olfasense

Working with the TO evolution and WiNose LIMS

Manual

TO evolution and WiNose LIMS

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1. Introduction

Welcome to the world of odours at Olfasense and thank you for choosing the TO evolution series for your olfactometry laboratory!

This manual guides you through the setup and usage of all parts of your instrument. The system consists of the olfactometer itself and the accompanying software package. The first section gives a brief tour to assembling your device and explains certain hardware features in detail. The software package belonging to your TO evolution system consists of a database-powered web application to manage all relevant data and a lightweight control software used to conduct measurements with your device. Separate sections for each software part provide an overview of the general structure of the system and how to solve common tasks.

Please note that only significant changes in the software lead to an update in the manual.

2. Hardware

The hardware of your TO evolution consists essentially of four parts
- The support bar, providing the foundation for the other elements of the TO evolution
- The dilution unit, the heart of the olfactometer
- Four or six panel interface ports depending on your device size
- Partition screens, to isolate the individual panel seats

Assembling the device

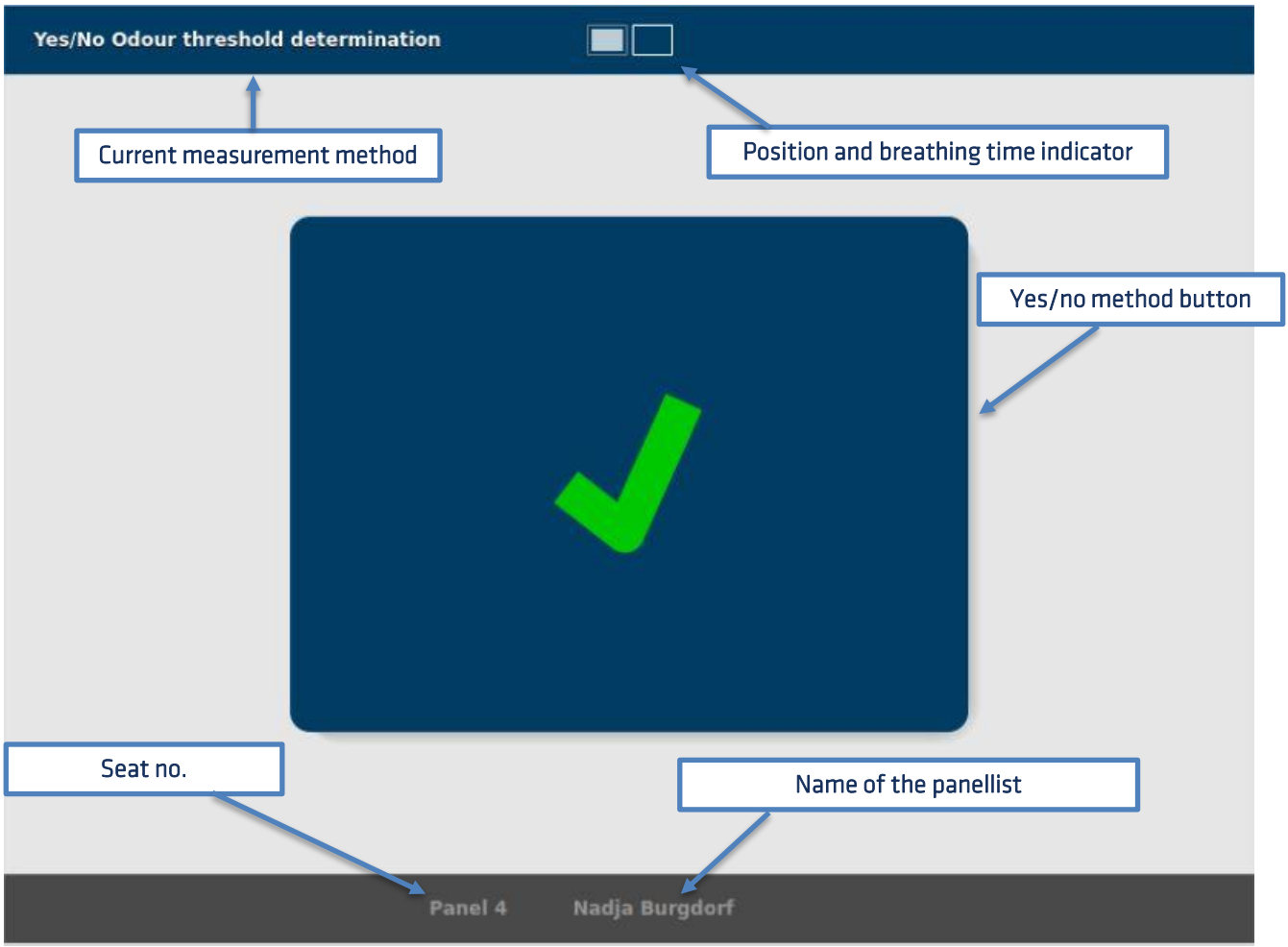
Place the support bar on a suitable well-sized table. Make sure to have enough space for your panel to sit comfortable.
Slot the dilution unit into the support bar, pushing it firmly until fixed. In the next step, attach the panel interface ports to the support bar. Each port is equipped with two short cables and two clips on each side to hold it in place. First, attach both cables to the support bar, pull the port gently towards the support bar until both clips snap in and the air tubes in the lower portion are connected. Finally, attach the partition screens to the support bar. Use the enclosed white plastic connectors to connect the screens to each other. Now proceed to attach the necessary cables to the outside of the dilution unit: power, air supply and network connection. Finally, switch the device on, check if all panel interface ports boot up correctly and try to access some features from the hardware test screen in the control software to see if everything works as expected. Refer to the corresponding section for details. When calibration or maintenance is required, simply reverse the process, as you only need to send in just the dilution unit. Unplug all cables on the outside and pull it out using the handles.

Panel interface ports

The mounting positions for your panel interface ports follow a fixed numbering scheme. Looking towards the sample bag end, the foremost place on the left is seat number one, place number two on the opposite side. Next to those seats, the numbers simply increase by two, so the left side would hold the uneven seat numbers, while the right side would hold the even numbered seats. Since the panel interface ports can be used interchangeably, they store their own seat number. The physical seat number, that is the number for a mounting position, is displayed on a small sticker on the support bar. The seat number stored in a panel interface port is shown at the bottom of the screen. Those numbers must match to correctly match replies of panel members later on. To alter the stored seat number of a panel port, press and hold the Olfasense logo on the start up screen.

2. Hardware

After a brief moment, a schematic top view of the device will appear, select the appropriate seat number and confirm by pressing the ok button in the lower right corner. This procedure might be necessary when you have disassembled your device in order to move it, e.g. into a new room. Once set up, you do not need to touch it again. While connected to the control software, the IP address of the machine you are running the control software on is also displayed. Additionally, while being connected, the blue top bar of a panel interface port displays a small schematic top view of your device. This indicates where a particular panel ports is located with respect to the device. During an actual analysis, this also serves as a breathing time indicator, flashing up to indicate which ports are currently receiving the presentation, fading out as the breathing time runs out. Devices capable of dual forced choice measurements are of course equipped with two nose masks. If you want to perform a method, which requires only one nose mask, e.g. yes/no, always use the left nose mask of each port. The unused nose mask to the right needs to be detached and then sealed with the enclosed small plastic plugs.



3. System requirements and Installation

The Winose evolution LIMS – henceforth often shortened to web system – is a web-based client server application. The system manages all data related to your daily lab operations, managing all relevant data, providing you with reporting tools and helping you keeping highest uality.

System requirements

The web system works on any machine running a Windows based operating system. Using Windows 7 or above is highly recommended. The specific hardware requirements depend a lot on your laboratory size, specifically how many people will be using the system at the same time. Any decent machine capable of running Windows 7 or above should be sufficient for smaller teams of up to five people. Since the database might grow large in the course of time, free hard disk space of at least 5 to 10 GB is recommended. The system alternatively also runs on Linux-like operating systems, although not officially supported.

Installation

To allow for maximum flexibility, the web system is supplied as a self-contained archive. The actual file is either provided by a download link or stored on a data medium as part of the TO evolution shipment. To install the software, simply extract the archive to a location that suits your needs. To avoid problems with the Windows user rights management, we highly advise against using the standard “Programs” or “Windows” subfolders. The installation itself is self-contained, it does not install or store anything outside its own folder and thus can easily be transferred to another machine should the necessity arise.
To fully benefit from the advantages of a client server application, it is highly recommended to install the LIMS on a dedicated, continuously running computer within your network to allow permanent access for everyone in your company. Most beneficial in that regard is a network, which always assigns the same IP address to the machine in question. This eases your daily work, since the information necessary to access your LIMS never changes. Otherwise, you will regularly need to adjust bookmarks or the information entered into your control software. For very small laboratories, without any notable IT infrastructure, it is of course possible to install the LIMS on the machine you’re using to conduct the measurements later on and just start it on demand.

3. System requirements and Installation

Network integration

The device currently only supports automatic IP configuration via DHCP. That means you will need to provide an existing network infrastructure, where a DHCP server takes care of assigning IP addresses to the device itself as well as to the panel interface ports. In most office environments, this should already be the case. For mobile measurements, contact us or your network administrator. Last but not least, it is highly recommend to use cable based network connections between the device and the machine controlling it.

Validation/Accessing the system

In order to check if everything is working correctly, open up a web browser, preferably on a different machine on your network.
Navigate to *http://ip-address:8080*, whereas "IP-address" is the address of the machine you installed the system on, 8080 is the default port used. Assuming everything works fine, the login page for the LIMS will show up. The user credentials (case sensitive) for the pre-existing admin account are:

Username: admin Password: winose

It is highly recommended to only make limited use of this account. Create a normal user account as one of your very first steps. Refer to the section "User and access rights management" for details.

4. Working with the TO evolution and WiNose LIMS

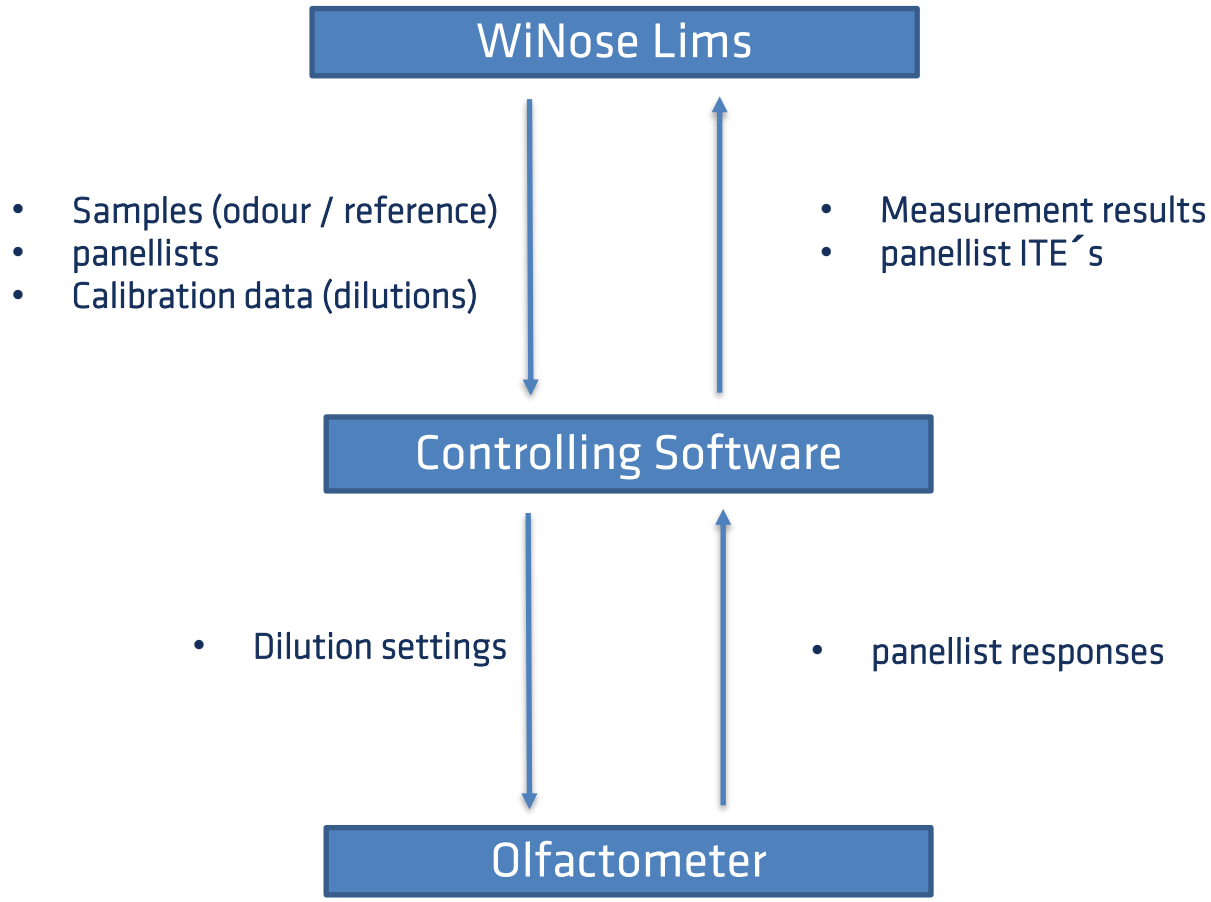
The following work flow shows the single modules of the TO evolution olfactometer and WiNose LIMS and how they intereact with each other.

Each module will be explained in detail on the following pages with some practical examples for running a sample according to the EN 13725:2003.

The WiNose evolution LIMS supports you in managing and controlling the quality of your measurements by providing many useful laboratory management tools. From qualifying your panel and keeping track of your lab performance, to managing reference gases, projects and clients, the WiNose evolution LIMS offers various options to support your day-to-day laboratory processes.

The TO evolution control offers you options like maintaining your olfactometer and measuring odour samples according to different measurement methods according to the EN 13725 or ASTM 679, as well as hedonic tone and intensity.

Following graphic shows the interaction scheme between LIMS, control software and olfactometer:

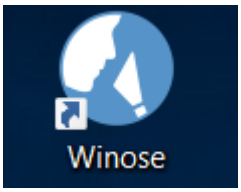


5. WiNose evolution LIMS

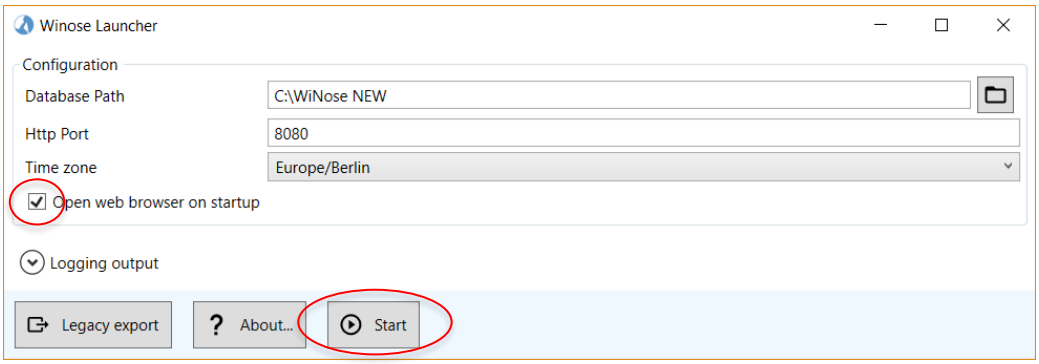
5.1 Getting started with the WiNose evolution LIMS

Before performing any odour measurements you always have to **start WiNose first**. If WiNose is not running you will not get access to your olfactometer via the control software which is further explained **in chapter 2**.

To run WiNose, after successful installation, you have to double click on following shortcut on your desktop.

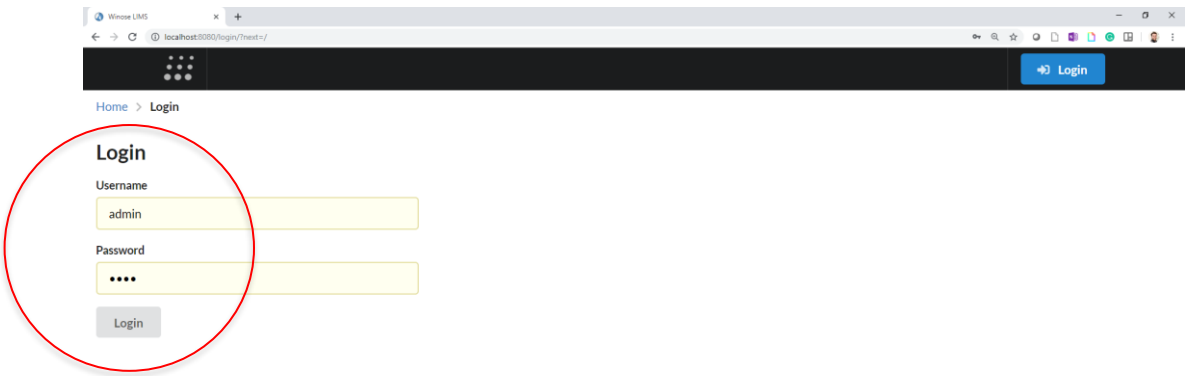


Once the software is started the **WiNose Launcher** pops up.



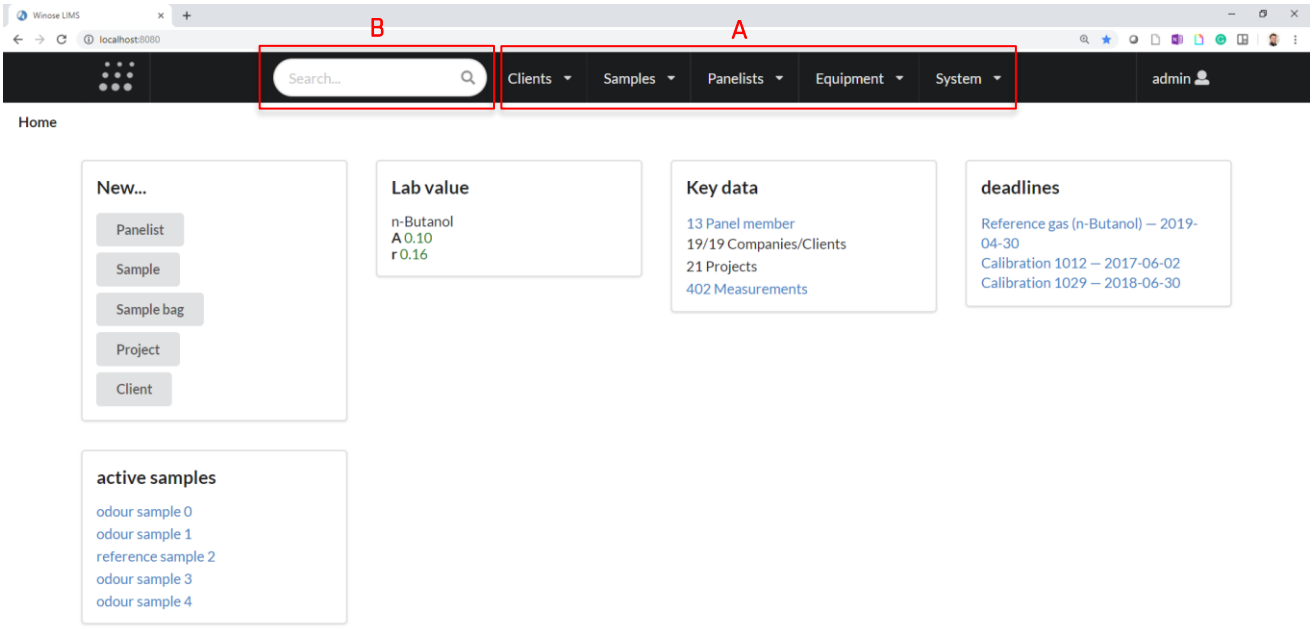
Then please click on start. If you marked the checkbox **Open web browser on startup** WiNose opens your default web browser automatically.

After the boot up the login screen occurs and you can login to WiNose with the user **admin** and password **WiNose**. Of course you can change any login information later on.



5.2 General system navigation – dashboard

As a web-based system, the **WiNose LIMS** looks and feels just like a website, so you will feel familiar right from the start.
The dashboard is the central navigation point from where you get access to all relevant settings and data in your WiNose LIMS. In WiNose there are 5 main categories (A): **Clients, Samples, panellists, Equipment, System**.
Each main category consists of sub functions, which will be described in detail on the following pages.



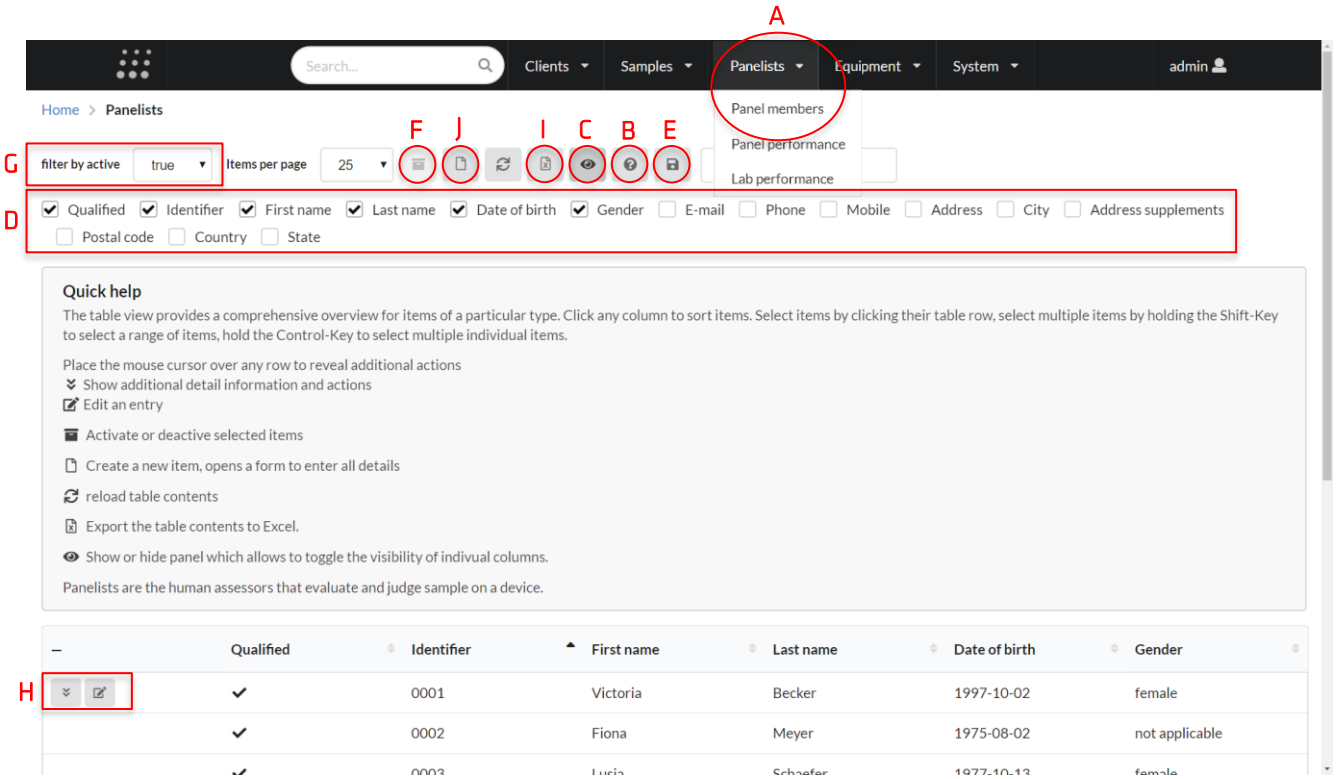
The dashboard offers you a quick overview about some relevant key information like lab value according to EN 13725 (performance on n-Butanol), active panellists, projects, deadlines for the calibration of your olfactometer or the validity of your reference gases, active samples, etc. and allows you via shortcuts (under **New...**) to create new panellists, samples, sample bags, projects or clients.

In the upper part of the dashboard you will also find a full text search field (B), which can help you with a fast access to your data.

The icon in the top left corner (Olfasense logo) takes you always back to the homepage/dashboard.

5.3 General page control and concepts

Table view



Most of the sub category pages use general page control items and work in the same way. They are called **table view**. We will now show this control using the example of **Panel members** of the main menu **panellists** (A).

A click on the **Quick help** (B) opens and you get an overview of the explanations of the individual controls of each page.
In the example above, additionally the button (C) was activated to see which other columns can be displayed (D). If you have decided on the columns that you want to display, you can save this view individually for your user account by clicking on (E).

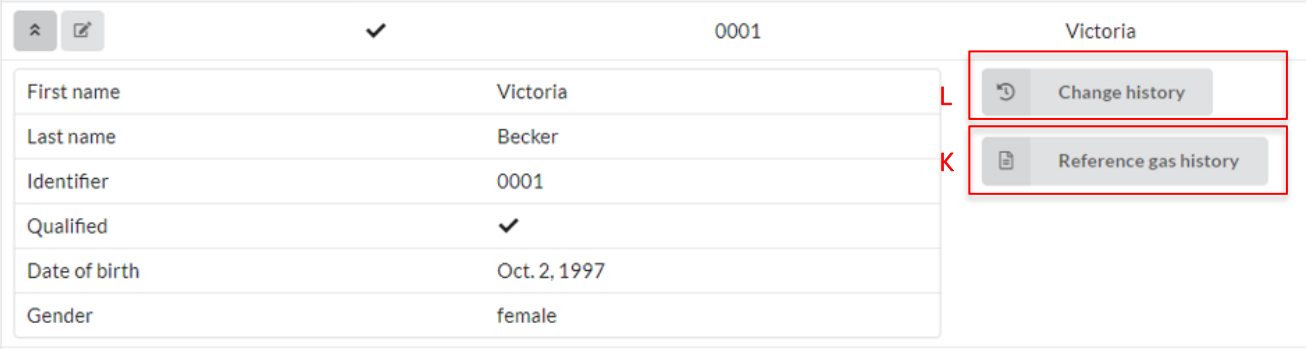
You can also export any table from each category to Excel by clicking on (I).

For data integrity reasons, it is not possible to delete any item from your web system. The approach taken here is to deactivate and, if necessary, reactivate items instead (F). If you need to toggle the active status on multiple items at once, select those items and click on the corresponding button (F). Table views generally filter out active **(true)** or inactive items **(false)** (G). The **true** and **false** choice allows you to switch between viewing active or inactive items. The **true** status has several consequences for an item. Inactive items do not show up in most list choices. For example, you cannot select an inactive bag while editing a sample.

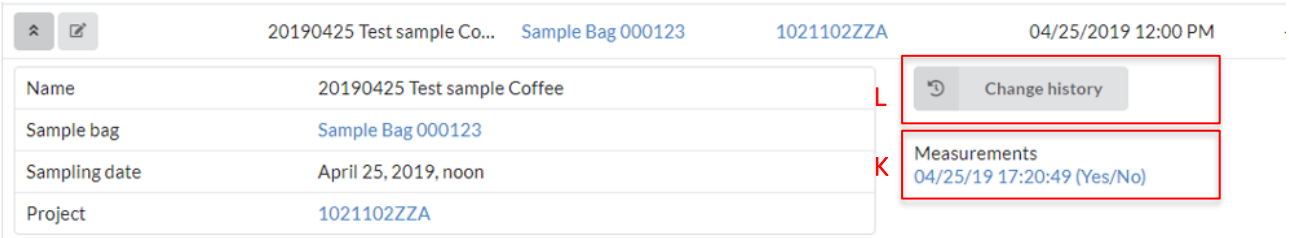
5.3 General page control and concepts

Finally, to save you some work, activating or deactivating certain items also changes the status for dependent items. Changing the active status for a sample, for instance, also sets the status of the used bag to match the sample. Deactivating projects also deactivates all samples, which are part of that project (and in turn, their bags).One important thing to know about the active or inactive status is the availability of an item within your control software. Generally, only active items show up/are taken into account in the sample or panel member selection.
As a workflow, we recommend the following: Create one or more projects with a couple of samples and perform the measurements for those samples. If you are satisfied with the results and generated all necessary reports, you could deactivate the samples and/or the projects. This keeps the sample selection in your control software from overflowing with irrelevant data.

Place the mouse cursor over any row and following buttons occur (H).
Use them to show additional information for this item entry or edit it.



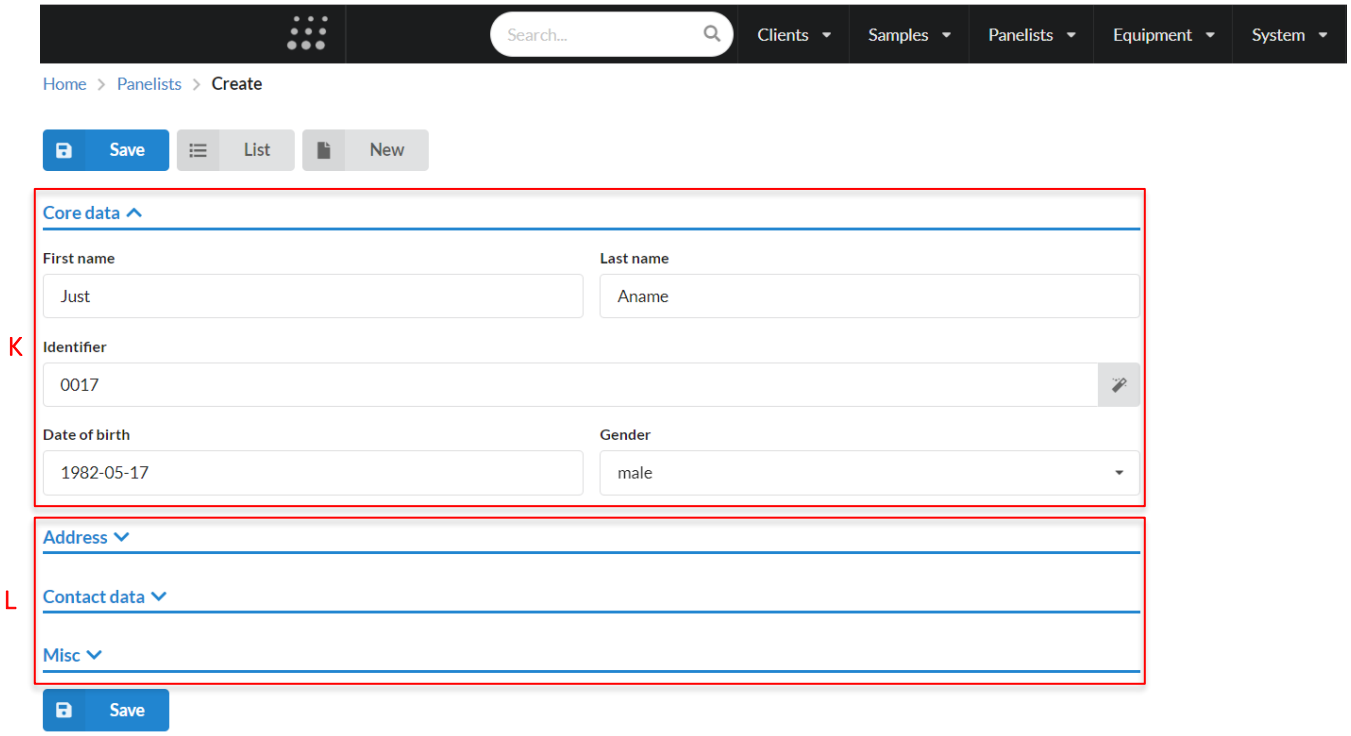
The additional information gives you an overview about the core data of the item. For most items you get also direct access to the relevant data of the item (K) like *Reference gas history* in the picture above or *Measurements* in the picture below,



Change history (L)
Keeping track of changes made to items is vital to keep data quality high. The web system tracks changes made to items and records all relevant (who, when, what) data for you. The change history for an item is accessible from the detail view for that particular item. See the screenshot below for details.

5.3 General page control and concepts

If you want to create a new item you have to click on (J) and it opens a new window called **data record form**.



The structure of these data record forms are basically similar. Entering **core data (K)** is a must, otherwise the item can not be created. In addition, there is **additional information (L)** that you can add, depending on what item you want to create.

After filling the details for a new item or finishing editing, hit save to create the new item or save your changes, which forwards you to the detail view for this (new) item.

Note that certain items, e.g. measurements cannot be edited retrospectively. Furthermore, to keep data consistent, changes to certain items are subject to specific conditions. This mostly affects all changes, which would influence the result of an analysis. For example, altering the concentration (ppm) value for a reference gas cylinder is not possible anymore, as soon as a sample derived from that cylinder has been used in a measurement. The same applies to various other properties, such as pre-dilution factors.

5.4 System

The **System** menu consists of 3 functions:

Users - User management with role based data access

Function	Admin	Head of Lab	Technician	Assistant
Create passwords from other users	x			
Olfactometer management	x	x		
Calibrations	x	x		
Create users	x	x*		
Reference gas management	x	x		
Clients/companies	x	x	x	
Projects	x	x	x	x
Project reports	x	x	x	x
panellists	x	x	x	x
Samples	x	x	x	x
Sample bags	x	x	x	x
View reference gas history laboratory + panellists, generate reports	x	x	x	x
View measurements/generate reports	x	x	x	x
Use control software	x	x	x	x

* no admins, but other head of labs

Language – Available languages are German and English. Others on request possible

About – Here you find the current version no. of your WiNose LIMS

5.5 Equipment

The **Equipment** menu essentially consists of 3 sections which are divided in 7 functions where you manage sample bags, reference gases and olfactometers.

5.5.1 Section 1 - Sample bags, bag materials, bag batch creation

Function - Bag materials

Since the material of a sample bag is a vital piece of information according to ISO 17025, WiNose treats this information as a separate item. In order to create sample bags in the LIMS, you first need to create at least one bag material, e.g. Nalophan, Tedlar or PTFE.

Function - Sample bags

The next step towards a measurement is having sample bags ready to take up the actual sample air. WiNose follows the concept, that a sample (as in the odorous air) can be contained in a sample bag, which is, for traceability reasons according to ISO 17025, an independent entity. Therefore, you can create a new empty bag before or when you are adding a sample. In consequence, the term sample within the context of WiNose refers to the combination of a sample air in a sample bag.

Function - Bag batch creation

If you want to put more than one bag at once into your LIMS you can use the **bag batch creation** function. This category doesn´t use the general page control (→ chapter 1.3) but offers a comprehensive way on how to create a batch of bags.

5.5.2 Reference gas, reference gas types

Reference gas types

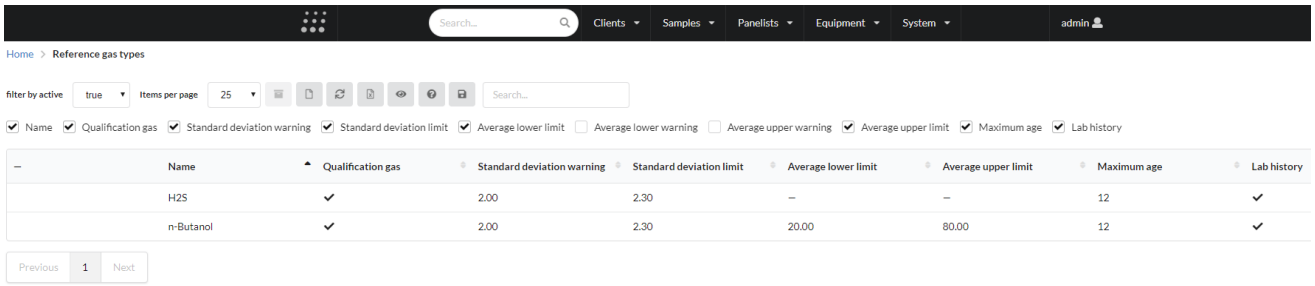
The EN 13725:2003 says:

> *In order to obtain a reliable sensor, composed of a number of panel members, assessors with specific qualities shall be selected from the general population to serve as panel members.*

The calibration of the odour panel, shall be done on the basis of a reference odorant. That way traceability to the accepted reference odorant is achieved.

This reference odorant is called **n-Butanol (CAS-Nr. 71-36-3).** The process for the panellist screening with n-Butanol is described in chapter ***6.7.2 Selection of assessors on individual variability and sensitivity*** of the EN 13725. The recommended concentration for a gas bottle of n-Butanol is 60,00 ppm.

In **WiNose** n-Butanol is defaulted as reference gas type but it is also possible to create more reference gas types, e.g. like H2S in Germany.



Reference gases

As a laboratory, you can create and manage multiple reference gas cylinders in WiNose that you need for everyday use. You have the option of specifying the expiration date of the gas. This allows you to see in the Dashboard when you need to put a new gas cylinder into operation at latest. In addition, the certificate of the gas can also be uploaded to WiNose. This facilitates your document management also with regard to an accreditation audit.

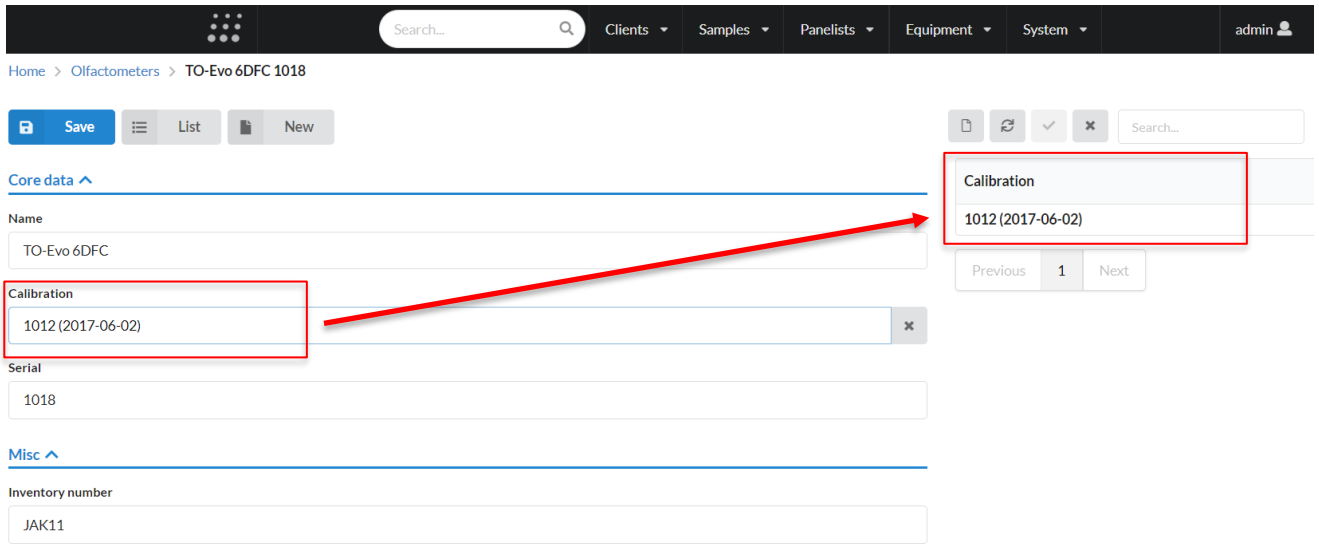
5.5.3 Olfactometers, calibrations

Olfactometer and calibrations

Select *Olfactometers* from the *Equipment* menu on the navigation bar, which takes you to the – yet empty - overview for your devices. When adding your device, you need to add the calibration set for it, which holds the real, calibrated dilution values for each dilution step the device is capable of. This can be done before you add your olfactometer if you go directly to *Calibrations* and then add a new item or while you are adding your adding your olfactometer if you click on calibration and then add a new item (calibration set).

The necessary initial calibration data file is part of your TO evolution shipment which you find on the USB-stick. Additionally, you may add the calibration certificate, e.g. as a PDF file, to the new calibration item.

Make sure to enter the correct serial number for the device, as the control software will use this information to match the device to the data available in your web system. The serial number of your device is printed on the device itself, usually on the rear end plate.



5.6 Panellists

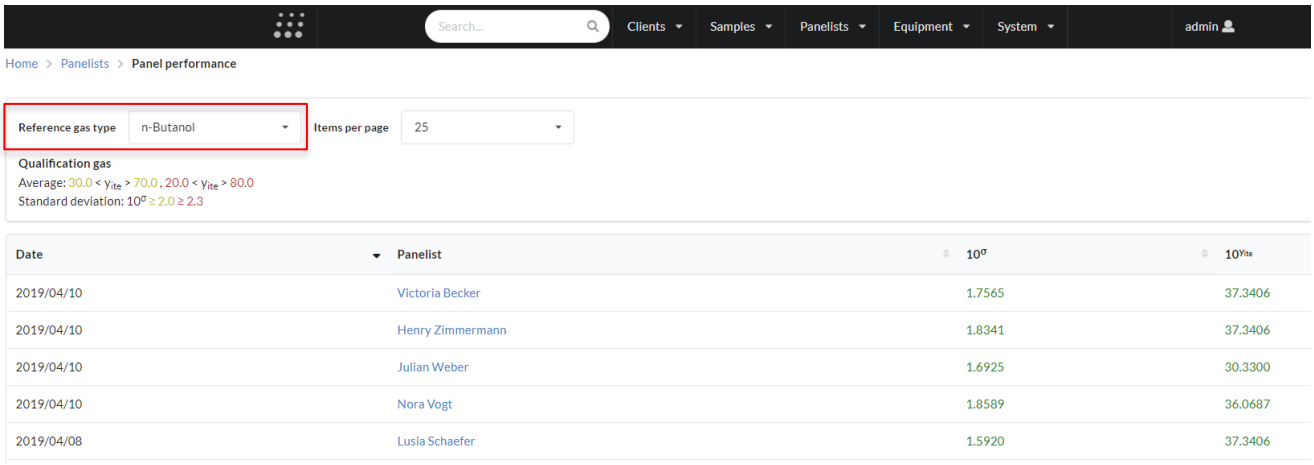
The **Panellists** menu essentially consists of 3 functions: Panel members, panel performance, lab performance.

Panel members

Your laboratory would not be complete without people assessing the sample air. Select **Panellists** then **Panel members** from the top navigation bar and add at least one panel member. Note that you have to assign a unique to the panellist. You can create this identifier manually or you can click on the **magic wand** to create a consecutive number automatically. This identifier is used to identify the panellist on report sheets, where it is often desirable or even required to not disclose real names of panel members.

Panel and lab performance

The panel and lab performance offer an overview about the current performance of your panel members or lab, which is created with the reference materials, e.g. n-Butanol according to EN 13725. This data is saved in WiNose automatically after the measurement of a corresponding reference sample.
In the *Reference gas type* drop-down-box, you can display the performance of your panellists or lab for the different reference guest types which are created in your WiNose.
If the panellists or lab meet the requirements of the EN 13725, the values are displayed in green, but if they do not meet, they will be displayed in red. If you have set warning limits for that reference gas type, they are displayed in yellow.



5.7 Samples

The **Samples** menu essentially consists of 2 functions: Samples and measurements.

Samples

Samples form an essential part of the day-to-day operations of an odour laboratory. This section discusses different ways to organize and manage your samples.

Samples are related to real odours, like air sampled from processing plants, waste water treatment facilities or similar.

Client supplied samples are modelled in the field “Misc” and the button “externally supplied”. The intent of the supplier property is to model the use of external bags instead of your own, which are often part of your lab accreditation.

Diluted samples

Modelling a diluted sample is as simple as changing the applied dilution factor in your sample item. To keep things consistent, certain restrictions and assumptions apply:

- Diluted reference samples need to specify the same reference gas cylinder as their source sample
- After a sample was used in a measurement (and thus might have contributed to the lab or panel member history) it is no longer possible to change its dilution factor
- Samples without a specified source sample are assumed to be “diluted at source”
- Finally, a sample might be completely supplied by a client with a prior dilution already applied. In that case, leave the source sample field empty, specify the supplying client and adjust the dilution factor. If you need to dilute it again, leave the supplier field empty in the resulting sample, since that one is now contained in one of your own bags.

Samples may be diluted as often as necessary; the respective detail view lists source samples and resulting samples.

5.7 Samples

Reference sample

Training and qualifying panel members on certain reference materials is a requirement for most laboratories working in compliance with the EN 13725 or similar standards. Therefore, the WiNose evolution offers dedicated support for such reference samples. A reference sample is implicitly defined by a sample item, which points to a reference gas cylinder. Therefore, the first step to create reference samples is supplying the necessary data of the gas cylinder, which is used to produce those samples particularly the substance and the concentration. Reference samples may optionally belong to a project. This meets the different approaches to continuous panel member training laboratories use. If you prefer to include the panel testing (for already qualified members) as part of a project, just link the matching project to your reference samples.

Measurements

With a couple of panel members and samples present in your system, you are ready to do a measurement. The details for actually running a sample analysis are outlined in the dedicated section for the device control software. Saved measurement results are accessible via the top navigation bar under the "Measurements" menu. The detail view for an analysis displays all the relevant key data, e.g. the result, the analysed sample, the used device, date and time and so on. From within the detail view for a particular measurement you may also access a more detailed onto each round.

Reporting

Printing or viewing reports is an important step within the process chain of an odour laboratory. The WiNose evolution supports you with reports on different stages. Each analysis on its own may generate a report. Click the report button on top of the detail view of an analysis. This report sheet includes all relevant data required by the EN 13725. The reference material history for each participating panel member in an analysis is often part of such a report. The reference material history is accessible from the detail view for a particular panellist. The print view further allows you to narrow the amount of entries you would like to print. Similarly, the reference history for the whole laboratory can be accessed via the navigation bar on top. Finally, since projects often consist of closely related samples, you may generate reports for a project.

5.8 Clients

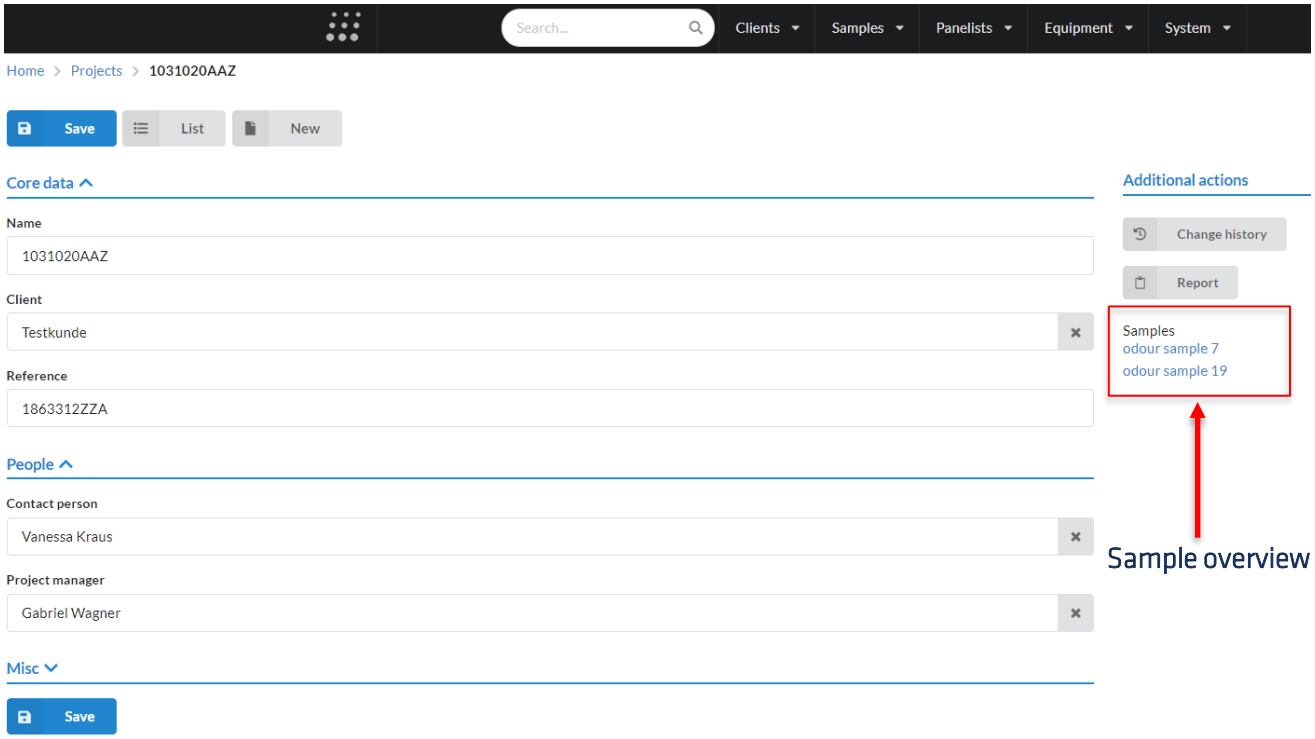
The **Clients** menu essentially consists of 4 functions: Companies, clients, projects, contacts.

Companies, clients and contacts

The system distinguishes between companies and clients. This is particularly useful for companies, which either have several facilities or operate several branch offices. In WiNose those facilities and offices are defined as clients.
Therefore, projects belong to a client, not directly to the company. The latter only serves as a top-level entity to group the facilities or offices that belong to that company.
Additionally, can group the companies into categories (line of commerce) (e.g. food processing, wastewater, automotive, perfume, etc.) and clients into departments (r&d, material testing, etc.).
You can also create contacts (contact persons) in WiNose that you can assign to projects or clients. These contacts are stand-alone entries because they can be assigned to multiple projects or even to different clients indicidually.

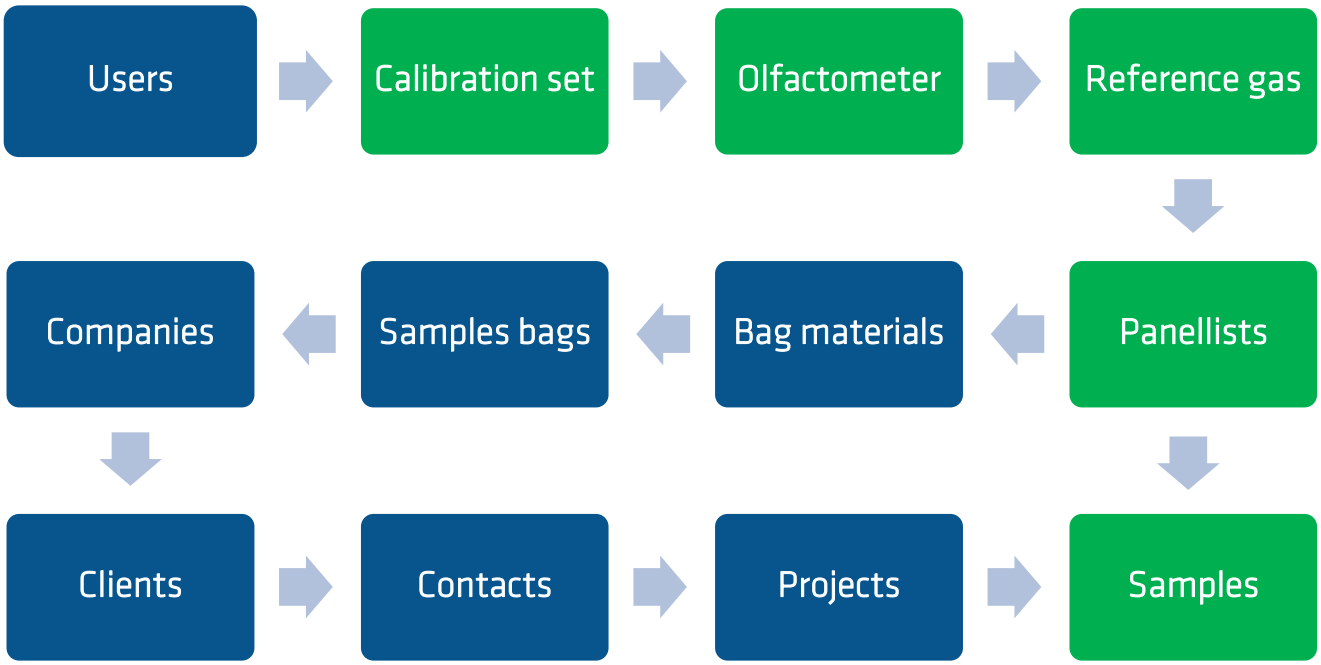
Projects

For a better overview you can assign the samples you create in WiNose to projects. You can either create a project before or while you are creating one sample or more.
In the detail view of the project you will find on the right side all samples assigned to the project.



5.9 Getting started

Here is a small overview of what you need to prepare in WiNose before you can measure a sample. The green-marked path describes entries that must be created, the blue path are optional entries which are not necessarily needed to start a measurement.



It is recommended to use all functions of WiNose for overview, data quality management and traceability reasons. It also assists you in getting through your accreditation audit in ease.

5.10 Entity overview reference

This section provides a general summary of all available items or entity types within the system and points out the intended usage of certain fields or properties.

Reused sub types

Address information (reused for panellists, companies, clients)
- Address, street including number
- Zip/Postal Code
- City
- County
- State/District, broader region within the country
- Address supplements, additional information, e.g. specifying a certain building within a bigger complex

Person information (reused for panellists, contacts, users)
- First name
- Last name
- Gender[2]

[2] *Follows ISO/IEC 5218 by providing the choices "not known", "male", "female" and "not applicable"*

Contact information (reused for panellists, contacts, clients)
- E-Mail
- Phone, landline
- Mobile

Companies
- Name
- Address information
- Category (as a link to a category created beforehand)
- Internal reference (general purpose field, to e.g. allow for linking to your internal ERP/CRM solution)

5.10 Entity overview reference

Clients
- Address information
- Contact information
- Client (as a link to the top level organization)
- Department (further specifies type and purposes within the client's structure)
- Contact (link to a contact person, as a dedicated point of contact, in contrast to the much more general information stored by the contact information)
- Internal reference (see Clients)

Note that the name for the Offices is automatically generated by appending the city to the name of the client an office belongs to.

Contact persons
- Contact information
- Person information
- Position (function or job position with an organization)

The contact person serves as a dual-purpose entity: it may be used for contacts on client side but also 'persons in charge' on your own side when it comes to projects.

Projects
- Name
- Client (as a link to clients)
- Internal reference (as above)
- Comments
- Contact person (contact on client side)
- Project manager (contact on your side)

Panel member
- Person information
- Date of birth
- Identifier (anonymized unique identifier for a panel member)
- Qualified (qualified with respect to the EN 13725, see … for details)

5.10 Entity overview reference

Samples
- Name
- Reference (more detailed sample description)
- Comments
- Contained in (the bag that contains the sample air)
- Time of sampling (date and time when the sampling took place)
- Factor (applied pre-dilution factor)
- Source sample (sample used as a source during pre-dilution)
- Externally supplied (optional field for client supplied samples)
- Cylinder (optional field pointing to a reference gas cylinder for reference samples)
- Project (link to a project)

Bags
- Name
- Material (link to the material the bag is made of)
- Manufacturing date
- Sample (not editable, back link to the contained sample air)

Reference gases
- Name
- Number
- Expiration date
- Substance (either n-Butanol or H2S)
- Concentration (in parts per million, ppm)
- Certificate file (file upload field, allows to attach the vendor supplied certificate)
- Comment
- In service since (distinguishes 'entered into the web system' from actual usage)

Olfactometers
- Name
- Inventory number
- Serial number (must match the real serial number of the particular device)
- Calibration (link to the calibrated dilution steps available to the device)
- Comment

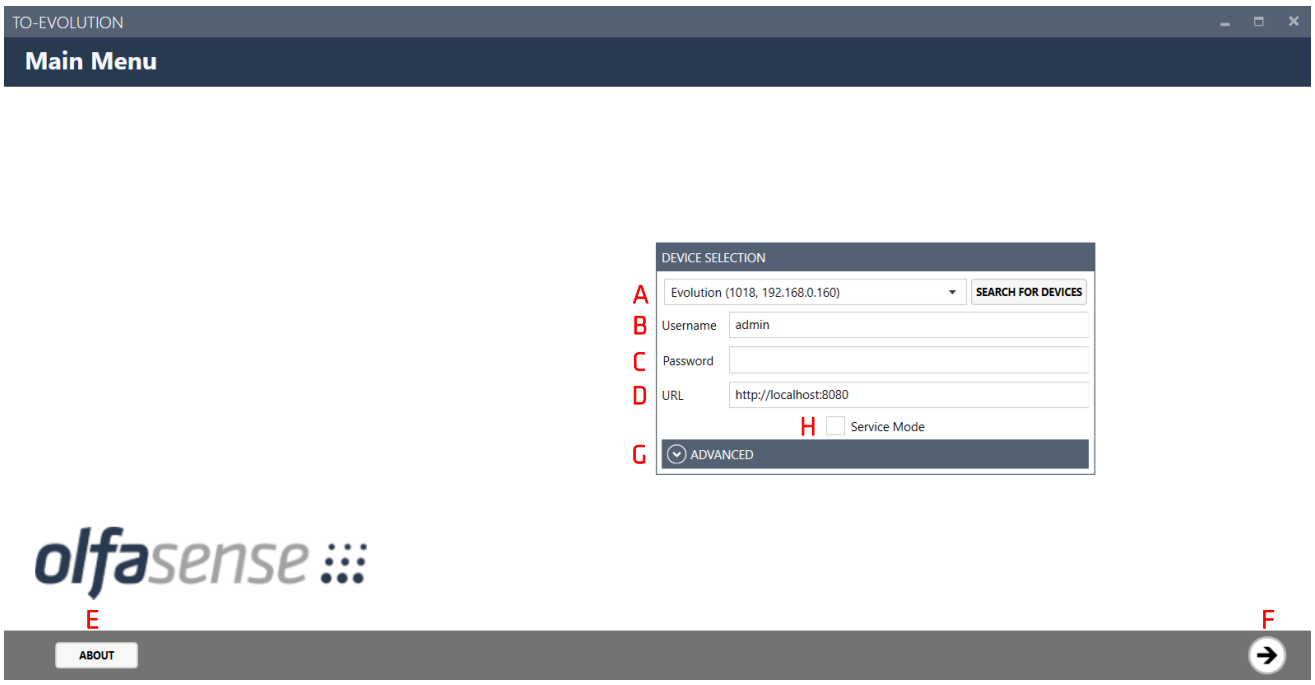
Users
- Person information
- Contact information
- User group
- Admin status

6. TO evolution Control Software

Once you have managed all your data in WiNose and prepared a new project with samples you can now start the TO evolution control software to measure your samples by double clicking on the following desktop shortcut:

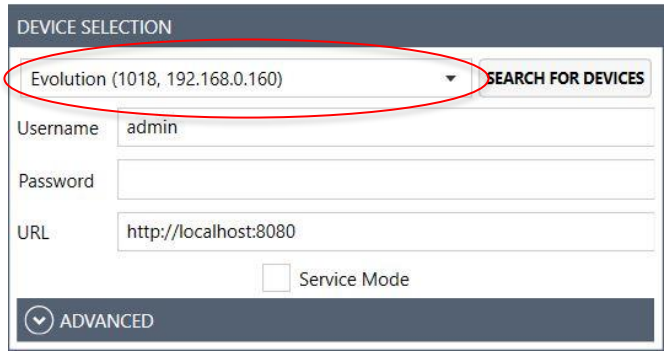
Once the software is started the **Main Menu** pops up.

6.1 Main Menu



A – Device

If your olfactometer is already switched on and connected to your PC/notebook it will automatically be found by the control software (with serial no. and IP-address):



6.1 Main menu

B - Username

Here you have to enter your username (same as for WiNose) which is per default setting **admin.** If you have created other users in WiNose they will also be able to login with their username and password.

C - Password

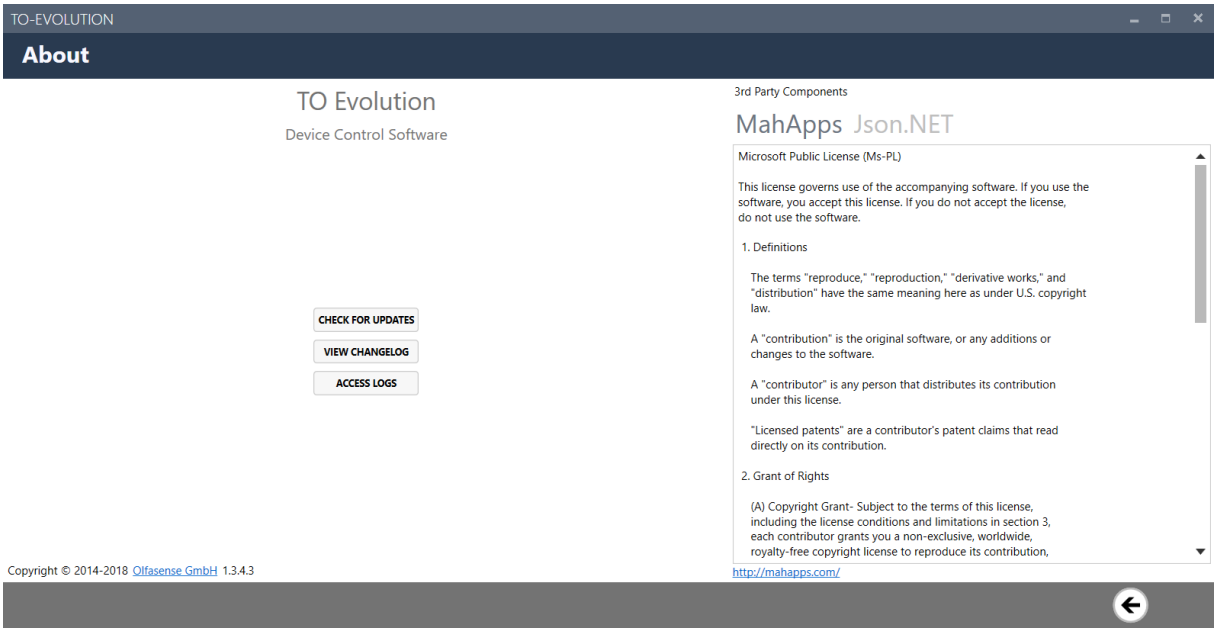
Here you have to enter your password which is per default **WiNose** for the username admin. Please note that you have to enter the correct password referring to the username you have set in WiNose if you don´t use **admin** as user.

D - URL

Here you have to enter the URL-address of your WiNose which is, if you have installed it locally (on your PC/notebook), http://localhost:8080/. In case you have installed your WiNose in your network please use this IP-adress.

E - About

Here you can find your current software version, check the control software for new updates, view the changelog and get access to your logs (in case of troubleshooting).



F – „arrow right“

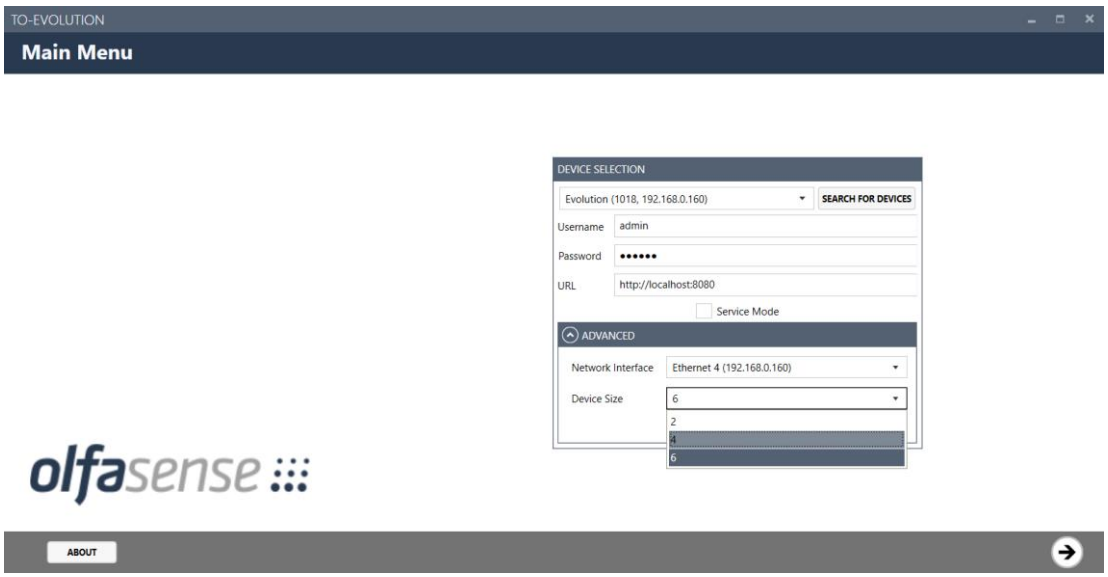
A click on the right arrow will lead you to the next screen. The right arrow appears only if all minimum settings have been made in the respective menu. In some menus no settings are required.

6.1 Main menu

G – Advanced

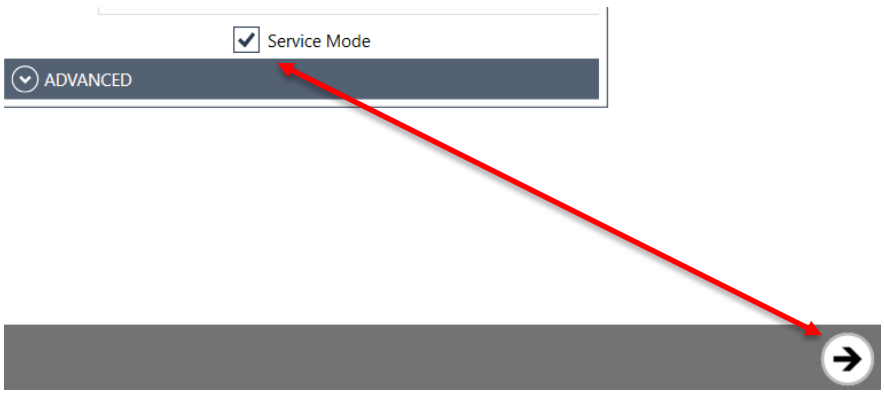
In case that the olfactometer is not be found automatically by the software you click on **ADVANCED** and select the correct **Network Interface** on the control PC which is used to connect it with your olfactometer. This can be locally (check your local network settings) or within your company network.

You have also the possibility to change your device size. If you, for example, bought a 6-station TO evolution you can here configure the software to use the olfactometer as 4-station (or even 2-station olfactometer). In this case only 4-stations (or 2-stations) will be provided with sample and reference air. This means that station 5 and 6 are "OFF" (or 3, 4, 5 and 6 in case you selected 2-port olfactometer). This option is mainly designed to save sample air on the ports which are not in use.



H – Service Mode

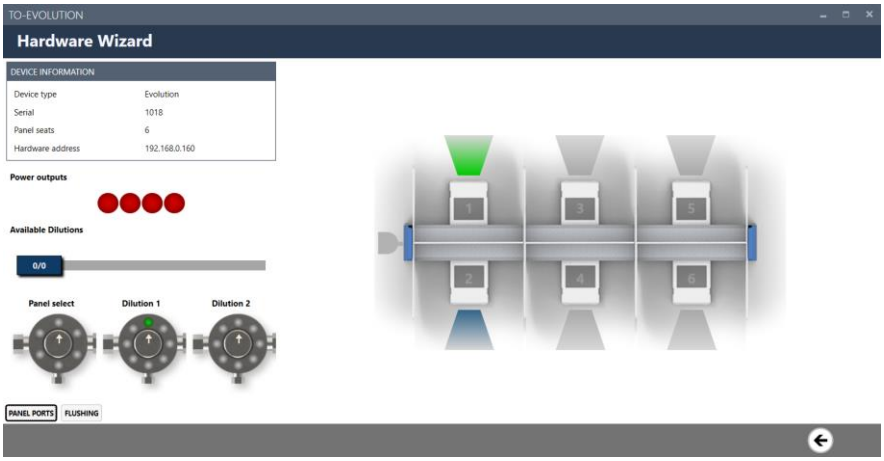
If you click the check box beside **Service Mode** and click on the arrow on the bottom right (F) you get access to the **Hardware Wizard** of the TO evolution which will be explained in further detail on the following pages.



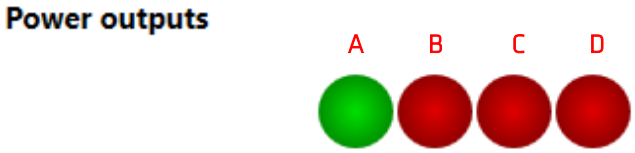
6.2 Service mode

The **Hardware Wizard** provides you with options to maintain your TO evolution.

Beside some information of your device (type, serial no., amount of stations, IP-address) you have a few other options you can do outside the standard operating process.



6.2.1 Power outputs



After clicking on the red dots they appear green and mean following (a mouse over shows you the short meaning as well):

A - opens the main valve (if everything is connected correctly you will hear air coming out of your olfactometer)

B – opens the extra valve (which refers to the dual-forced-choice method)

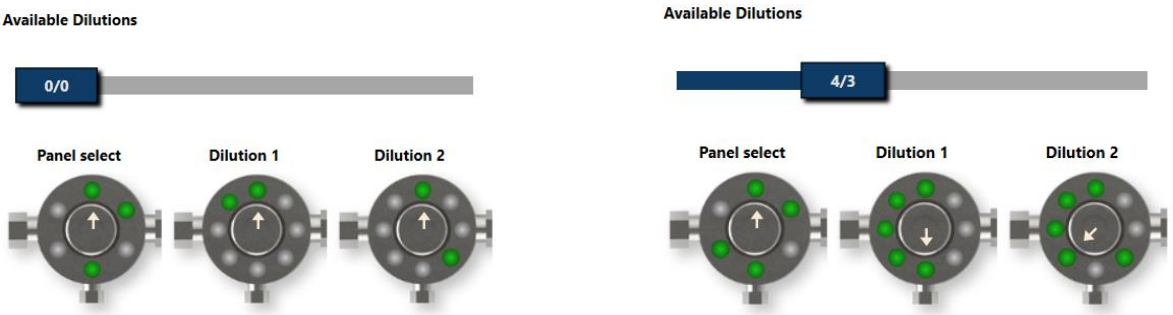
C – switches on the heating system. This option is very important if you may have some contamination in your olfactometer after heavy highly concentrated, sticky samples. We advice to switch on the heating system and wait for about 25 min before using the flushing mode and getting rid of the contamination

D – opens the flushing valve which is important for the internal flushing procedure with compressed air

WARNING – do not use the heating system for more than 30 minutes. Longer heating without flushing air can cause overheating and damages to the olfactometer.

6.2 Service mode

6.2.2 Available dilutions



Here you can check if the motors of the dilution units and panel switch are working correctly by using the slider bar. You can also set dilutions manually with this option.

Each dilution factor refers to an ID and each ID refers to the positions of dilution unit 1 and dilution unit 2 (e.g. 4/3): On the right picture above it means that dilution unit 1 it set to motor position 4 dilution and unit 2 is set to motor position 3.

In order to get an overview which ID refers to which dilution factor you can use following table and crosscheck it with your calibration set in your WiNose LIMS.

Please note that the following dilutions (single mask: yes/no and triangular-forced-choice; dual mask: dual-forced-choice) are only examples(!) for dilution factors and may be different from your calibration set.

slide bar	id	value (single mask)	value (dual mask)
0/0	0	0	0
4/1	1	65000.0	134625.0
1/2	2	45166.0	93545.0
2/2	3	31384.0	65000.0
3/2	4	21807.0	45166.0
4/2	5	15153.0	31384.0
1/3	6	10529.0	21807.0
2/3	7	7316.0	15153.0
3/3	8	5084.0	10529.0
4/3	9	3532.0	7316.0
1/4	10	2455.0	5084.0
1/5	11	1706.0	3532.0
1/6	12	1185.0	2455.0
4/4	13	823.0	1706.0
4/5	14	572.0	1185.0
4/6	15	398.0	823.0
4/7	16	276.0	572.0
5/4	17	192.0	398.0
5/5	18	133.0	276.0
5/6	19	92.7	192.0
5/7	20	64.4	133.0
6/4	21	44.8	92.7
6/5	22	31.1	64.4
6/6	23	21.6	44.8
6/7	24	15.0	31.5
7/4	25	10.4	21.6
7/5	26	7.25	15.0
7/6	27	5.04	10.4
7/7	28	3.5	7.25

6.2 Service mode

6.2.3 Calibration example yes/no and 3-FC:

The calibration procedure itself is described in chapter 6.5.5 of the EN 13725.

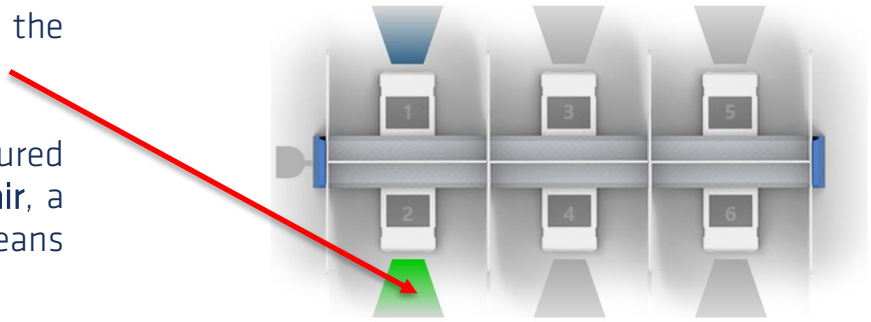
You can use this tool for calibrating/checking the dilutions of your olfactometer.

Please note: For calibrating you need a calibration gas which is filled into a sample bag which you connect to the olfactometer. Please do not connect the gas directly to the olfactometer!

1. Please select a station/panel port where you want to connect your calibration monitor (FID, CO_2, etc.) by clicking on the trapeze close to the port

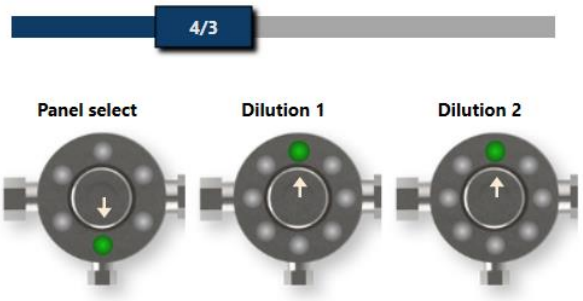
Example: Clicked on the trapeze of panel port 2

NOTE: A green coloured trapeze means **sample air**, a blue coloured one means **reference air**



2. Now, please select the dilution you want to check by moving the slider bar of the **available dilutions** (related motor configurations)

Example: In this example the slide bar is moved to the position 4/3 which refers to the dilution factor 1:3532 (as mentioned in the table of the prevoius page)



3. Once the panel port is selected and the dilution factor is set you can open the main valve by clicking on the left dots of the **power outputs.**

Once you have opened the main valve a diluted sample will come out of the nose cup of port 2

6.2 Service mode

6.2.4 Calibration example dual-forced-choice:

The calibration procedure itself is described in chapter 6.5.5 of the EN 13725.

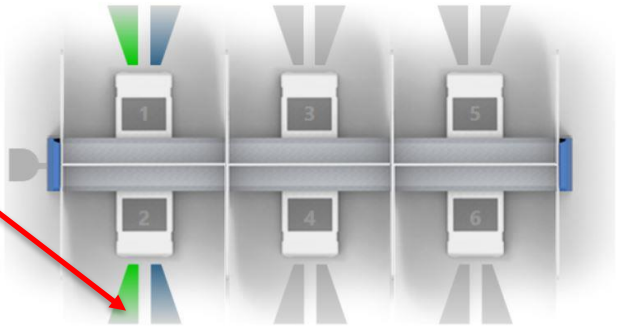
You can use this tool for calibrating/checking the dilutions of your olfactometer.

Please note: For calibrating you need a calibration gas which is filled into a sample bag which you then connect to the olfactometer. Please do not connect the gas directly to the olfactometer!

1. Please select a station/panel port where you want to connect your calibration monitor (FID, CO_2, etc.) by clicking on one trapeze close to the port. Compared to the calibration with one nose mask (yes/no, 3-FC) here you have to select the nose mask (left or right).

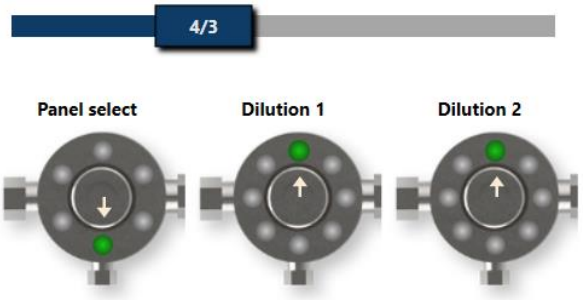
Example: Clicked on the trapeze of panel port 2 and the nose mask

NOTE: A green coloured trapeze means **sample air**, a blue coloured one means **reference air**



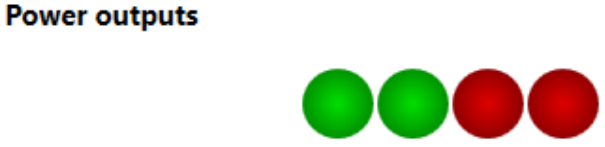
2. Now please select the dilution you want to check by moving the slider bar of the **available dilutions (related motor configurations)**

Example: In this example the slider bar is moved to the position 4/3 which refers to the dilution factor 1:3532 (as mentioned in the table of the prevoius page)



3. Once the panel port is selected and the dilution factor is set you can open the main valve and extra valve by clicking on both left dots of the **power outputs.**

Once you have opened both valves a diluted sample will come out of the left nose mask of port 2

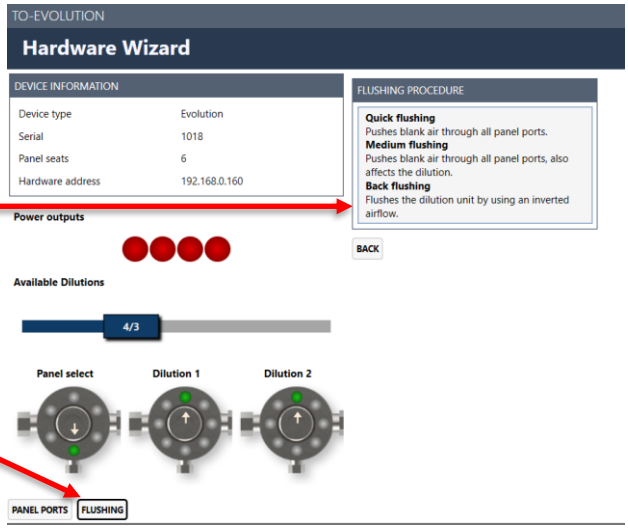


6.2 Service mode

6.2.5 Flushing and cleaning

The TO evolution offers 3 different flushing modes. You can open the flushing menu if you click on **Flushing**

Click here to open the menu there



Quick flushing

The quick flushing does only push air through the panel ports and panel switch valve and cleans all tubing. It does not effect the dilution unit so the sample bag can stay connected. Quick flushing automatically occurs between the sequences of the sample analysis.

Medium flushing

In addition to the quick flushing the medium flushing does also push air through the dilution system to clean the whole olfactometer. As it also sucks air through the sample connection from the lab environment to the whole olfactometer you have to disconnect the sample bag. If you don't disconnect the sample bag the whole sample will be distributed to the dilution unit and will contaminate it heavily (depending on the sample of course). Medium flushing automatically occurs after you have saved the results of your sample analysis. You will be informed to disconnect the sample bag.

Back flushing

The back flushing mode allows you to flush your olfactometer backwards. Environmental samples sometimes consist of invisible particles. These small particles can contaminate the dilution system of your olfactometer slowly. As the TO evolution works with highly precise sapphire orifices to dilute the samples they could get blocked by those particles. By using the back flushing from time to time you can prevent this contamination effectively. How often you have to use this mode depends on the amount of samples you measure. As it is not an automatic mode as the other flush modes we advise to use this mode frequently.

6.2.5 Flushing and cleaning

Cleaning process

To get rid of contamination a proven procedure (90 min.) can be as follows:

1. To heat up the dilution system turn on the heating and wait for 30min,

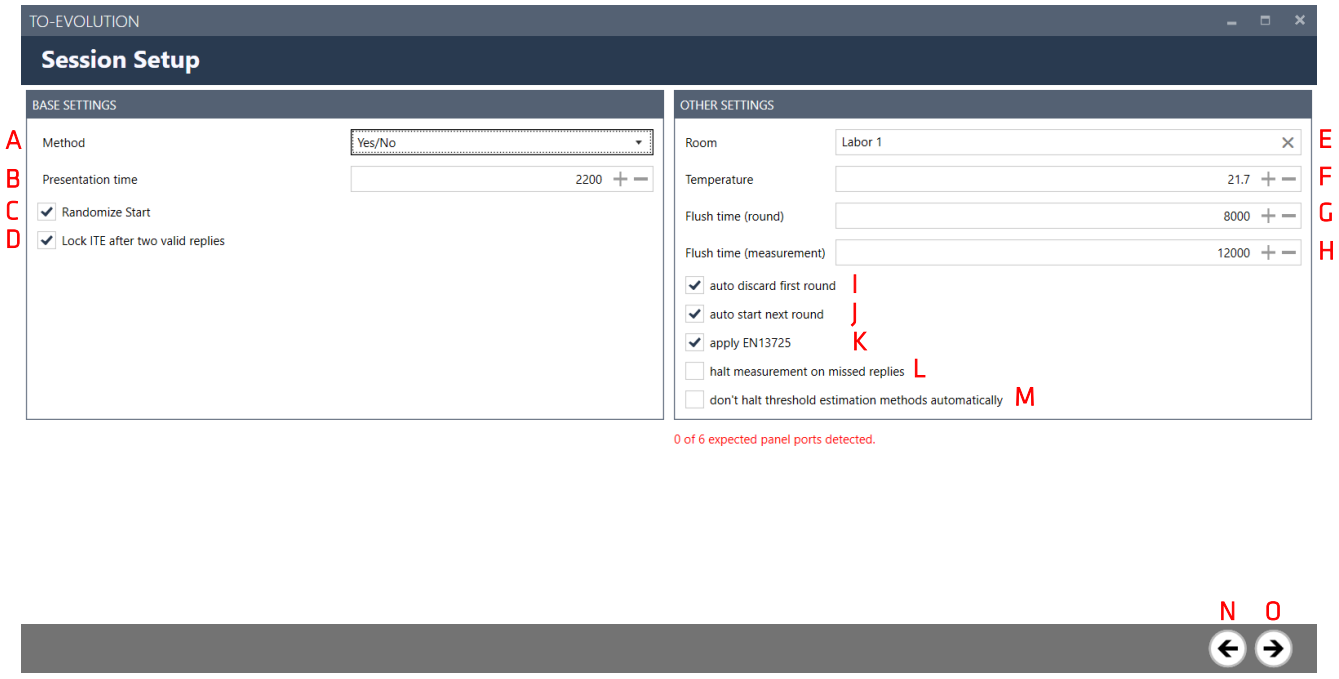
2. Turn on medium flushing in addition to the heating and wait for 30 min,

3. Turn off the heating and keep flushing for another 30 min.

If needed you can repeat this routine several times.

6.3 Session setup

After entering username and password and clicking on the right arrow in the main menu you will get to the **Session setup.**



A - Method

On the TO evolution you can select between the most relevant methods for odour analysis according to the standards EN 13725, ASTM 679 and VDI 3882:

- **Yes/No** – using one nose cup (left port)
- **Dual Forced Choice** – using two nose cups
- **Intensity** – using one nose cup (left port)
- **Hedonic tone** – using one nose cup (left port)
- **3-AFC (ASTM)** – using one nose cup (left port)
- **Forced Choice/Hedonic tone** – using two nose cups
- **Forced Choice/Intensity** – using two nose cups
- **Customized Intensity/Hedonic tones (configurable)** - using one nose cup (left port)

B – Presentation time

Here you can sent the presentation time which means the sniffing/inhaling time for the panellist. In the yes/no method the default presentation time is 2.2 sec while in the dual forced choice it is 8.0 sec. You are free to select your suitable presentation time. According to the EN 13725 you can choose a presentation time between 1.5 sec and 15.0 sec. **Please note that the sample consumption increases if you select a longer presentation time.**

6.3 Session setup

C – Randomize Start

When checked it means it randomly selects where a measurement starts. If you leave it unchecked it always start at port 1.

D – Lock ITE after two valid replies

When checked the first two successive sample detections will be used to calculate the ITE. Replies done after already achieved an ITE are still logged, but ignored for calculation.
If not selected answers from panellists will only be accepted as valid if they answer correctly without omitting or wrong answer until the end of the sequence. If an answer is omitted or confirmed incorrectly, the correct answers before will not taken into account for the calculation of their ITE.

E - Room

Here you can enter the room name of your laboratory if required. It will be shown on the report later on.

F - Temperature

Here you can enter the temperature in your laboratory if required. It will be shown on the report later on.

G – Flush time (round)

Here you can set the flushing time of the olfactometer between two rounds/sequences. Technically it is the quick flushing (see 2.2.3 Flushing). In case of samples with a high potential to contaminate your olfactometer you can increase the flushing time between two sequences.

H – Flush time (measurement)

Here you can set the flushing time of the olfactometer between two samples, when you have finished/saved a sample. Technically it is the medium flushing (see 2.2.3 Flushing).

I – auto discard first round

According to the EN 13725, the operator of the olfactometer has to discard every first round/sequence if the sample has a different character to the previous one. For example waste water treatment and composting. However, the round/sequence can also be added later again.

6.3 Session setup

J – auto start next round
The software automatically starts the next sequence after the minimum break of 30 sec between two rounds/sequences.
Please note that the operator has to stop the whole analysis manually.

K – apply EN 13725
When checked you apply the blank error evaluation and retrospective screening (dZ) as defined in the EN 13725 (chapter 9.2 following). This checkbox should be always selected if you want to work in accordance with the EN 13725.

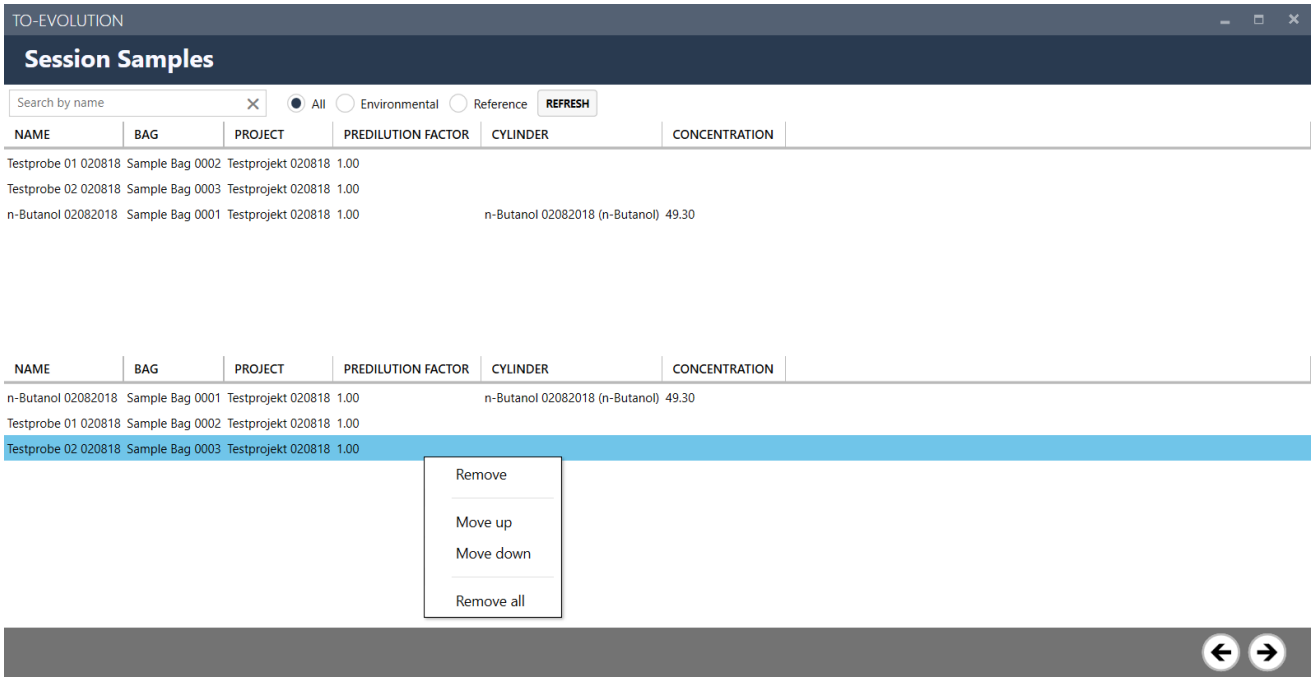
L – halt measurements on missed replies
Stops a running measurement when a panellist fails to reply in time. This only applies to forced choice methods.

M – don´t halt threshold estimation methods automatically
Always present the complete dilution series to the panel, regardless of the amount of positive replies. Applies to all methods which produce ITE´s.
The operator can stop the analysis at any moment manually. The operator can decide to keep the results until this moment or not.

N – „arrow left“
Go to prevoius screen.

O – „arrow right“
Go to next screen.

6.4 Session samples



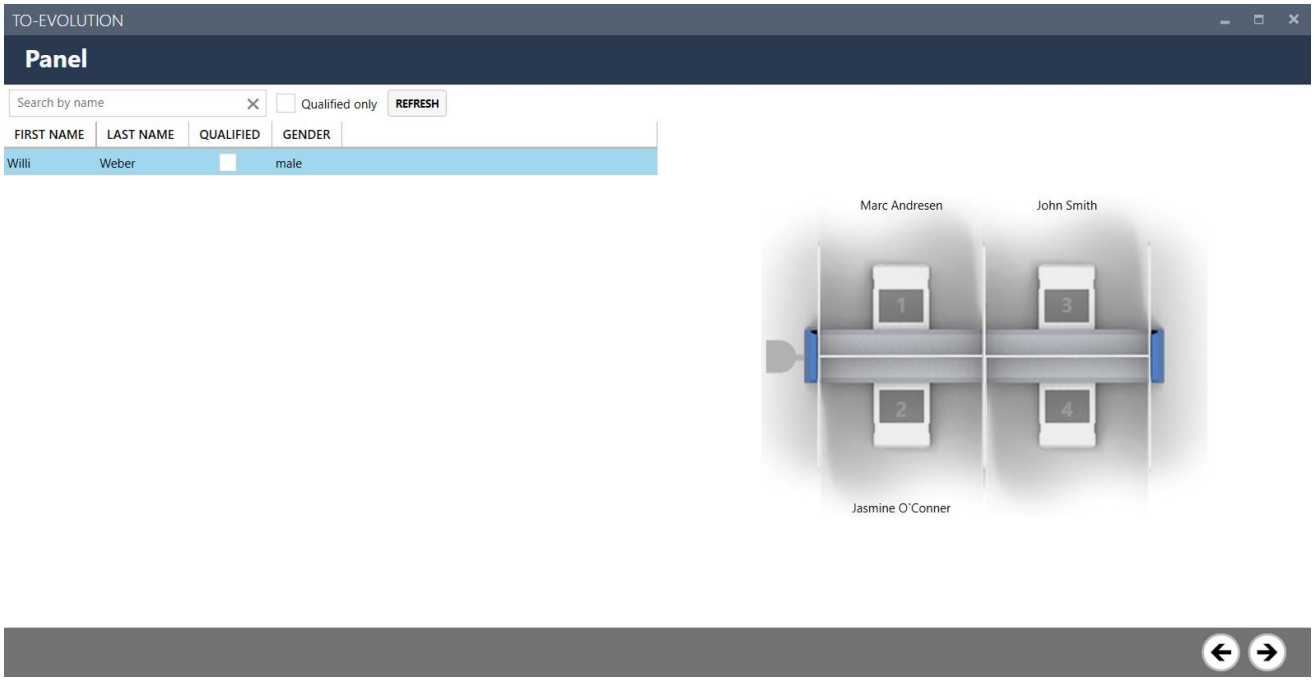
In this menu you can selcet the samples you want to analyse. Here you can also set the descending order in which you want to analyse the samples.

A double click on the sample adds it to the list below. You can change the order or you can remove a sample by a right click on the sample name.

You typically start with n-Butanol first.

If you have many samples in your system already, it can be very crowded which leads to a lack of overview. In this case you can search for a sample in particular by using the search option on the top left or you can sort by „environmental“ (all samples which are not a reference or „reference“ (e.g. n-Butanol or H_2S).

6.5 Panel



In the panel overview you can select your panellists just by dragging the panellist name and dropping it to the position where the panellists sits.

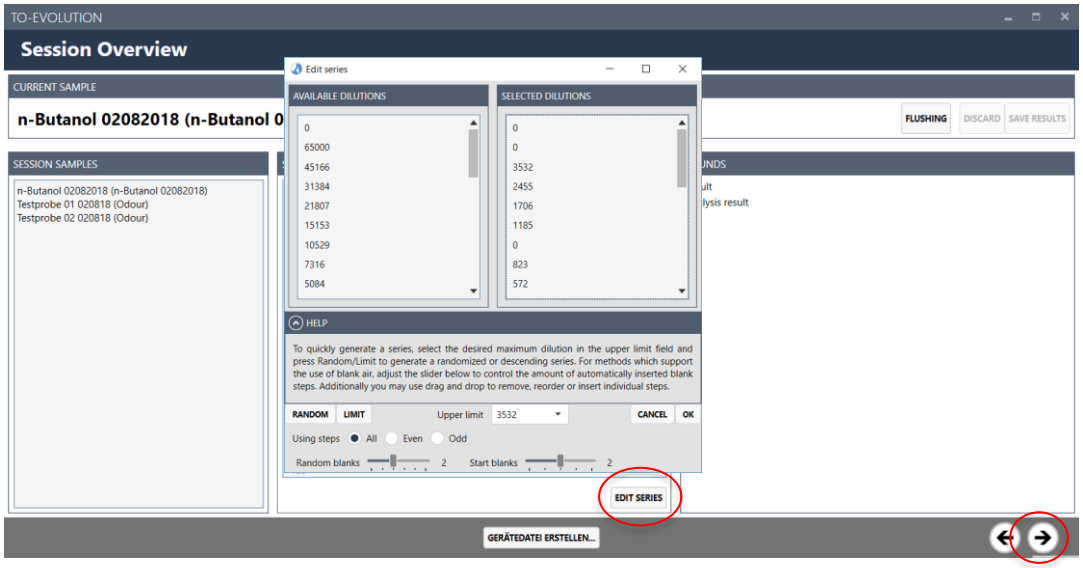
Any unoccupied panel seat will not be included in the calculation of the results. So you can work with only one or even three panellists if you want to.

In order to be able to work in accordance with the standards, however, you need results from at least 4 panellists. You can measure a sample first with two panellists and later with 2 others. The software will automatically merge these results later.

Of course it is more effective to work with at least 4 panellists simultaneously.

6.6 Yes/No method

6.6.1 Session overview



In the session overview you can set the dilution row of your current sample.

Click on **EDIT SERIES** for opening the dilution menu of the olfactometer. Before you set your dilution row you can choose between ussing them **all** with a step factor of **1.4** or **even** and **odd** with a step factor of **2**. Subsequently you can set the start dilution step (**upper limit**) and moder ny clicking on random or limit.

You can also choose the dilutions you want to work with manualyy if you drag them from the left column **avaliable dilutions** and drop them to the right column **selected dilutions**.

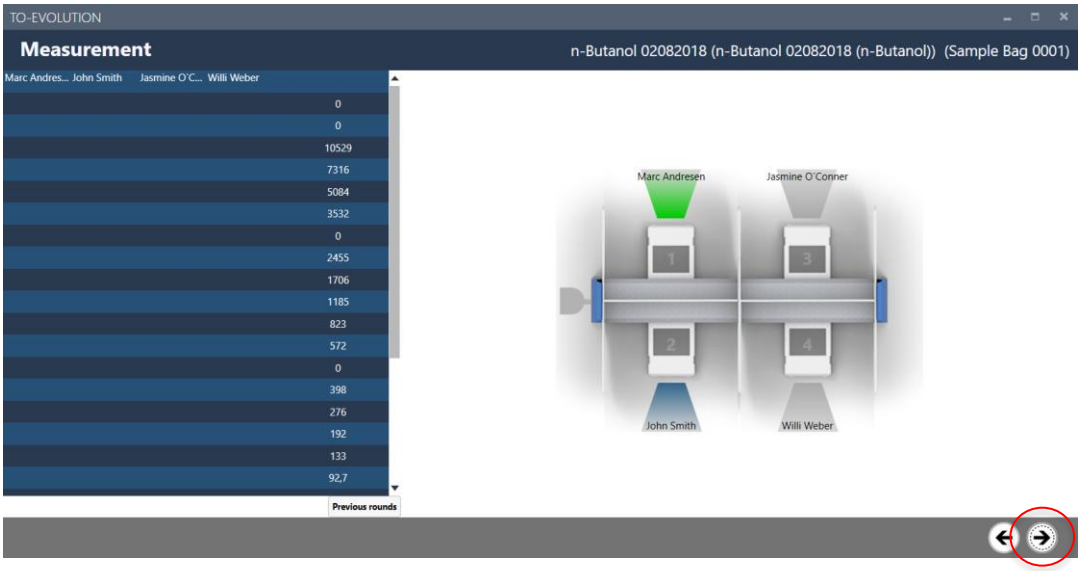
Please note that you should always set a dilution which is higher than the expected odour threshold of the panellists. If you most likely don´t know it in advance (e.g. unknown odours) please start with the highest dilution. If panellists do also answer in the highest possible dilution you have to pre-dilute the sample (e.g. 1:10) to bring it in the measurement range of the olfactometer.

A typical start dilution factor for n-Butanol with a concentration of 60ppm (recommended) os somehwhere around 1:4000 to 1:5000. The ITEs of the panellists should be between 760 and 2850 OU/m^3 then for getting qualified according to the EN 13725.
In the Yes/No method you can also select the no. of random blanks and start blanks. The meaning of blanks is described in chapter 8.3 and annex B.3 of the EN 13725.

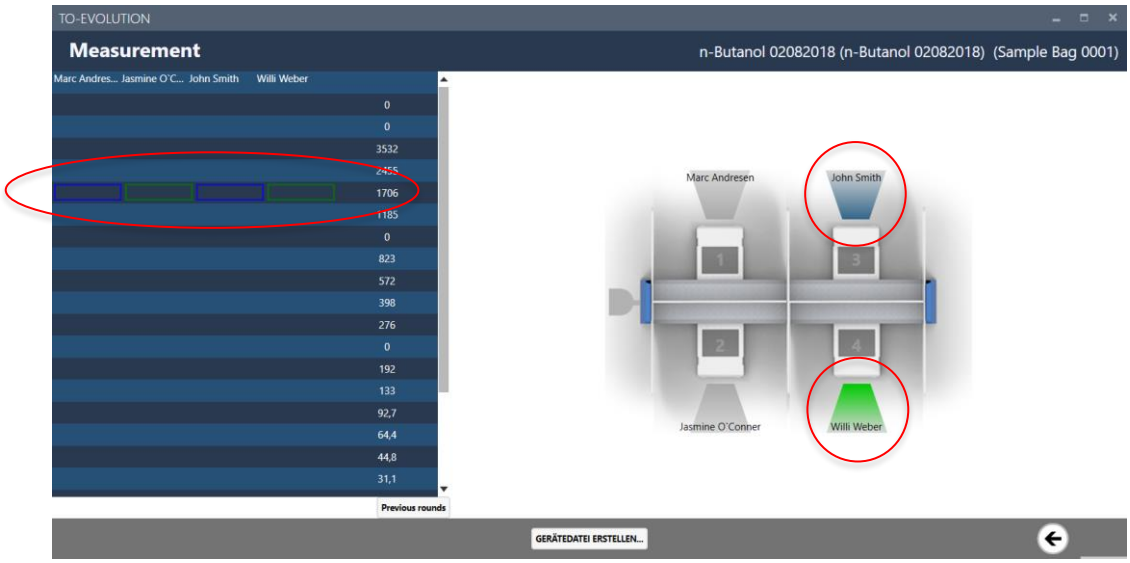
Once the dilution row is set, the arrow on the bottom right occurs which means that you can now move towards to start the first sequence.

6.6.2 Sequence starts

Now the sequence is set. By clicking on the right arrow on the bottom right you can start the sequence.



The sequence is now running automatically and the panellists have to sniff at the nosemasks for the presentation time you have set in the Session Setup (chapter 2.3).

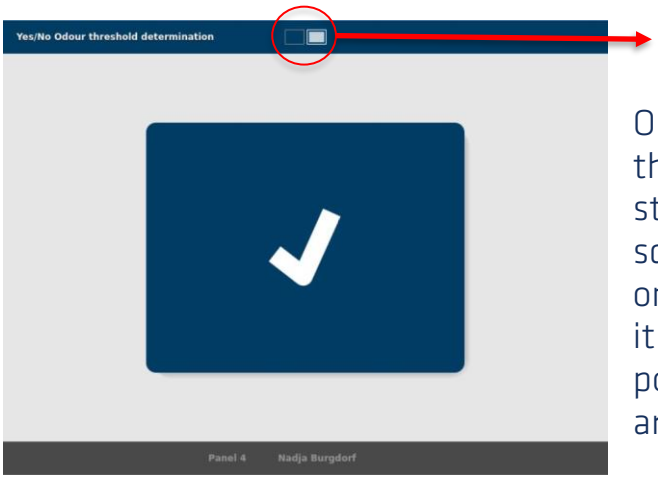


At any moment the operator can see which panellist is getting sample air (green coloured) and referece air (blue coloured).

Each dilution step will be presented to each panellists one after another.
On a 4-station olfactometer each panellist has to sniff at the nose mask for the presentation time which was set before. The exhalation phase has the same duration as the sniffing time.
On a six-station olfactometer the exhalation phase is twice as long as the sniffing time until the next dilution step will be presented.

6.6.3 Panellist workflow

The following workflow is important for the panellists in the Yes/No method.

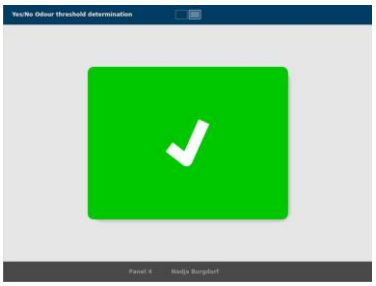


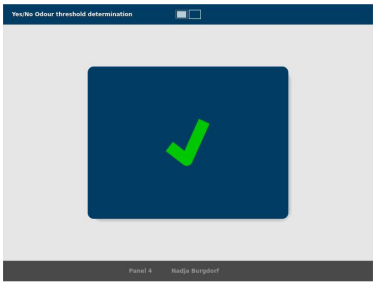
On the upper edge of the panel port screen the panellists can see 2 squares (4-station) or 3 squares (6-station). These squares indicate position of the panellists on the olfactometer. If the frame is white it means that they are sitting in this position. The ones with a grey frame then are their neighbors.

The panellists must sniff at the sniffing port as soon as the frame is filled with white. With the duration of the presentation time, the white field fades out until it is completely gone. That's then the exhalation time. Now that the neighbors have to smell, the panellists can recognize when it is next time to sniff.

In the first presentations (sniffs) the panellists most likely will not smell any odour as the operator has set a high dilution as start step (upper limit). As each round the dilution factors decrease (→ concentration increases) there will be the moment when the panellists do smell a difference between one presentation to the other. The one which smells is most likely the sample air so that the panellist has to give a positive answer to that presentation → „Yes, I smell". **All answers** must be repeated until the olfactometer stops the dilution series and finishes the round. Depending on their individual sensitivity to that particular odour some panellist need to give more answers than the others. At least each panellist should have 2 positive (yes/correct) answers in a row. Please refer to chapter 2.3 **(D – Lock ITE after two valid replies).**

To give a yes answer, the panellists have to touch the blue field in the middle of the screen with their finger. The blue field turns green at the moment of touch and retains a green tick in the middle after touching.

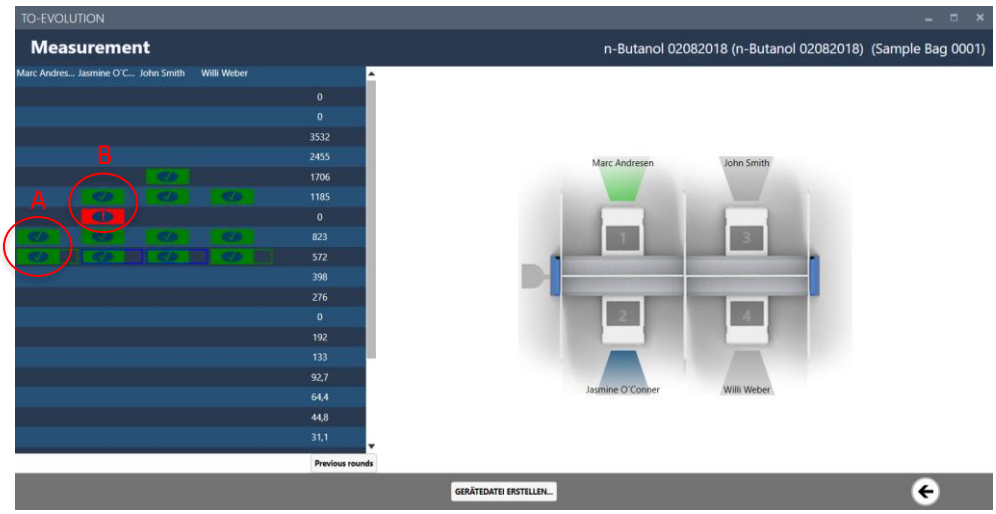




This answer can not be revised. It is only possible to cancel the answer when, at the moment of touching the display, the finger is moved out of the blue field.

6.6.4 Sequence finished

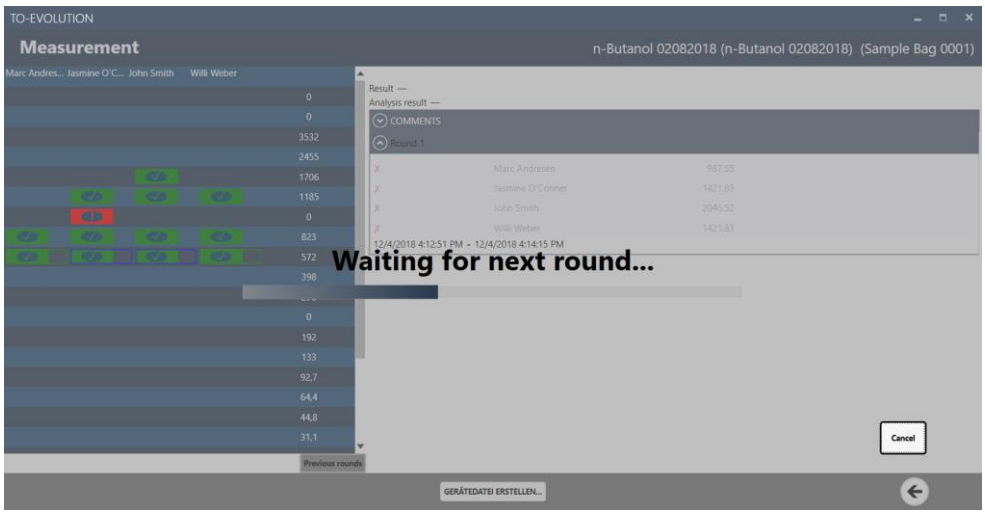
The sequence runs until the most insensitive panellist has confirmed the second time in a row. Thereafter, the software stops the sequence automatically (A).



In the example above all other panellists were more sensitive than panellist 1 (A).

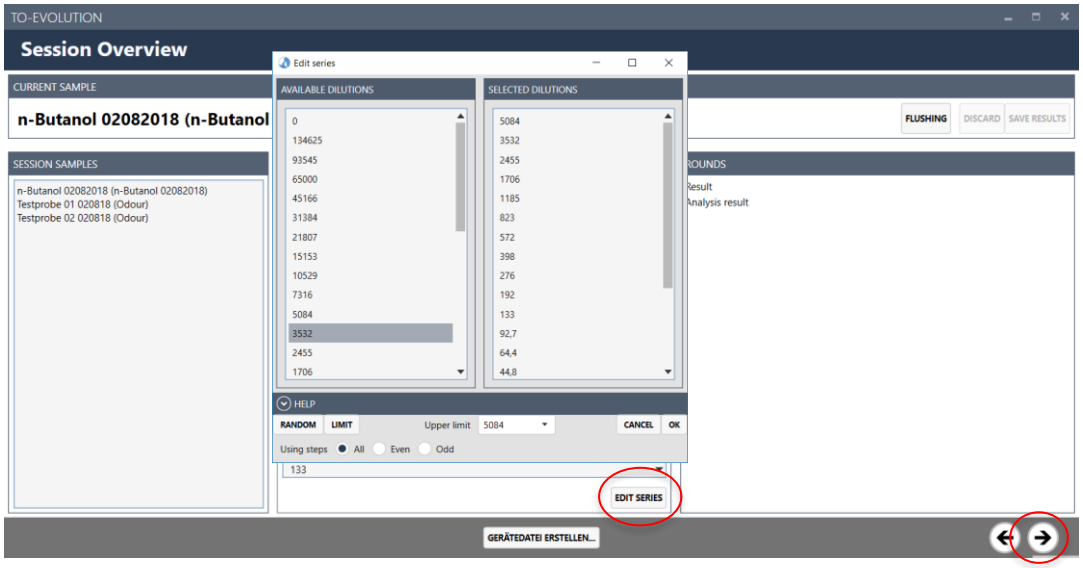
panellist 2 also answered in a blank step (B). This should be avoided of course but, in practice, is a quite common situation. There can be various reasons for it like being unconcentrated, being to fast in responding, imagination or uncertainty. It´s all human and It is uncritical if the panellists still fulfil the criteria of having less than 20% answers on blanks in all sequences. As more trained and experienced panellists are, as less „blank mistakes“ they do.

If you checked the box **auto start next round (J)** in the session setup (→ chapter 2.3) the next sequence will start automatically after a break of 30 sec. If not, you will get back to the session setup. You can cancel the sequence at any time to go back the the session overview. If you cancel the sequence you can also decide to keep the results until this moment or not.



6.7 Dual-Forced-Choice method

6.7.1 Session overview



In the session overview you can set the dilution row of your current sample.

Click on **EDIT SERIES** for opening the dilution menu of the olfactometer. Before you set your dilution row, you can choose between ussing them **all** with a step factor of **1.4** or **even** and **odd** with a step factor of **2**. Subsequently you can set the start dilution step (**upper limit**) and mode by clicking on random or limit.

You can also choose the dilutions you want to work with manualy if you drag them from the left column **avaliable dilutions** and drop them to the right column **selected dilutions**.

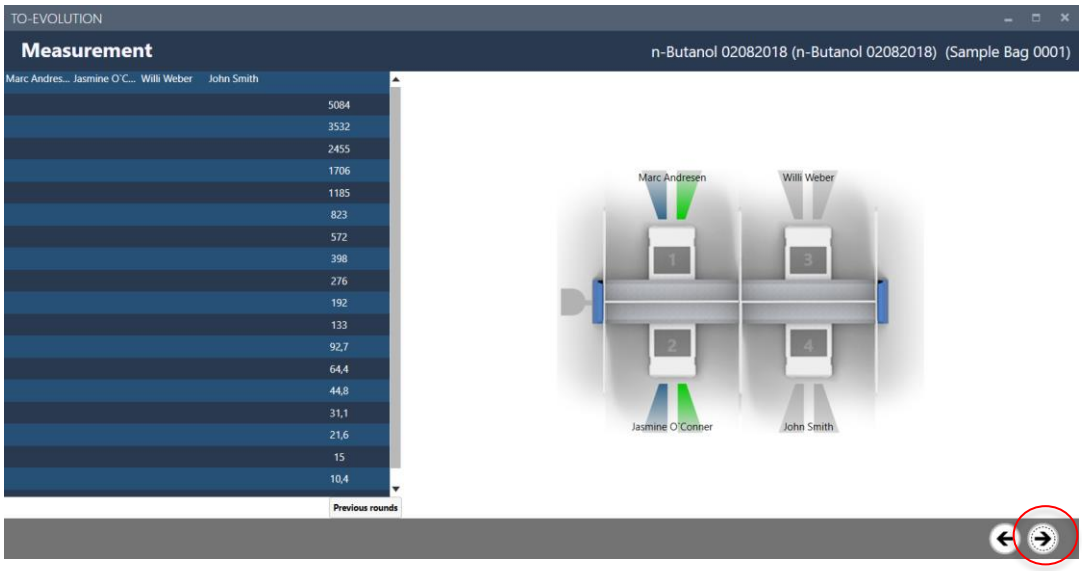
Please note that you should always set a dilution which is higher than the expected odour threshold of the panellists. As you most likely don´t know it in advance (e.g. unknown odours) please start with the highest dilution. If panellists do also answer in the highest possible dilution you have to pre-dilute the sample (e.g. 1:10) to bring it in the measurement range of the olfactometer.

A typical start dilution factor for n-Butanol with a concentration of 60ppm (recommended) is somewhere around 1:4000 to 1:5000. The ITEs of the panellists should be between 760 and 2850 OU/m^3 in order to be within the range of allowed sensitivity according to the EN 13725.

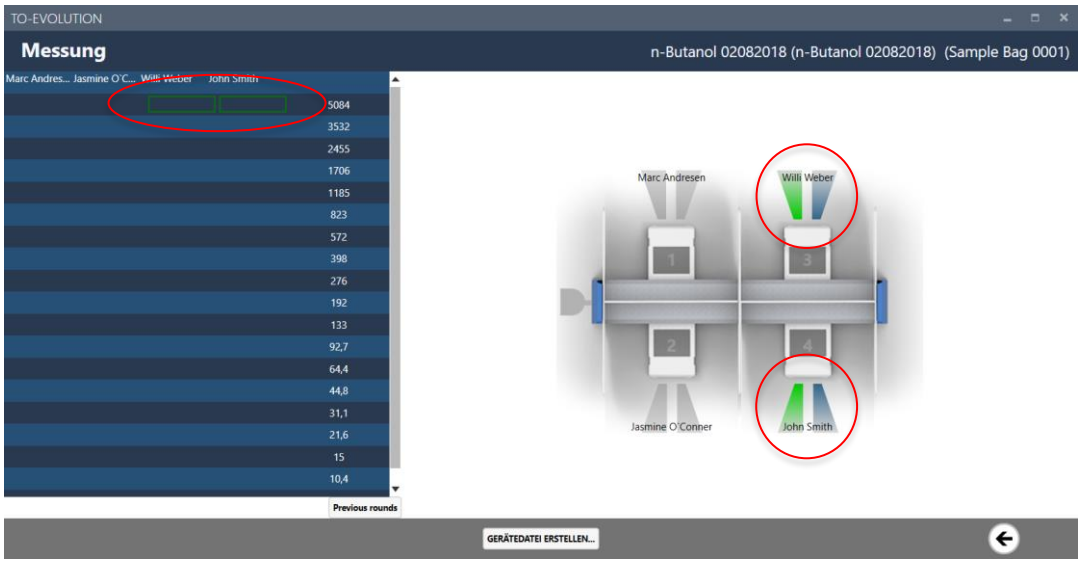
Once the dilution row is set, the arrow on the bottom right occurs. This means that you can now start the first sequence.

6.7.2 Sequence starts

Now the sequence is set. By clicking on the arrow on the bottom right you can start the sequence.



The sequence is now running automatically and the panellists have to sniff at both nosemasks for the presentation time you have set in the Session Setup (chapter 2.3).

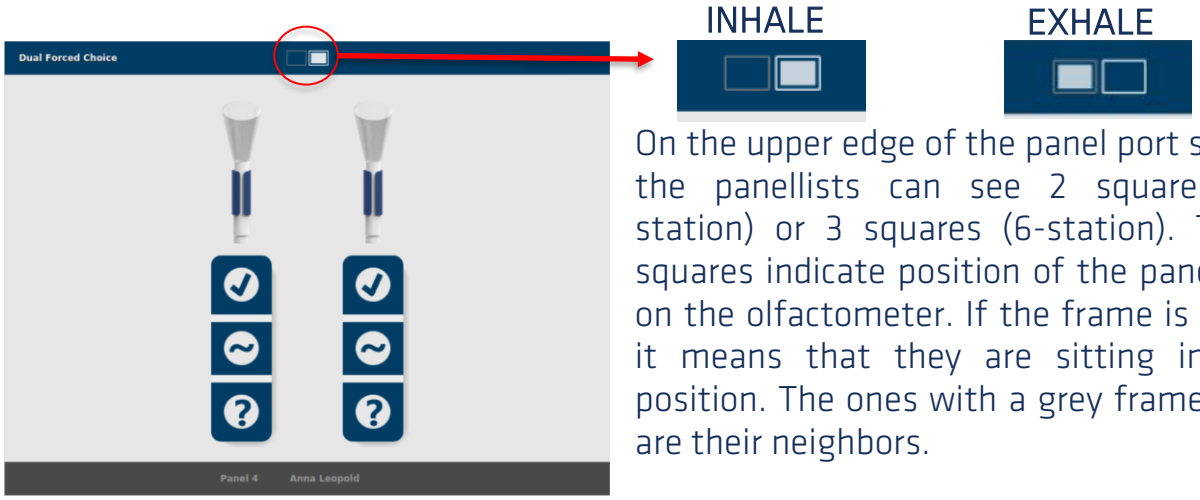


At any moment the operator can see at which nose mask the panellists are getting sample air (green coloured) and reference air (blue coloured).

Each dilution step will be presented to each panellist one after another.
On a 4-station olfactometer each panellist has to sniff on both nose masks for the duration of the presentation time which was set in the session setup. The exhalation phase has the same duration as the sniffing time.
On a six-station olfactometer the exhalation phase is twice as long as the sniffing time until the next dilution step will be presented.

6.7.3 Panellist workflow

The following workflow is important for the panellists in the D-F-C method.



On the upper edge of the panel port screen the panellists can see 2 squares (4-station) or 3 squares (6-station). These squares indicate position of the panellists on the olfactometer. If the frame is white it means that they are sitting in this position. The ones with a grey frame then are their neighbors.

The panellists must alternately sniff at both sniffing ports as soon as the frame is filled with white, e.g. starting on the left port, then sniffing on the right and then back to the left port. During the presentation time, the white field fades out until it is completely gone. As soon as it has completely disappeared the exhalation time starts. Now that the neighbors have to smell, the panellists can recognize when it is next time to sniff by looking at the visual indicators as described above.

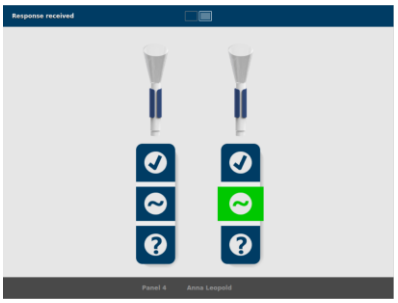
In the first presentations (sniffs) the panellists most likely will not smell any odour as the operator has set a high dilution as start step (upper limit).
But even if they don´t smell any odour they are forced to make a choice if the odour comes from the left or right sniffing port. This is very different compared to the Yes/No method where you only have to give an answer when you smell something.

The panellist is presented with two sniffing ports, of which one presents the odour and the other reference air. The location of the odour in consecutive presentations is randomly distributed over the two sniffing ports. The panellist is asked to indicate which of the ports is the one with the odour. When the panellist doubts, he/she is asked to indicate a sniffing port 'at random'. The panellist is asked whether his/her choice was a **guess (?)**, an **inkling (~)** or **certain (✔) answer.**

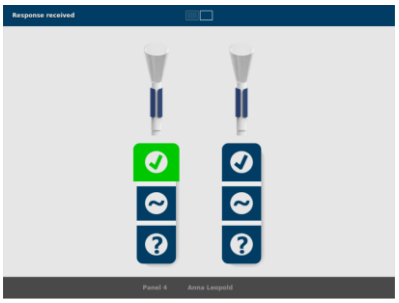
6.7.3 Panellist workflow

Practically it means that if the panellists do not smell any difference between both sniffing ports they shall choose one port and touch with their finger on the **? (guess)** symbol on the display. In case that they have got a tendency that it comes from one specific port but they are not sure yet, they should touch the **~ (inkling)** symbol.
As each round the dilution factors decrease (→ concentration increases) there will be the moment when the panellists do smell a difference between one port and the other. The one which smells different is most likely the sample air. The panellists then need to confirm their selection of the presentation by touching the **✔ (certain)** symbol → „Yes, I am sure (that it is e.g. the left port)".

GUESS right port



INKLING right port



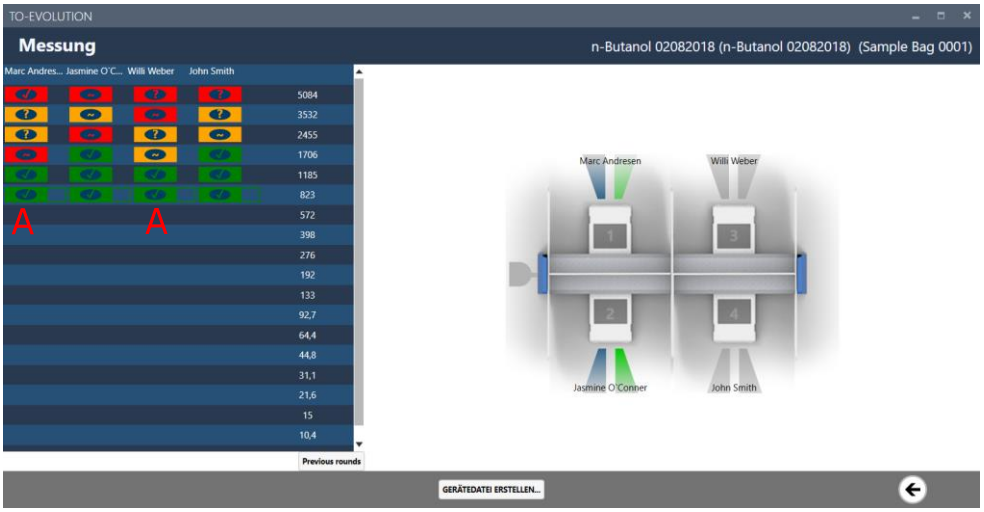
CERTAIN left port

These answers can not be revised. It is only possible to cancel the answer when, at the moment of touching the display, the finger is moved out of the selected symbol.

All (certain) answers must be repeated until the olfactometer stops the dilution series and finishes the round. Depending on their individual sensitivity to that particular odour some panellist may need to give more answers than the others. Each panellist should have at least two positive (certain/correct) answers in a row. Please refer to chapter 2.3 **(D – Lock ITE after two valid replies).**

6.7.4 Sequence finished

The sequence runs until the most insensitive panellist has confirmed the second time in a row with a certain answer. Thereafter, the software stops the sequence automatically.

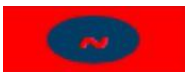


In the example above panellists 2 and 4 were more sensitive than panellist 1 and 3 (A).

On the screen the operator can see what answers the panellists made in the current dilution row.
In total following answers can occur:

 **Guess incorrect** in the reference air

 **Guess correct** in the sample air

 **Inkling incorrect** in the reference air

 **Inkling correct** in the sample air

 **Certain incorrect** in the reference air

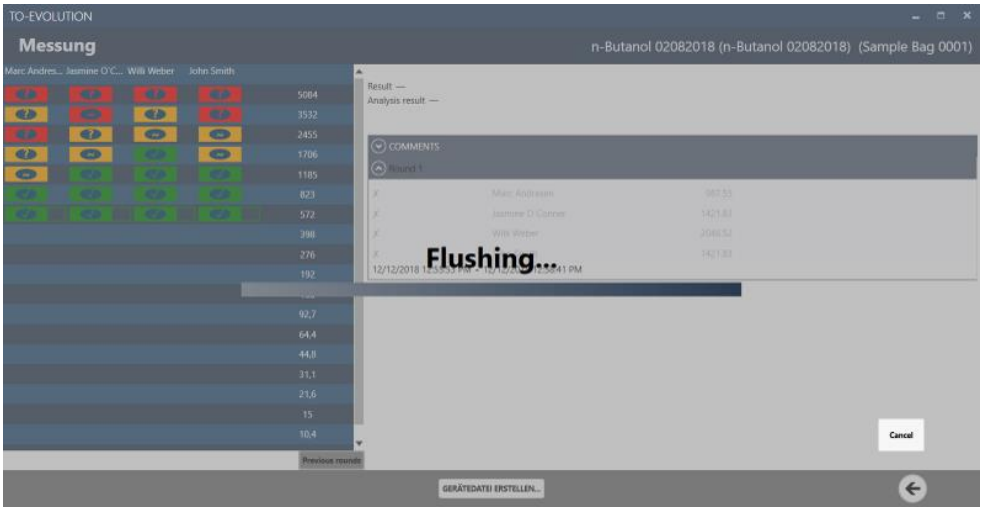
 **Certain correct** in the sample air

 **Missed reply** no answer from the panellist

NOTE: Missed replies will exclude the panellist. It will also stop the olfactometer working if you didn´t check the box in chapter 2.3 → M – **don´t halt threshold estimation methods automatically.**

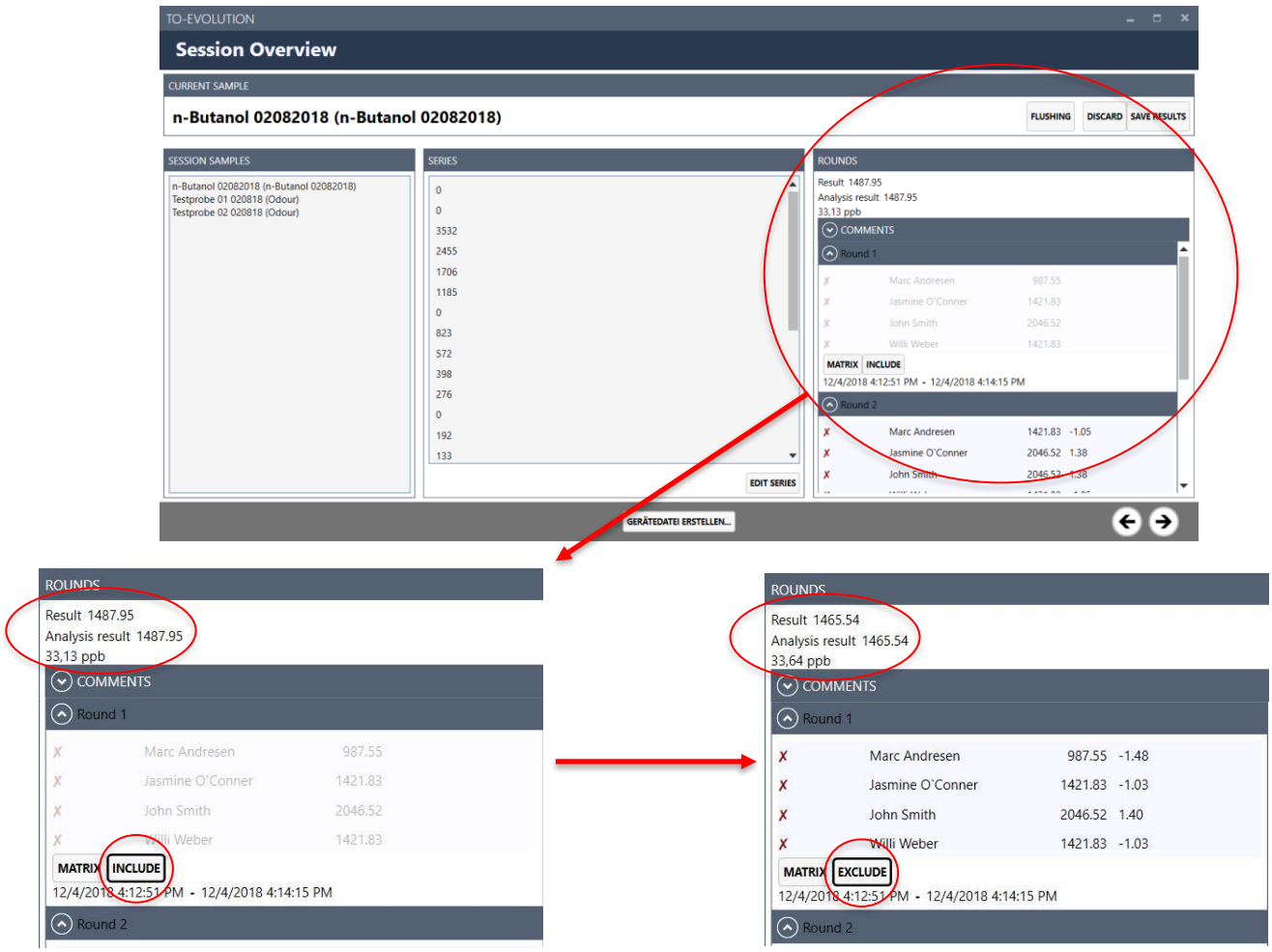
6.7.4 Sequence finished

If you checked the box **auto start next round (J)** in the session setup (→ chapter 2.3) the next sequence will start automatically after a break of 30 sec. If the option was not selected, you will get back to the session setup. You can cancel the sequence at any time to go back the the session overview. If you cancel the sequence you can decide to keep the results that have been collected so far or to discard them.



6.8 Session overview - results

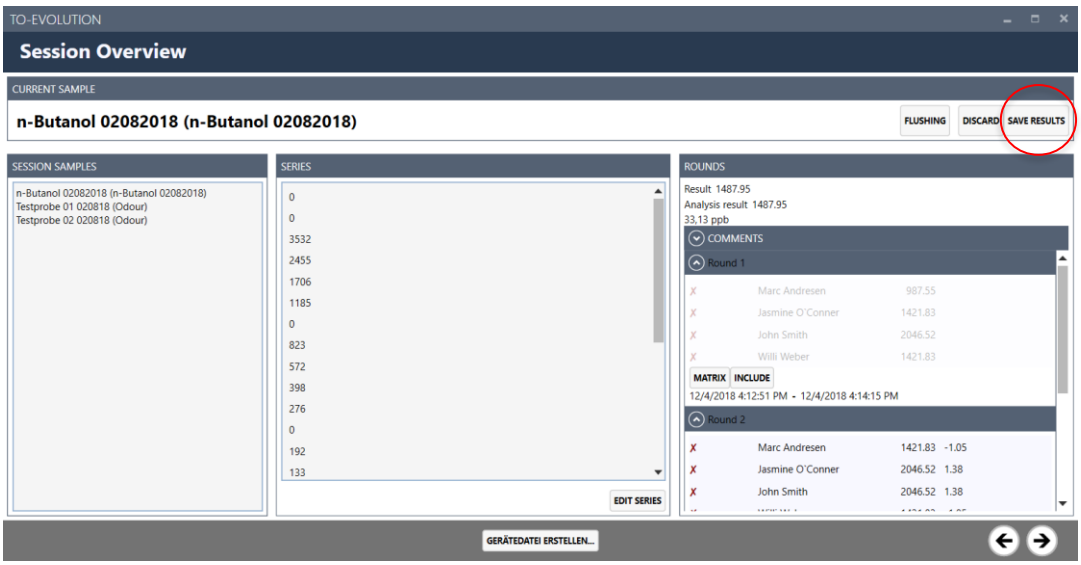
The number of valid rounds in a measurement shall be at least 2 (8 ITE´s with 4 panellists). A preliminary round of a measurement may be made and the data systematically discarded (i.e. it is always excluded) which leaves the data from the next two rounds as basis of calculation for the ITE (→ chapter 8.5 of the EN 13725).
Practically that means that you have to measure 3 sequences and always discard the first sequence. The software automatically discards the first round if you checked the box **auto discard first round (I)** in the session setup (→ chapter 2.3).
You can also discard each round manually or include each round again for any reason.



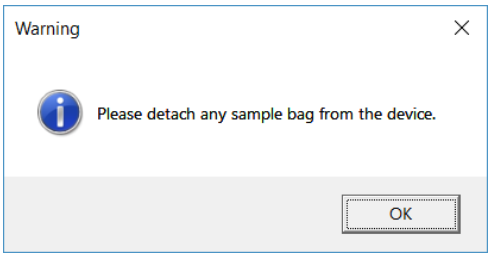
As you can see in the session overview the first sequence is discarded. By clicking on **INCLUDE** you can include the results to the overall calculation of the measurement result.
By clicking on **EXCLUDE** you exclude the sequence from the overall result calculation. This is for example necessary if one sequence is completely implausible compared to the others or a panellist has made too many blank mistakes or was unconcentrated for any reason.
If you have to discard a sequence afterwards you maybe have to do another sequence then to achieve at least 2 valid, reliable and plausible sequences.

6.8 Session overview - results

Once you have measured all required sequences, you can save the results by clicking on SAVE RESULTS. You will find the saved results in your WiNose LIMS where you can also create a report.



After clicking on SAVE RESULTS you will be asked to detach the sample bag from the olfactometer.



If you don´t detach the sample bag and press the OK button the olfactometer start to flush and sucks the whole sample inside the dilution unit. This will most likely contaminate your dilution unit dramatically. So please follow the instructions and detach the sample to avoid this.

After the flushing sequence you can start with measuring the next sample.

6.9 Remarks

Setting up an odour lab is a complex task, and it becomes even more complex if you aim to get an accreditation according to ISO 17025.

The Olfasense team would happy to accompany you in this process!

With our experience of more than 35 years in olfactometry and more than 350 sold olfactometers around the world you are in best hands.

In addition, our team consists of experts, which are assessor for the German Accreditation Body DAkkS, and members of various working groups such as EN 13725, VDI 3880, EN 16841, ISO 16000-28 and many more.

So whatever your question is, our senior staff are ready to provide expert opinion, comment and analysis, and are available for in-depth interviews on a wide-range of odour related topics.

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