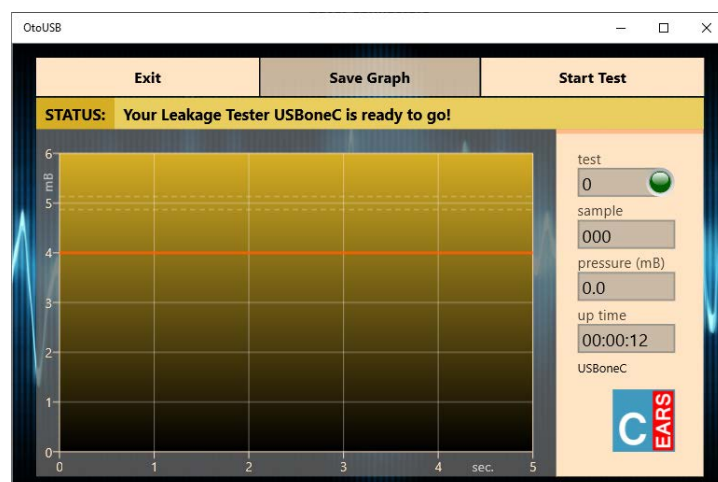


Picture 3.1.1: device selection window

Tap or click your leakage tester from the list and then the software will try to connect to the selected device. If only one tester is connected (e.g. USBoneC) then the program will try to establish a connection with this USB device straight away and the basic screen below will become visible.

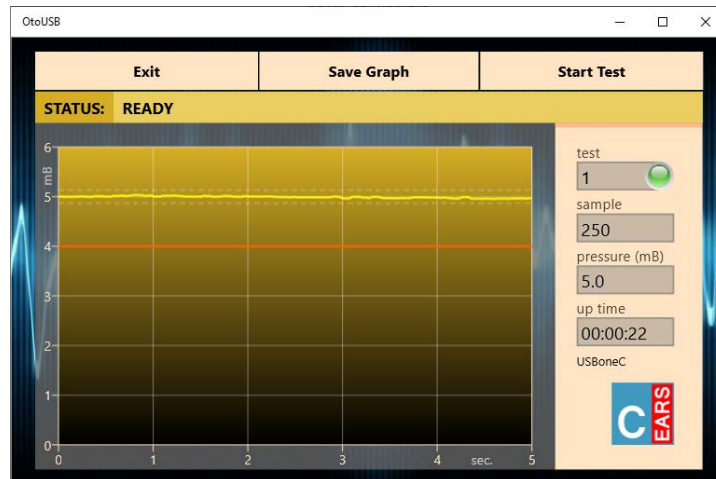
#### 3.2 Standard Measurement

When a connection has been established, the screen will look like the picture below. All measurement sessions are started from this screen. Tap the logo to activate a *pop-up* window with additional information.



Picture 3.2.1: the base screen

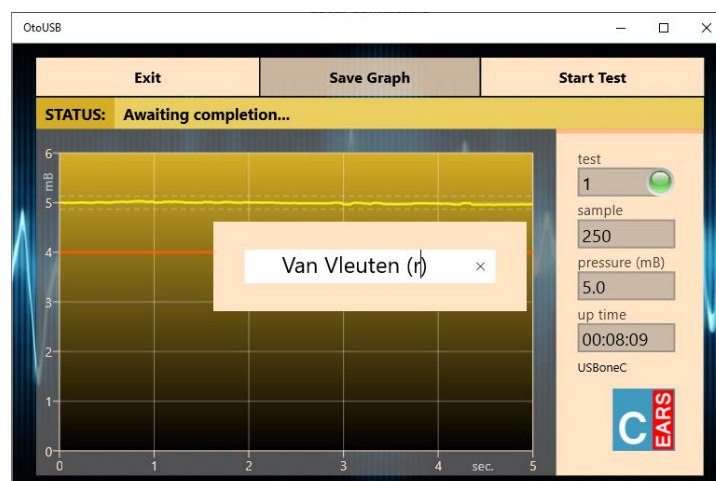
To start a test, tap the **Start Test** button, the air pump in the tester will bring the pressure in the tester within moments to 5mB. The actual leakage measurement will take five seconds. During the session, ideally the pressure must remain at 5mB; a margin of 4mB is adhered to indicate that a lower value is to be interpreted as insufficient fitting of the earpiece. The final assessment is, of course, with the hearing care professional. The picture below shows a possible result of a measurement.



Picture 3.2.2: a 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 **Save Graph** button will pop up a window that allows you to enter a filename as shown below.



Picture 3.3.1: saving a graph

The graph will be saved in the so-called 'Portable Network Graphics' file format; therefore, the *extension* name reads **.png**. One should not add this extension, it will be added automatically. Touching the screen outside the pop-up window halts the filing procedure, but it can be put on again until the next session is started. The graph itself will be provided with the filename and a date/time stamp at the bottom. There are two storage procedures available.

### 3.3.1 Storage in a *fixed* location

Click in the *pop-up* window on the so-called *placeholder* (enter filename) and enter the name; a maximum of 48 characters can be used, conclude with [ENTER].

Two files will be saved: one in colour (avg. 70kB) and one in b&w (avg. 40kB) with a transparent background.

The graphs will be captured and saved in your Pictures Hub in the OtoUSB folder:

**C:\Users\YourName\Pictures\OtoUSB\LeakageTest\name\_*b&w*).png.**

Although the quality is somewhat dependent on the chosen screen size of the *app*, the saved graph has a fixed size. From this directory one can prepare the graphs for further processing e.g. e-mailing, transferring or embedding in forms etc.

### 3.3.2 Storage in a *freely selectable* location

Click in the *pop-up* window on the so-called *placeholder* (enter filename) and enter the name; a maximum of 48 characters can be used, conclude with [/], the *slash*. Windows will open a dialog where you can determine the location yourself and, although not recommended, change the name. This method also creates e.g. the possibility to save the graphs at 'OneDrive', so others can start using the results immediately.

The filename that will be included in the graph is the name as originally entered in the pop-up window, if the filename has been changed in the dialog box then this change cannot be fed back to the chart.

To prevent it from becoming a 'fill-in exercise', it was decided to save only the graph as visible in the *app*, so no b&w version. Do **not** 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 session is running, the program will be terminated and the leakage tester will be put in low power *standby* mode
- **Save Graph:** the graph can be stored in a *fixed* or *freely selectable* location, and will be saved to: *filename* [.png], the extension .png is automatically added, maximum *filename* length: 48 characters
- **Start Test:** a new session will start, the button name changes to **Wait** and for the **Exit** button to **Stop Test:** the running session 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 (0.0725psi); the orange line indicates the (4mB) lowest limit that still meets the specification; SI-unit for pressure: Pascal [Pa] (5mB  $\equiv$  500Pa)
- **sec.:** the x-axis shows the total measurement time in seconds; the measurement time can only start when the initial pressure (5mB) has been reached

### 3.4.3 information panel

Details are displayed at the right of the graph and provide information about the progress of a session:

- **test** : [number] : the number of sessions done since the *app* started  
     [LED colour]: *example*  
     [d. green] : session running  
     [l. green] : session completed, result within specs  
     [orange] : session completed, not within specs or session terminated  
     [red] : session started, but unexpectedly halted or ended erroneously
- **sample** : the number of measurement moments (= samples) during the session
- **pressure** : the instantaneous measured pressure, or the last measured pressure (mB)
- **up time** : the time (hh:mm:ss) passed since *app* has an active connection to a USB tester
- **USBxxxx** : the name of the attached USB leakage tester

### 3.4.4 status

The status of the leak tester is shown immediately above the graph on the status line. The leakage tester comes with a number of *states*; the most important of these are discussed in the next chapter.

If only the user's attention is required, the background will turn orange, however, in the event of an error message, the background will turn red.

If, at the end of the status message, the addition (RESUMED) is visible, this indicates that the *app* has been restarted after the screen has been in *sleep* mode or after the *app* has been minimized [ \_ ].

## 4 STATUS MESSAGES

### 4.1 Device Connection

After selecting a device (automatically or from the list), the *app* tries to establish a USB connection with the USB leakage tester. Problems that occur during this phase are shown on the status line.

An overview of the most important error messages:

- **Select the appropriate device, tap to connect:** choose your device from the list of devices
- **No device(s) attached:** not a single USB leakage tester available on this platform\*
- **Attempt to connect to Leakage Tester USBxxxx:** the *app* tries to establish a connection with 'USBxxxx'
- **Unable to read/write data from/to the device:** failed to read/write data from/to the device\*
- **CHECKSUM ERROR (RETRY x):** the operating settings in the tester have not been received or processed correctly; a maximum of five attempts will be performed
- **PERSISTENT CHECKSUM ERROR:** data not properly processed in the leakage tester\*
- **Your Leakage Tester USBxxxx is ready to go!:** the leakage tester is ready for the first session

\* leads to **Exit (only)**: terminate *app* and/or dis- and reconnect leakage tester

## 4.2 Measurement

*Normal* messages while a session is running:

- **SESSION START:** just a short notice
- **AIR IN:** the air pump will try to pressurise the system to just above 5mB
- **STABILIZING PRESSURE:** the pump halts, the target pressure has been reached and the system will check for a short time whether the pressure is stable enough; after this phase, when the leakage is relatively high, the pressure curve might enter the graph below 5mB
- **MEASURING PRESSURE:** the actual measurement session is running, the graph is drawn
- **SESSION FINISHED:** the last sample has been delivered, the sessions has been completed and the system will be depressurized, while the system is depressurizing one can already start filing the graph
- **READY:** the test has been completed, the leak tester is ready to take a new measurement

*Possible* messages on errors or warnings during or after a session:

- **SESSION TERMINATED:** tapping **Stop Test** causes this message
- **TARGET PRESSURE (5mB) NOT REACHED:** the system loses so much air that the pressure cannot be increased sufficiently: the otoplastic may have a very poor fit or placed incorrectly; before drawing any conclusions, the system should always be checked for leaks without an otoplastic, also check whether the air pump operates properly
- **PRESSURE UNSTABLE:** a stable test-pressure cannot be acquired, if it persists service is necessary
- **PRESSURE DISCHARGE TOO SLOW, OBSTRUCTION?:** after a session, pressure should leave the system within a few moments; when air cannot leave - or only with difficulty - the system, this indicates internal contamination or valve malfunction, if this message remains service is required
- **READY (BELOW REJECTION LEVEL):** the session has been completed, but at some point during that session a pressure of 4mB or less was measured
- **Unable to read/write data from/to the device:** failed to read/write data from/to the device, likely due to interference in the USB connection or cable too long\*
- **Data flow from USBxxxx discontinued:** the program halts for an unknown reason\*
- **CONNECTION WITH Leakage Tester USBxxxx LOST!:** the USB connection went down, most likely due to a disconnected cable\*

\* leads to: **Exit (only):** terminate *app*, restart it and reattach tester

## 4.3 Archiving

*Common* messages during archiving:

- **This filename 'name' already exists:** the filename *name* already exists, (re-)enter a different name; remember that names like com1, com2, etc., lpt1, lpt2, etc., con, prn etc. are not allowed
- **Character (x) not allowed in a filename:** in Windows 10, a filename may not contain character in the range  $x = [\"\\\", \"/\", \"*\", \"?\", \":\", \"<\", \">\", \"\\\", \"|\"]$ , these tokens are automatically deleted as you type
- **Graph 'name' has been saved:** the file '*name*.png' has been saved with time/date stamp