BallastWISE

Ballast Water Investigation System



User Guide

v.2.8, March 2025

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Revision history

v.2.6, December 2023

- New BW50 measuring chamber with separate filling and emptying connectors.
- Software v. 5.10 or newer interphase modifications including results display and auto camera configuration (if available).

v.2.7, January 2024

- Addition of Video Review tool and Video compression tool descriptions

v. 2.8, March 2025

- Description of software version 6.0 including server based licensing, calibration, and result logs

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1 OVERVIEW

BallastWISE automatically counts live organisms in water samples using video and image analysis.

According to the IMO/USCG Ballast Water Performance Standard D2 the number of live organisms in ballast water discharge should be no more than:

Organism category	**Limit**
Live organisms ≥ 50 µm	10 cells/m^3
Live organisms between ≥10 and < 50 µm	10 cells/mL

BallastWISE counts live organisms in the two size fractions **≥10 to < 50 µm** and **≥ 50 µm** without addition of chemicals. The test requires no laboratory skills and is easy to set up. A 1 page report is produced for each test, indicating compliance or non-compliance with IMO and USCG standards.

2 SPECIFICATIONS

Weight	6.4 kg
Dimensions	38 x 31 x 18 cm (l x h x w)
Power requirements	24VDC 1,25A (100 – 250V mains adapter or from external computer battery bank), peak current 2A
Built in cameras	6 MP machine vision industrial video cameras
Optical resolution	2.4 µm (10 – 50µm), 22 µm (> 50 µm)
Optical resolution:	2.4 µm (10 – 50µm), 22 µm (> 50 µm)
Organism sizes:	Calculated for each individual as equivalent ellipse minor axis. Minimum detection width = 2x optical resolution.
Velocity range	0.024 – 0.6 mms^{-1} (10 – 50 µm), 0.22 – 22 mms^{-1} (> 50 µm)
Max concentrations	20,000 per unit volume (mL, L)
Measuring chambers	≥10 to < 50 µm: Polystyrene with 4.8 mm ID, 8mm OD (4.8x8) silicone tubing ≥50 µm: SAN with 4x6 mm silicone tubing connections and 4.8x8 mm silicone tubing through the pumps
Sample sizes	400 mL ≥10 to < 50 µm, 650 mL for ≥50 µm
Output	Video files (optional), tab-separated data files (position and size) for each organism at each point in time, accumulated fluorescent images, accumulated track plots
Reports	Final result counts with risk assessment, size distributions (optional), track plots (optional)
Computer	Portable computer with the following minimum requirements: 8 GB RAM, quad core CPU (PassMark CPU benchmark > 10,000), hard drive write speed > 120 MB/s (PassMark Hard Drive benchmark > 7,000)

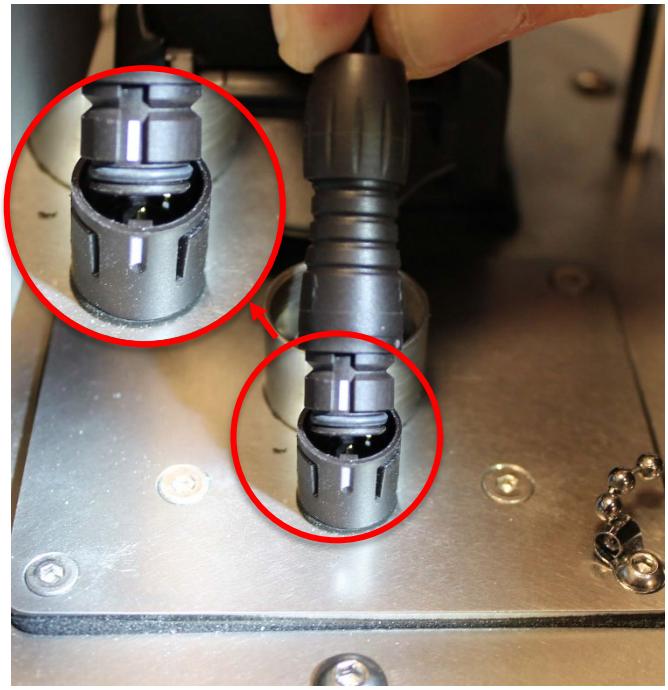
3 BallastWISE setup

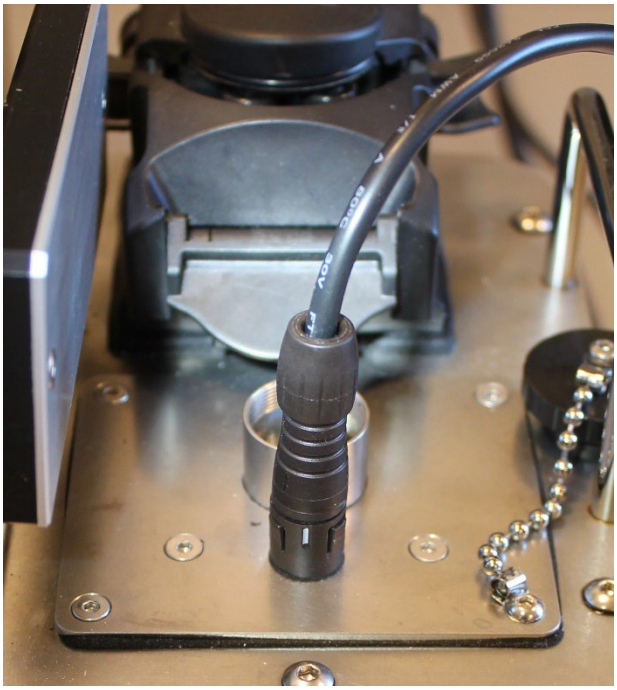
3.1 Connect power and USB cables

Open the BallastWISE case.



Plug the BallastWISE power cable into its socket as shown below (plugs and sockets can vary depending on serial number).

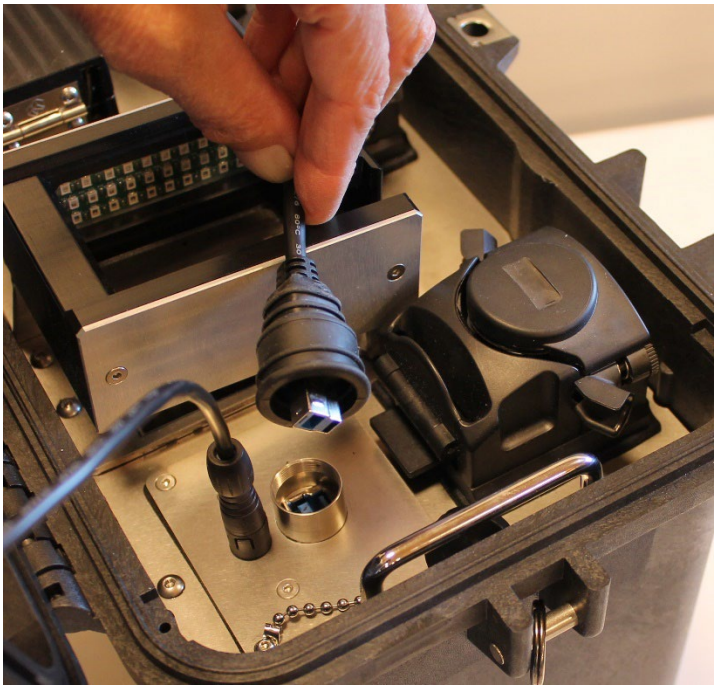


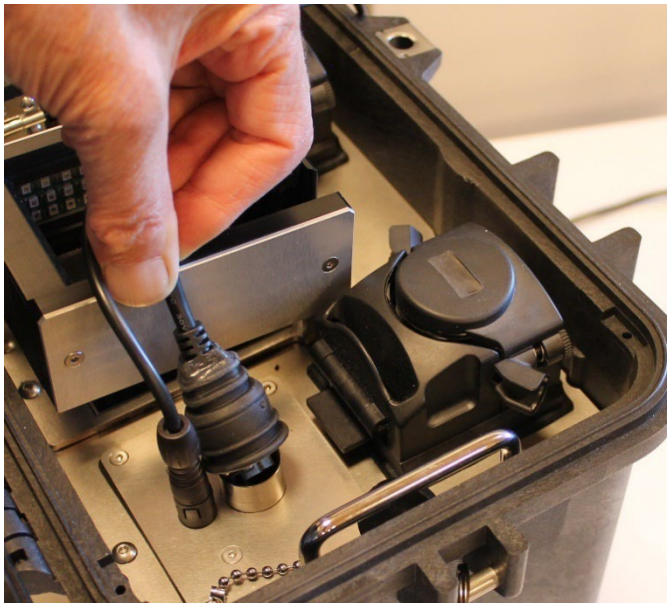


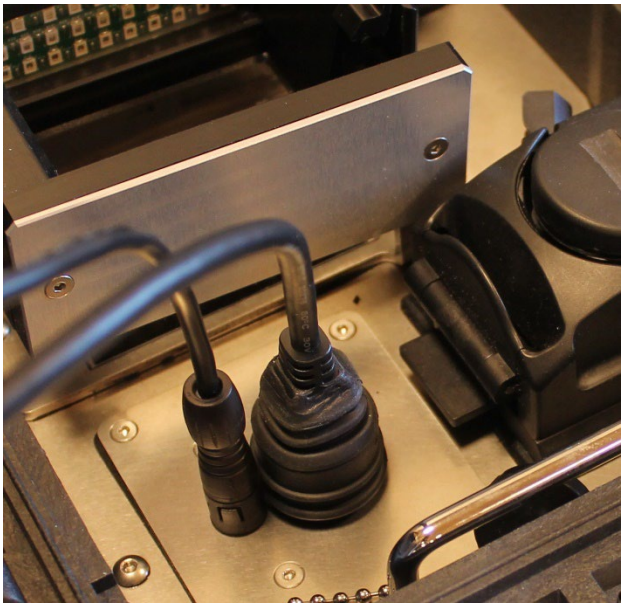
Connect the USB cable to the computer USB port and to the USB socket in the BallastWISE case:

1. Uncap the USB port lid on the BallastWISE case
2. Connect the USB cable. The cable must be pushed all the way into the socket. The rubber cover will fit snugly around the plug and will keep the USB plug dry in case water is spilled.
3. After the analysis, unplug the USB plug by pulling the cord and cap the USB port.











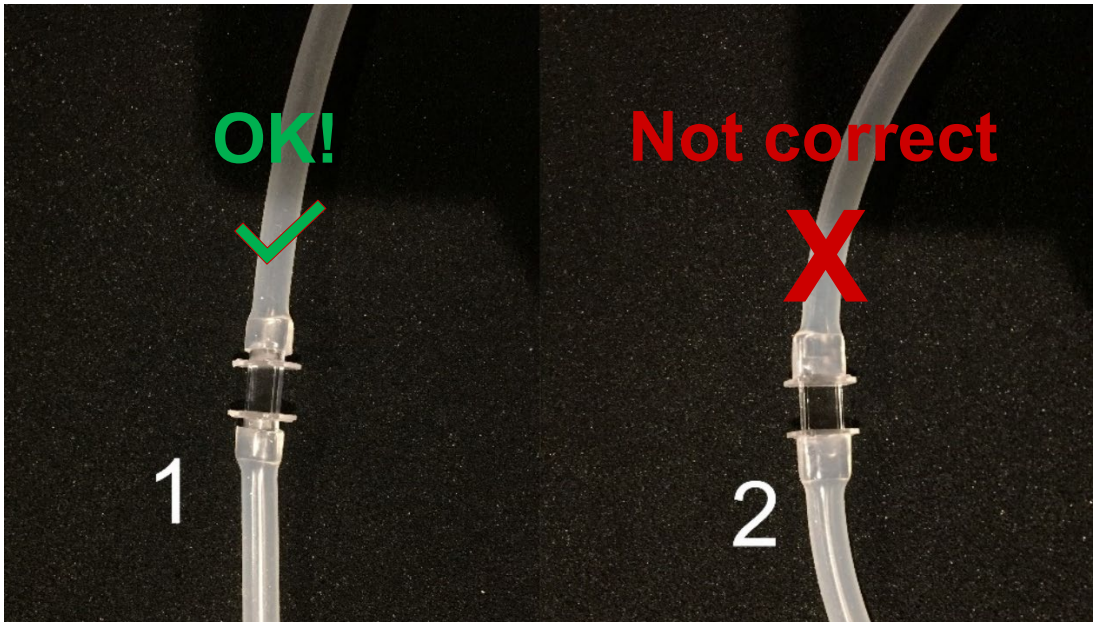
Plug both the BallastWISE and the computer power cables into a power socket

4 BW10: ANALYSIS OF ORGANISMS IN THE ≥10 TO < 50µM FRACTION

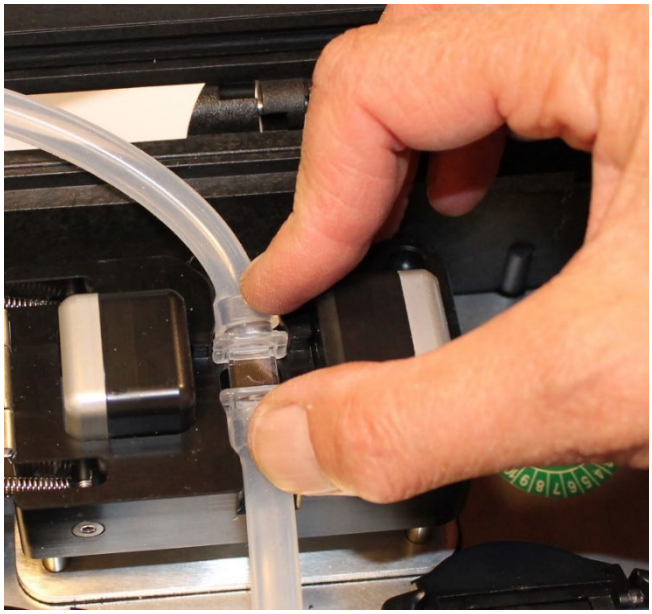
4.1 HOW TO PLACE THE BW10 MEASURING CHAMBER IN THE HOLDER

The small measuring chamber for BW10 is mounted with silicone tubes for filling and emptying the chamber. The tubes must be fitted onto the chamber leaving a gap of about 2 mm between the tubes and the edge of the chamber.

Below, in image no. 1, the tubes are mounted correctly, while in image no. 2, the tubes are mounted incorrectly, as there is no gap between the tubes and chamber.



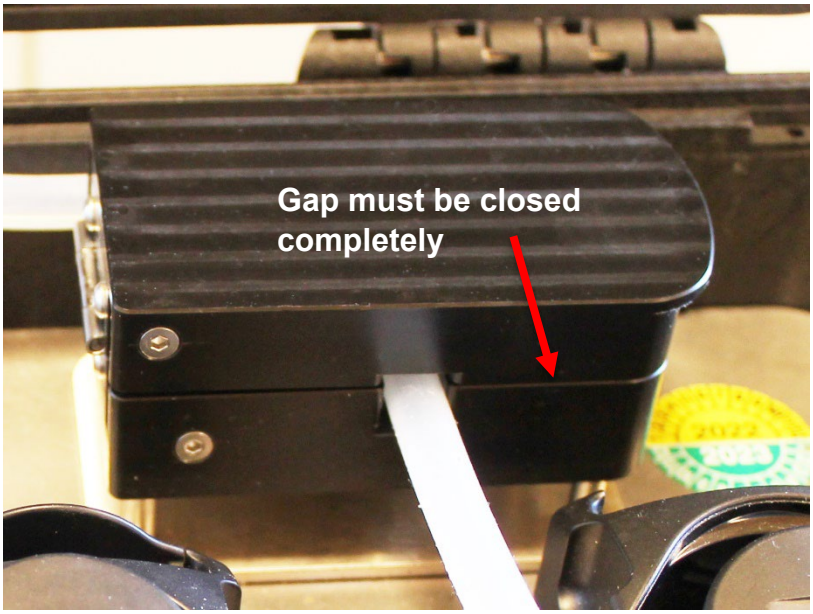
Place the measuring chamber in the holder on the right side of the case, as shown below. It is important that the chamber sits snuggly in place in the holder to get correct measurements.

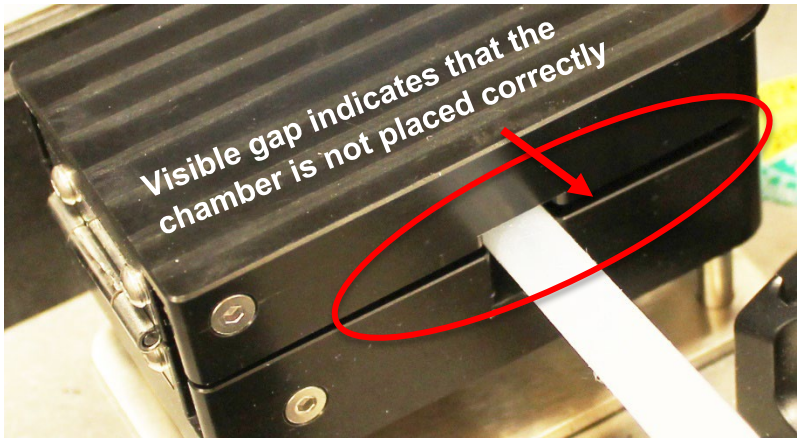




Close the chamber holder completely, as shown below. No gap should be visible between the bottom and top of the holder if the chamber is correctly closed.

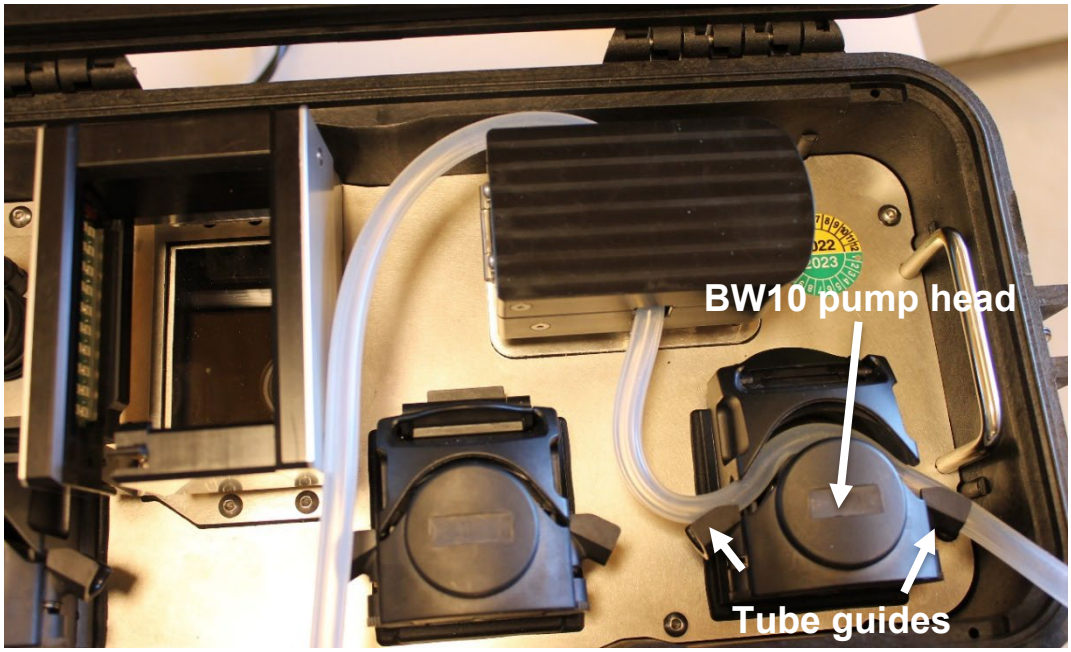






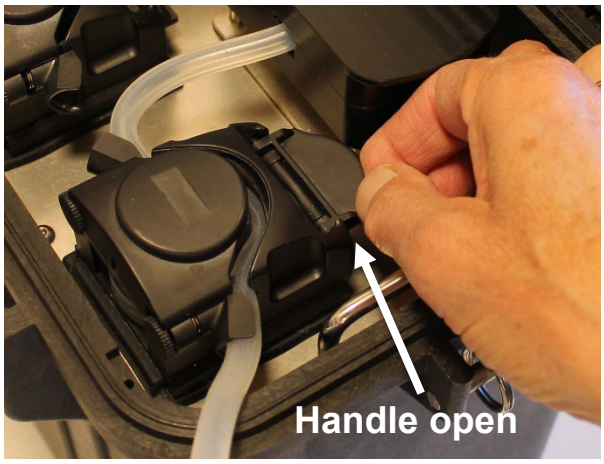
If a gap is visible, open the chamber holder and place the measuring chamber in the holder again, close and make sure that the lid closes completely. If the lid does not close properly, it means that the chamber is not placed properly.

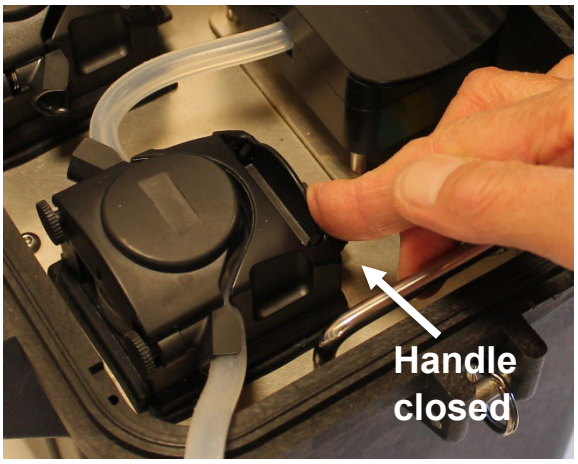
Place the tube in the pump head as shown below. Make sure that the tubing fits into the tube guides and check that the tubes are pushed properly down into the pump head.



4.2 CLOSING THE BW10 PUMP HEAD

Close the pump head by flipping the handle on the back side of the pump all the way up until it clicks. It is important to close the pump head completely to ensure correct flow through the measuring chamber.





4.3 GETTING READY TO ANALYZE A WATER SAMPLE

To prepare the water sample, start by gently mixing the sample – for example by gently turning the container. Then pour approximately 400 mL into the small sample bottle.





Screw the lid onto the small sample bottle and connect the inflow tube of BallastWISE to the connector tube on the lid of the sample bottle, as shown below. Connect the outflow tube to one of the connector tubes on the larger waste bottle.







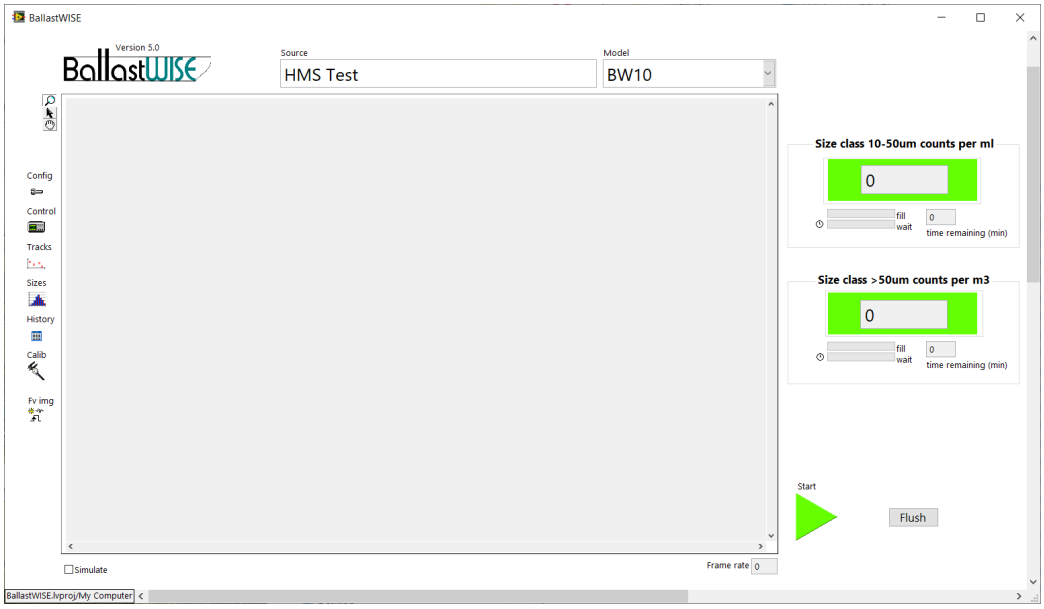
Optional: Close the BallastWISE case lid to block out additional background light while analyzing the sample.

Make sure that tubes and cables exit at the front of the case, as it is important that the tubes should not be squeezed or twisted.

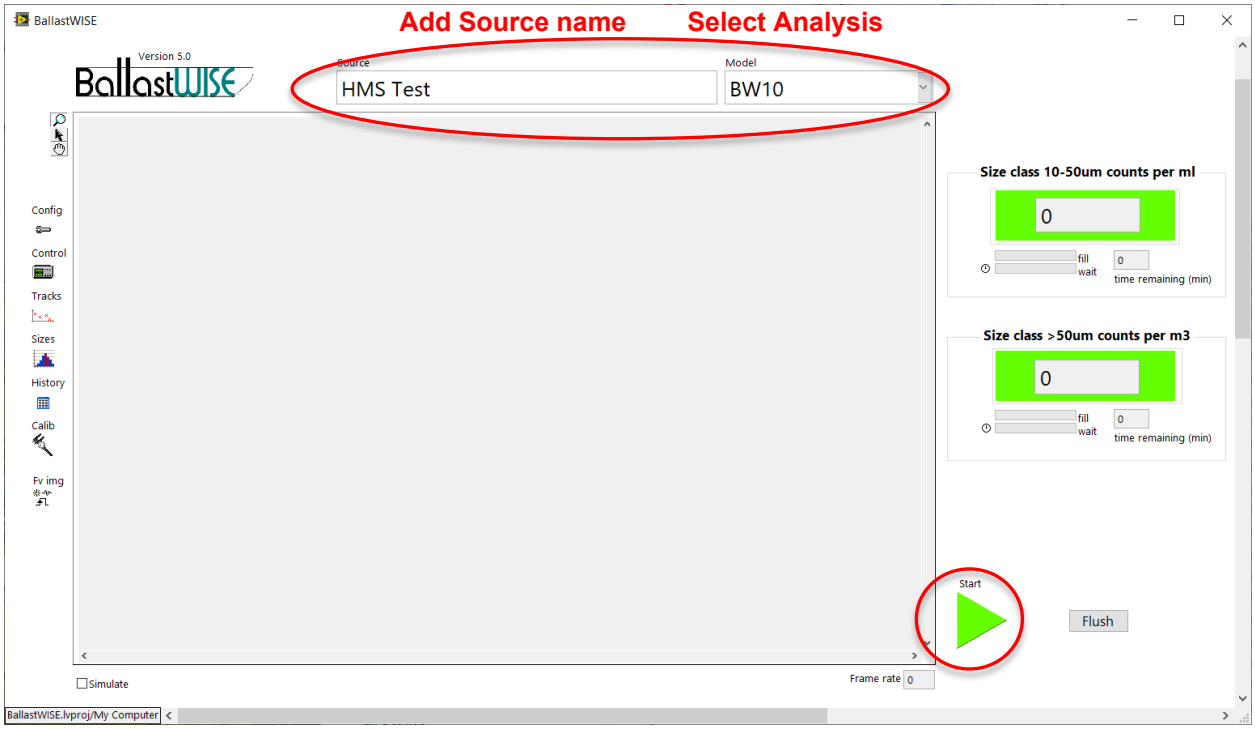
4.5 START BALLASTWISE

Start the BallastWISE software program on your computer by clicking on the program icon on the computer screen, or search for BallastWISE in the Start menu 

The BallastWISE front panel will open:



4.6 START THE ANALYSIS



Select the BW10 analysis model and enter an identifier for the sample test in the Source field (e.g. information on time, vessel, harbour, location). Special characters are not allowed. Make sure that the identifier is unique.

Start the analysis by pressing the green arrow: 

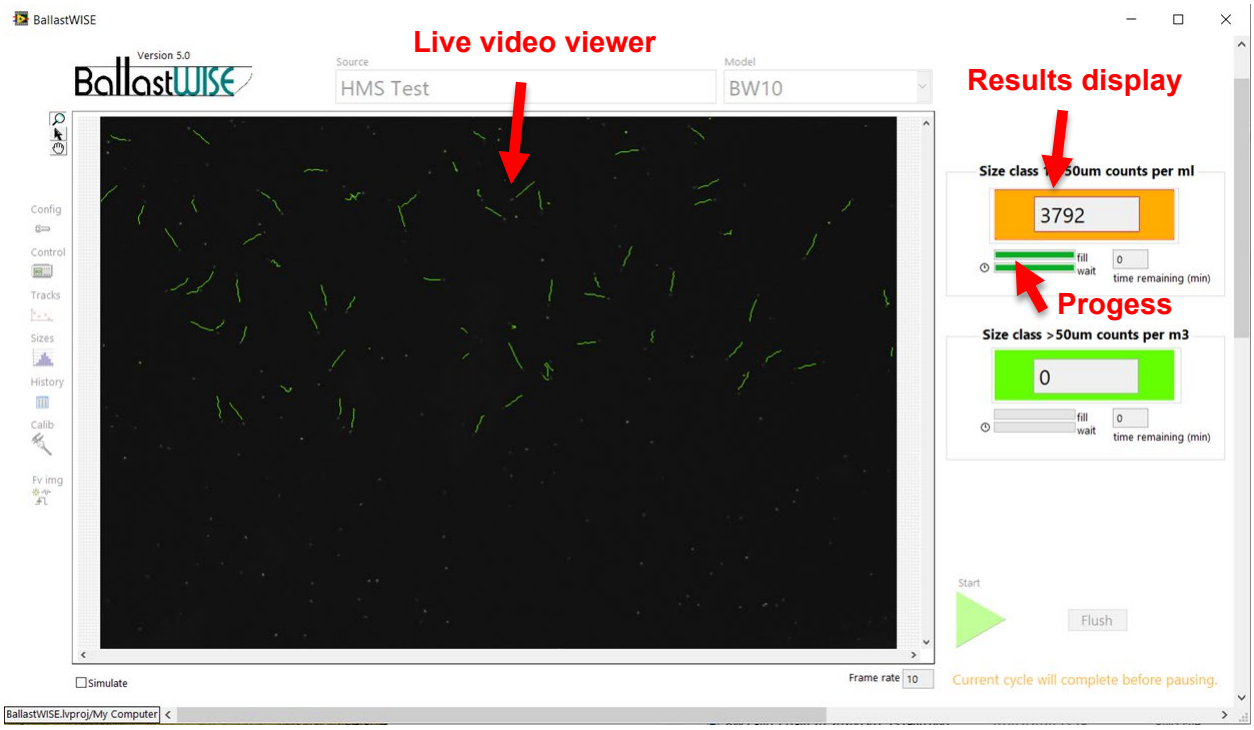
4.8 WAIT WHILE BALLASTWISE ANALYZES THE SAMPLE

BallastWISE analyzes per default 1 mL of sample, which equals 40 chamber volumes. Analysis time is approximately 20 minutes. The BallastWISE screen will show a live video of the water sample during the analysis.

Follow the analysis on the progress bars, which show the status of the following processes:

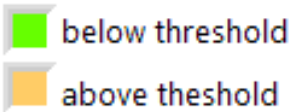
- Fill
- Wait (while the water sample settles)

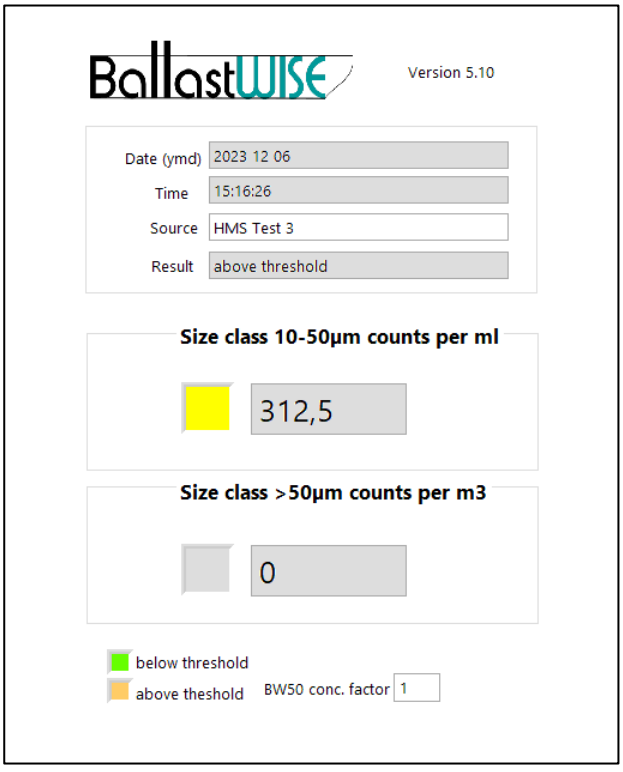
The preliminary test results for compliance or non-compliance are indicated on the screen:



4.9 READ THE RESULTS

The result is an average number of organisms per mL, which is automatically saved in a report. In this case, the total count for organisms between ≥10 to < 50 µm was 312,5 organisms/mL, which was above the threshold of 10 org./mL, and therefore is marked orange.





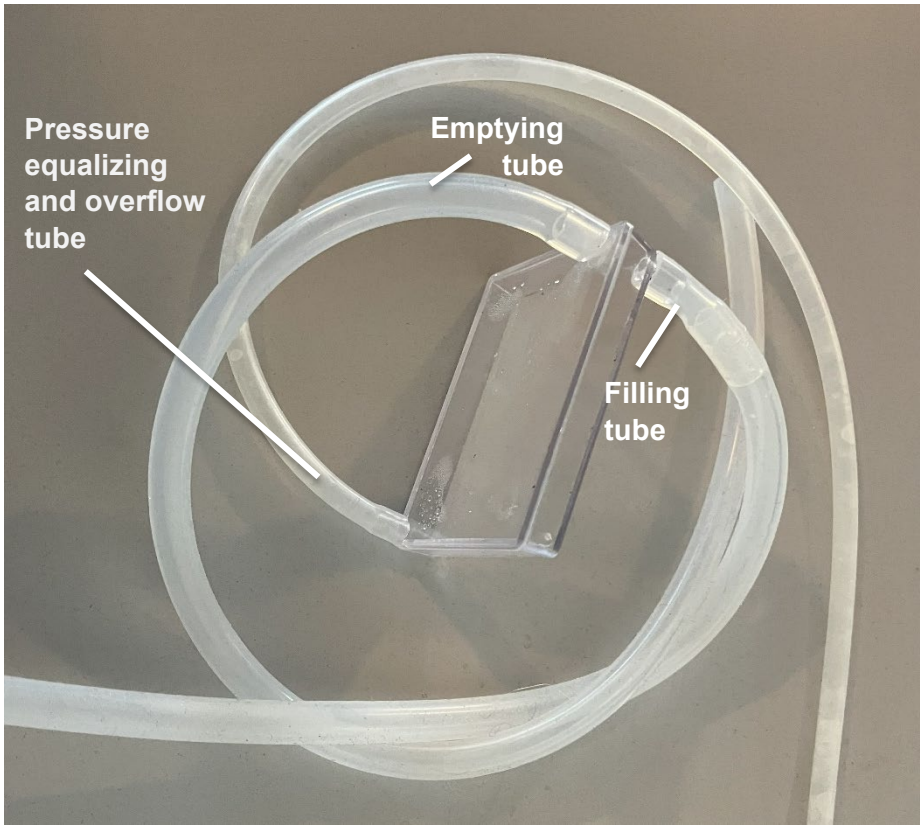
5 BW50: ANALYSIS OF ORGANISMS IN THE ≥50 µM FRACTION

5.1 HOW TO PLACE THE BW50 MEASURING CHAMBER IN THE HOLDER

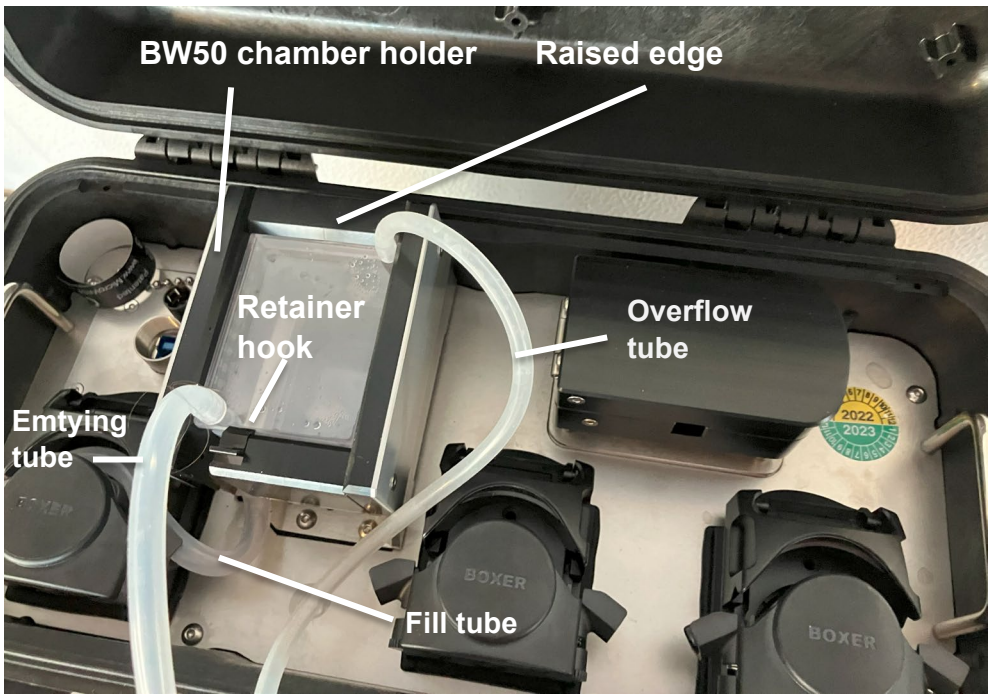
5.1.1 Chamber with separate in and outflow connectors (new chamber type)

The large test chamber (BW50) is shown below. The thickness of the chamber is 7 mm, and seen from the side it has a trapezoid shape. The chamber has three tube connectors, one from the bottom for filling, one immediately above the fill connector for emptying. The third connector is placed on the top at the opposite corner for pressure equalizing/overflow.

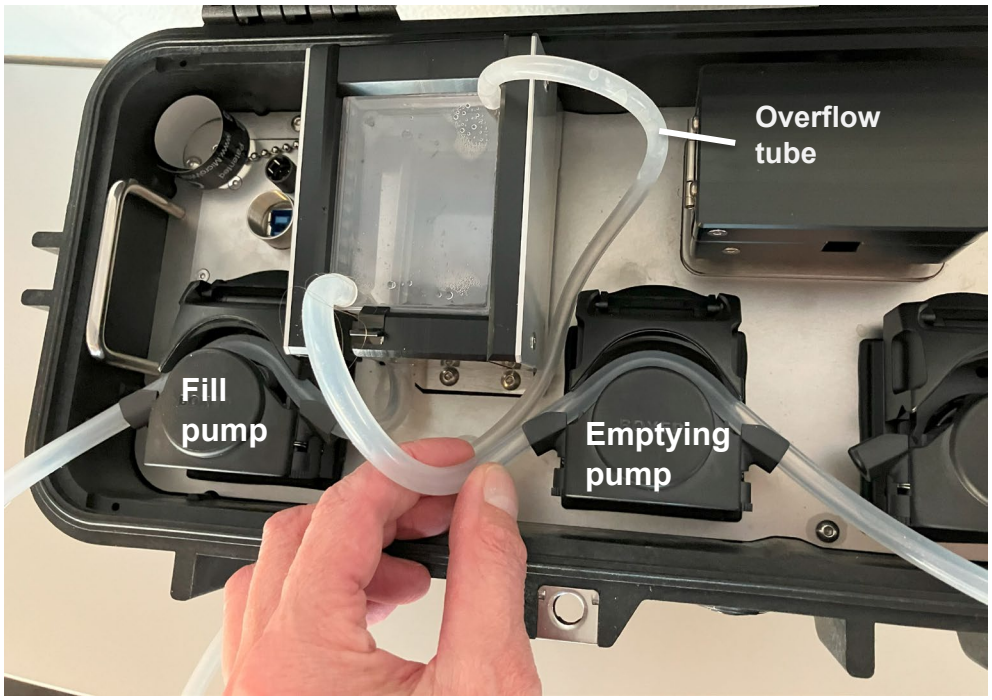
The BW50 chamber is connected to 3 tubes. The filling and emptying tubes are connected to the filling and emptying connectors. A thinner tube from the top of the chamber is for pressure equalizing and overflow, which ensures proper filling of the chamber and removal of air bubbles.



Place the chamber in the chamber holder on the left side of the case by inserting the upper end (the one with the pressure equalizing and overflow tube) under the small raised edge towards the back end of the holder. Then push the entire chamber down so that it clicks into place underneath the retainer hook towards the front of the chamber holder

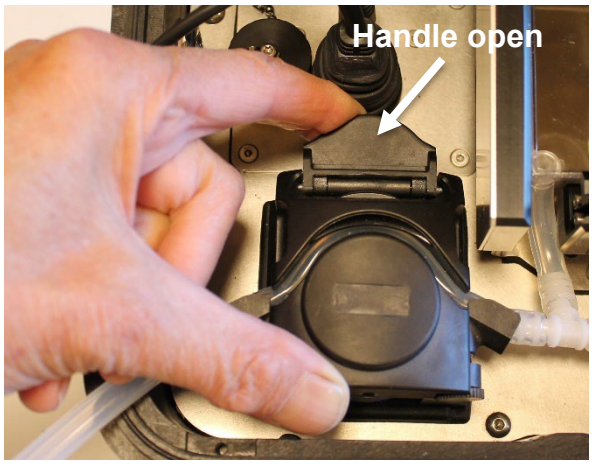


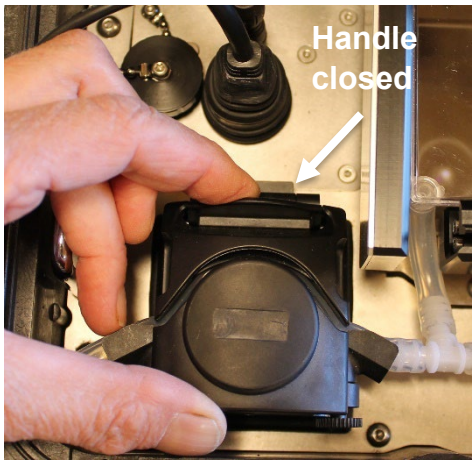
1. Place tube attached to the bottom of the chamber in the left fill pump.
2. Place the overflow tube between the chamber holder and the emptying pump, to keep it out of the way, as shown below
3. Place the emptying tube into the right emptying pump.
4. Make sure that the tubes are seated correctly as shown below, make sure that the tubes are placed properly in the tube guides and check that the tubes are pushed properly down.



5.2 Closing the BW50 pump heads

Close the pump heads by flipping the handle on the rear of each pump all the way up until it clicks.

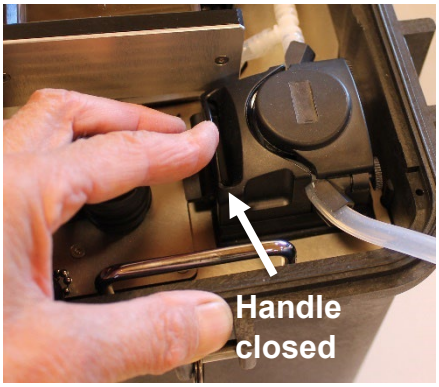




It is important to close the pump heads completely, as shown below, to ensure correct flow through the measuring chamber.

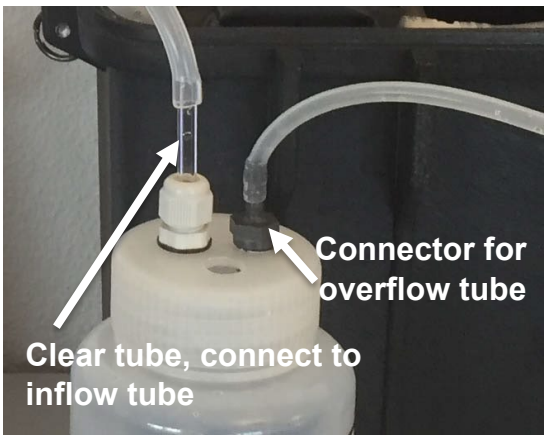






5.3 Getting ready to analyze a water sample

To prepare the water sample, pour at least 600 mL of the sample that you want to test into the sample container.



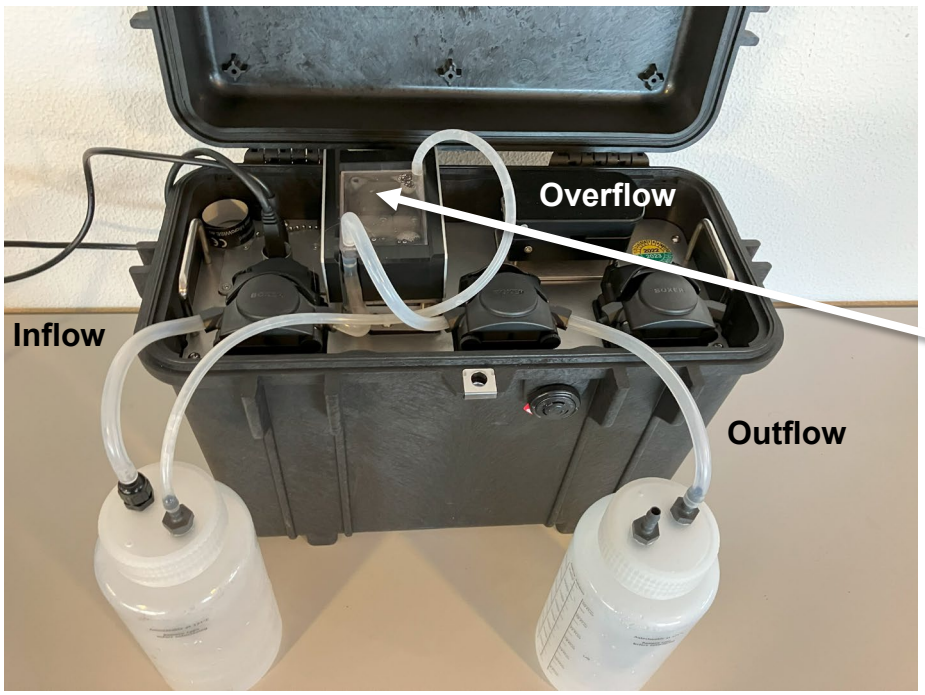
Screw the lid onto the large sample bottle.

The lid has two connectors, one clear acrylic tube for the inflow tube, and one black connector for the overflow tube.

It is important that the clear acrylic tube within the analysis sample bottle is placed down to the bottom of the bottle.

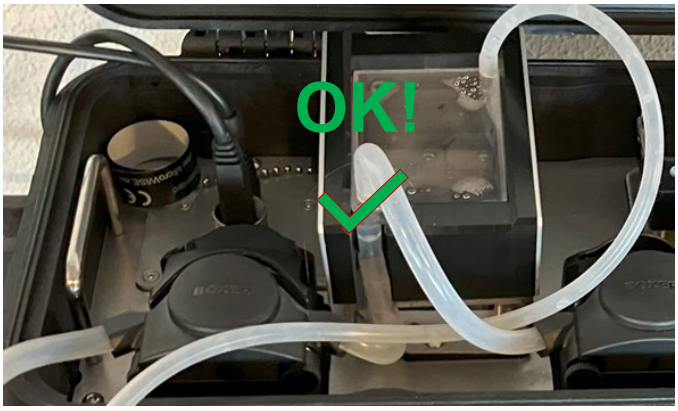
Attach the inflow and overflow tubes to the connectors on the analysis sample bottle.

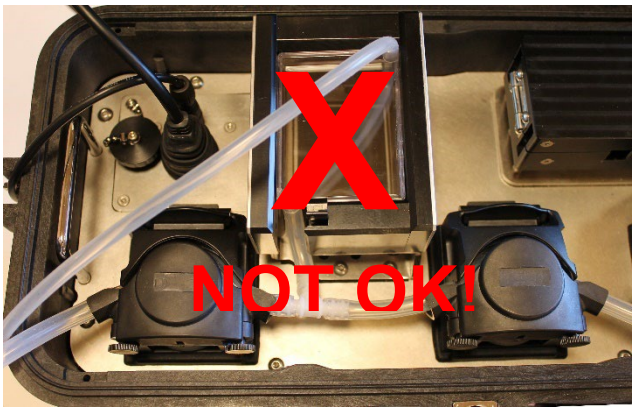
Connect the outflow tube to one of the connectors on the waste bottle as shown below.



Chamber with 3 connectors, and separate in and outflow tubes (new chamber type)

Make sure all tubes are out of the field of view of the large measuring chamber, as this may affect analysis.





Close the BallastWISE case lid gently. This is to block out light while analyzing the sample. **Make sure that the tubes are not squeezed and that cables exit at the front of the case.**

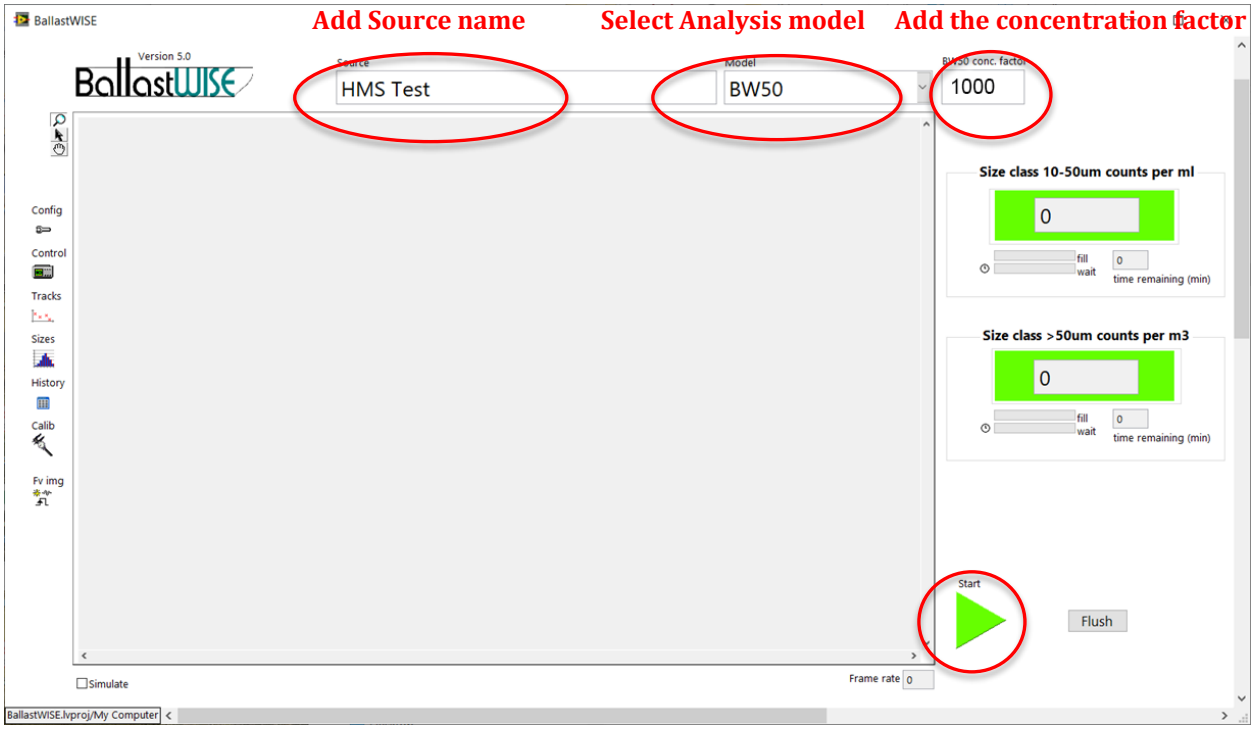


START THE ANALYSIS

Select the BW50 analysis model. In the field **Source**, enter an identifier for the sample test in the Source Field (e.g. information on time, vessel, harbour, location). Special characters are not allowed. Make sure that the identifier is unique.

Enter your sample's concentration factor under **BW50 conc. factor**. The concentration factor indicates the amount of concentration of the water sample by filtration or other means. In the example below 1000 L are filtered down to 1 L, therefore the concentration factor is 1000. If 500 L is filtered down to 1 L the concentration factor is 500. If the sample is not concentrated, the factor should be set to 1.

Start the analysis by pressing the green arrow: 



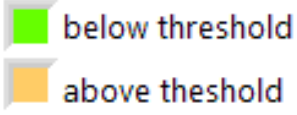
5.4 WAIT WHILE BALLASTWISE ANALYZES THE SAMPLE

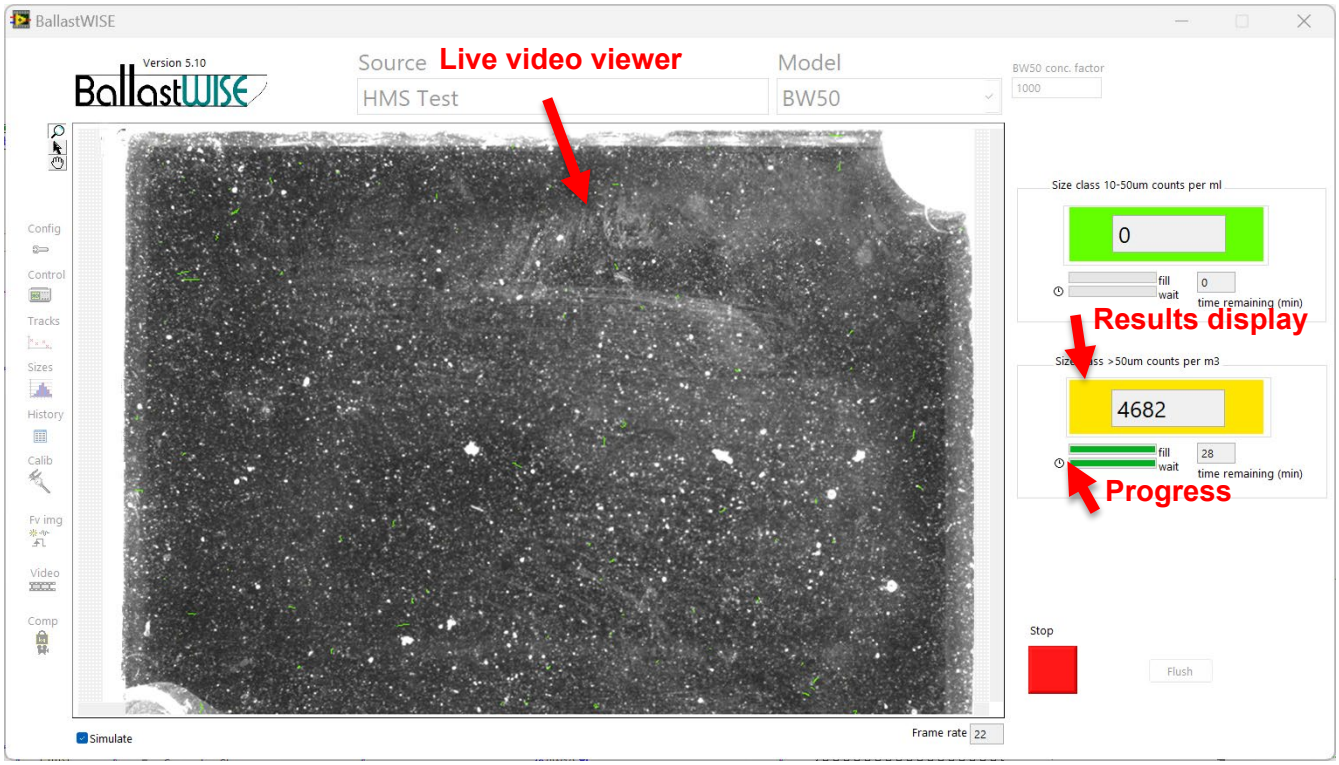
BallastWISE analyzes per default 600 mL of sample, which equals 20 chamber volumes. Analysis time is approximately 25 minutes. The BallastWISE screen will show a live video of the water sample while analyzing it.

The progress can be followed on the progress bars. The progress of the following processes is shown:

- Fill
- Wait (while the water sample settles)

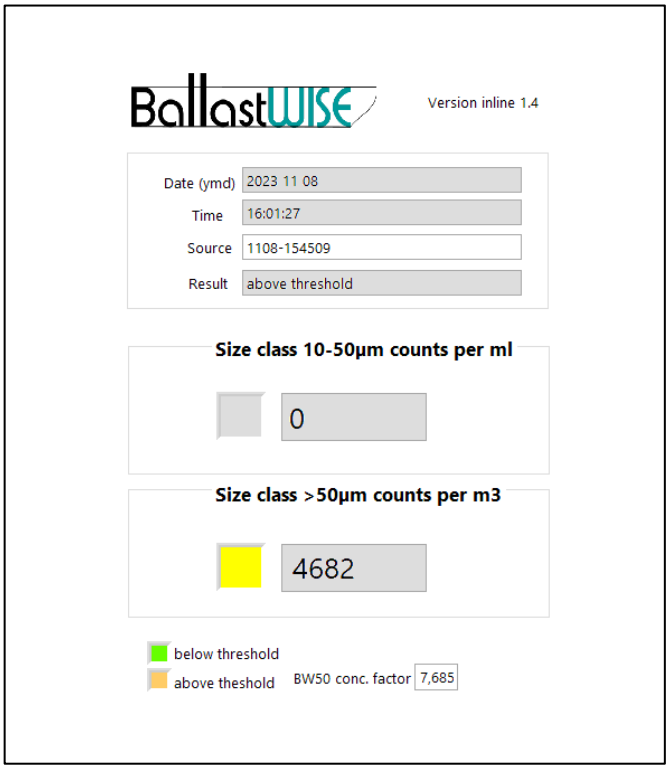
Preliminary results for compliance or non-compliance are indicated on the screen:





5.5 READ THE RESULTS

The result is an average number of organisms per liter, which is automatically saved in a report. In this case the result for organisms ≥50 µm was 4682, which poses is above the threshold of 10 org./m3, and therefore is marked yellow.



6 ANALYZING BOTH SIZE FRACTIONS AT THE SAME TIME

BallastWISE can analyze both size fractions at the same time. Prepare samples for both size fractions as described above, and select BW10 & BW50 from the model drop-down. Enter an identifier and concentration factor for BW50 as described above and push the start button. BallastWISE with both BW50 and BW10 chambers mounted is shown below.

Progress will be displayed for both size fractions and the final report will display both results. Analysis time is approximately 50% longer that for a single size class alone.

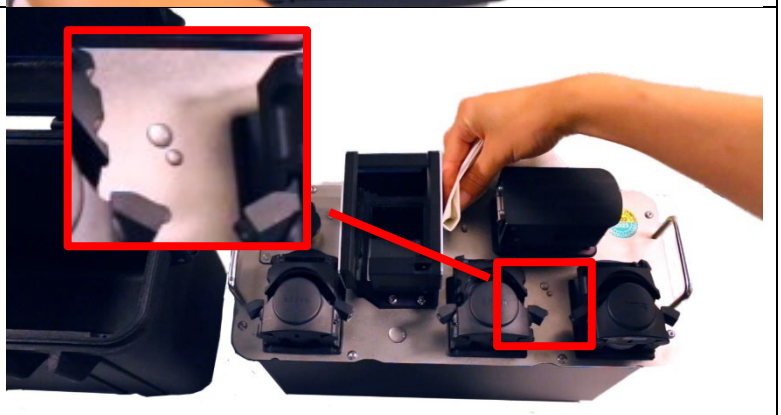
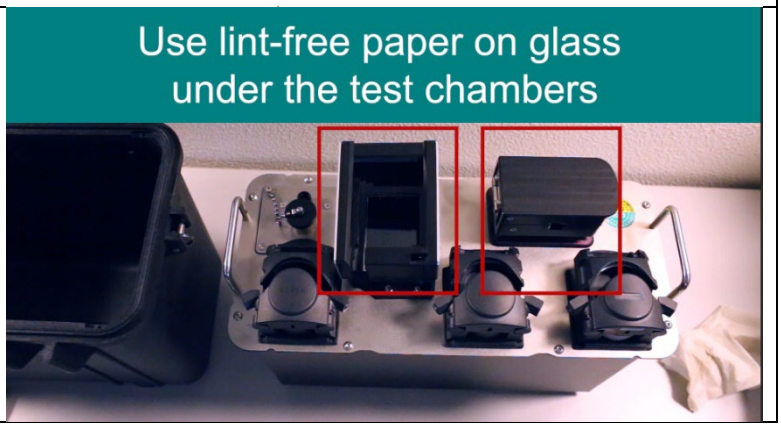


7 MAINTENANCE OF BALLASTWISE

Well-functioning laboratory equipment is an integral part of quality assurance. All equipment must be maintained and kept in good order. Maintenance includes appropriate setup of new equipment, proper daily handling, regular cleaning, routine maintenance and annual calibration, preventive maintenance and appropriate repairs.

7.1 ROUTINE MAINTENANCE AFTER EACH TEST SESSION

It is important to check the instruments for water spillage after each sampling session. BallastWISE is splash proof, however any saltwater spills should be dealt with immediately. Spills could for example be caused by your tubes leaking if they are incorrectly attached. By checking for spills potential interference with tests will be avoided, such as a layer of salt water on the glass above the camera, which would impact test results, or saltwater getting into the USB or power socket which could impact performance of the system.

1. Lift the test instrument out of its case.	
2. Check for water spillage on the surface and sides of the instrument. If water is found, wipe it away.	
3. Water on or near the glass parts must be wiped using lint-free paper.	

4. Check the bottom of the instrument and the case. If water is found, wipe it away.	 
5. Finally, place the instrument back into its case.	

7.2 MEASURING CHAMBERS AND TUBES

Always use new measuring chambers and tubes for critical tests.

For lab tests or during training sessions, chambers and tubes can be reused but should be rinsed between tests with demineralized water.

Tubes will eventually wear out where they are placed in the pumps and should be replaced every ten tests. Tubes can be detached and reversed to double their life span. If track images show any sign of convection flow (straight tracks moving in the same direction, around the edges of the chamber), it is usually because of worn-out tubing. If so, replace the tubing immediately and repeat the test.

8 BALLASTWISE DATA STORAGE LOCATION

Imported data log files: C:\Users\Public\Documents\Bioras\Tracking\Import\Done

Videos: C:\Users\Public\Documents\Bioras\Tracking\Video

Fluorescence images: Documents\BallastWISE\Fv Images

Track plots: Documents\BallastWISE\Tracks

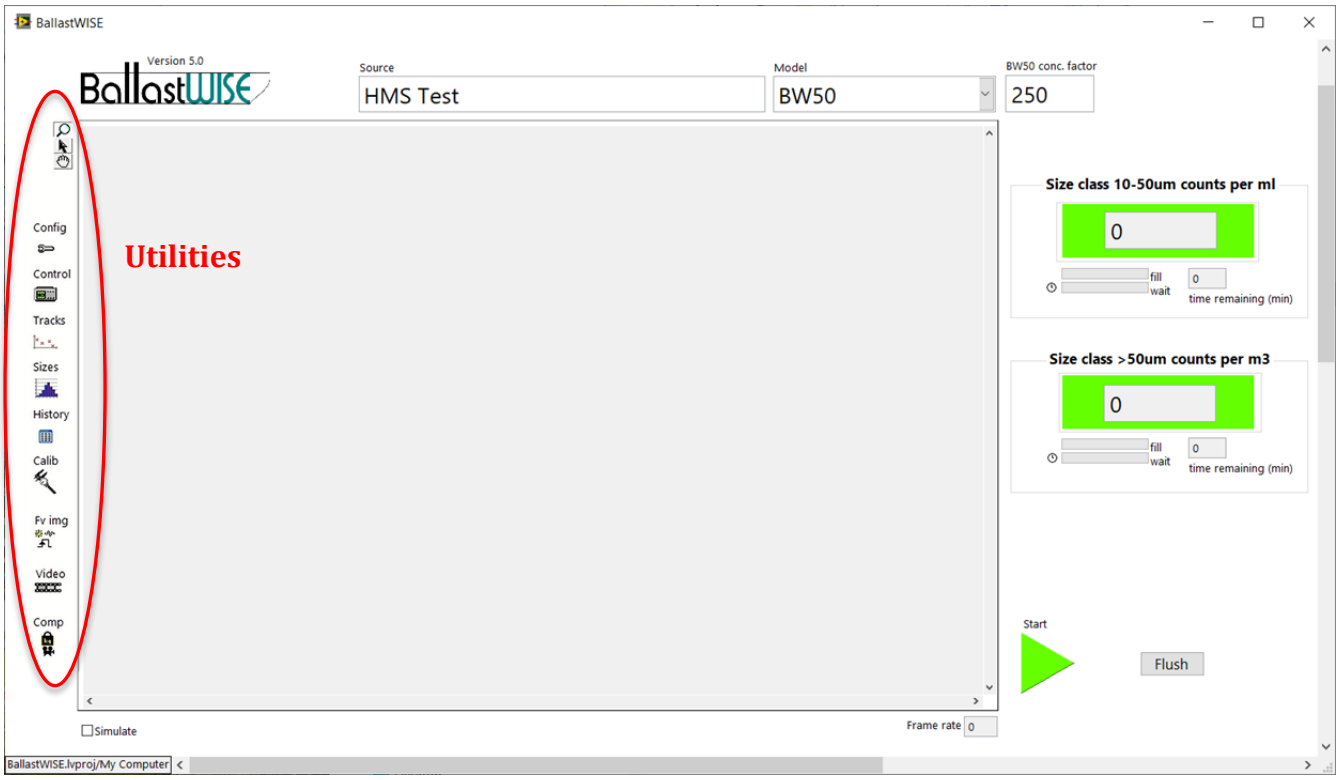
Reports: Documents\BallastWISE

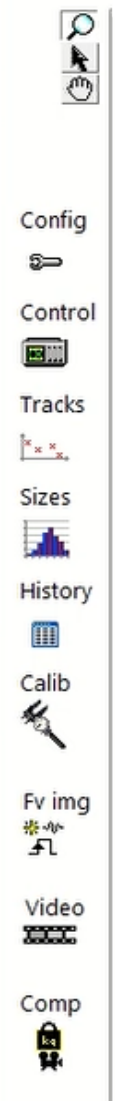
Reports, fluorescence images and track plots are not automatically moved or deleted. They do not take up much storage but they should be moved and backed up regularly.

Important! Care must be taken to ensure that the disk drive does not fill up, especially if videos are saved as these take up a lot of storage. If the disk is full, the BallastWISE software will not run properly.

9 BALLASTWISE CONFIGURATION, UTILITIES AND REPORTS

Utilities and reports can be accessed by clicking the icons in the panel to the left:





1. Viewer Control Tools
    a. Zoom
    b. Select tool
    c. Scroll tool
2. Configuration Tool
3. Control Tool
4. Track Viewer
5. Organism Size Viewer
6. History, Table of Results
7. Calibration
8. Variable Fluorescence Image Viewer
9. Video tool
10. Compression tool

9.1 VIEWER CONTROL TOOLS



9.1.1 Zoom control

 Enlarge image: Select the magnifying glass, click in the picture with the mouse ("+" magnifying glass).

 Minimize image: Select the magnifying glass, keep the shift key pressed down and click simultaneously in the picture window ("-" magnifying glass). Alternatively, right click on the image and select "Zoom to fit".

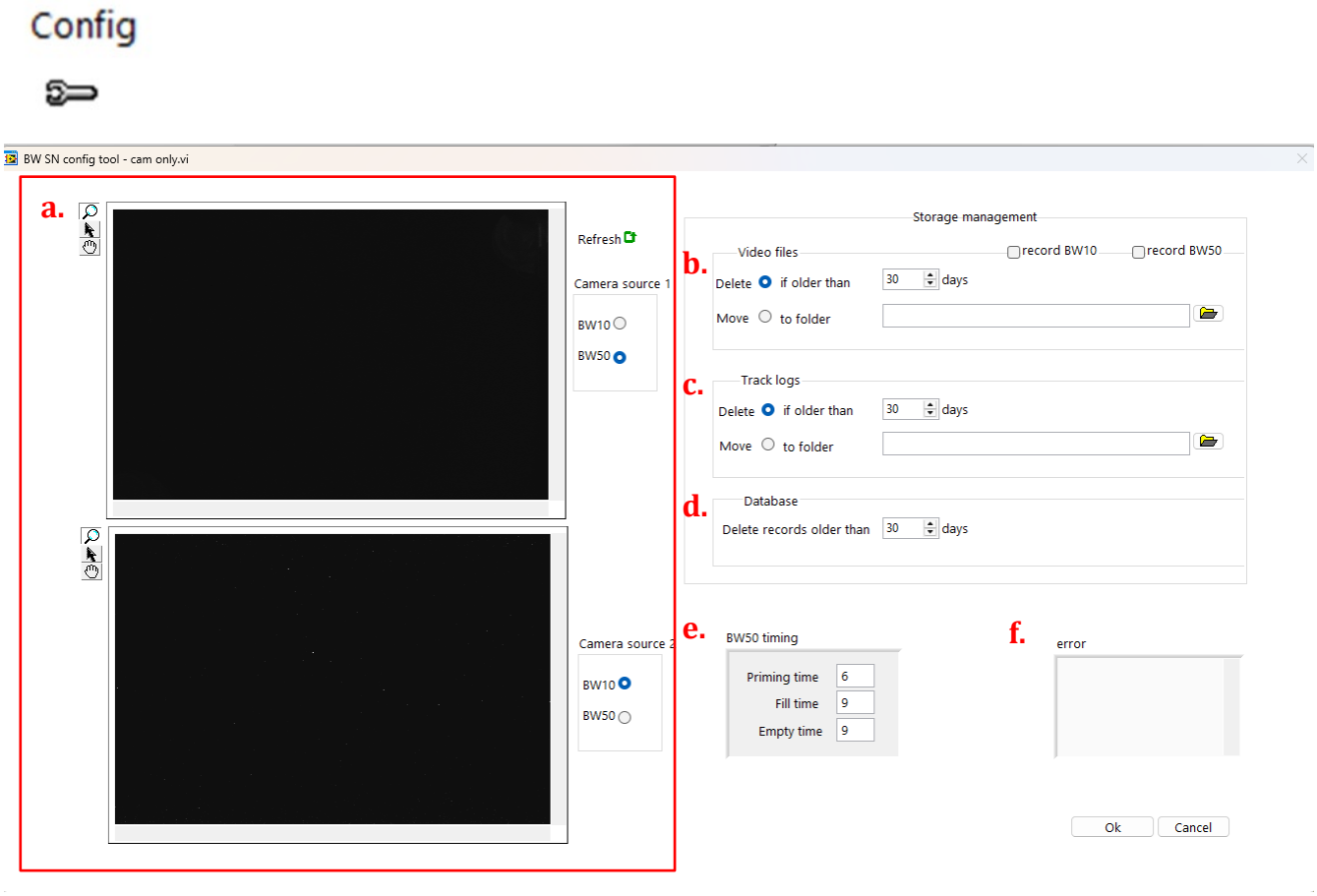
9.1.2 Select tool

 The arrow tool is for selecting and pointing.

9.1.3 Scroll tool

 Hand tool for moving the view in the image window.

9.2 CAMERA CONFIGURATION TOOL AND FILE STORAGE MANAGEMENT

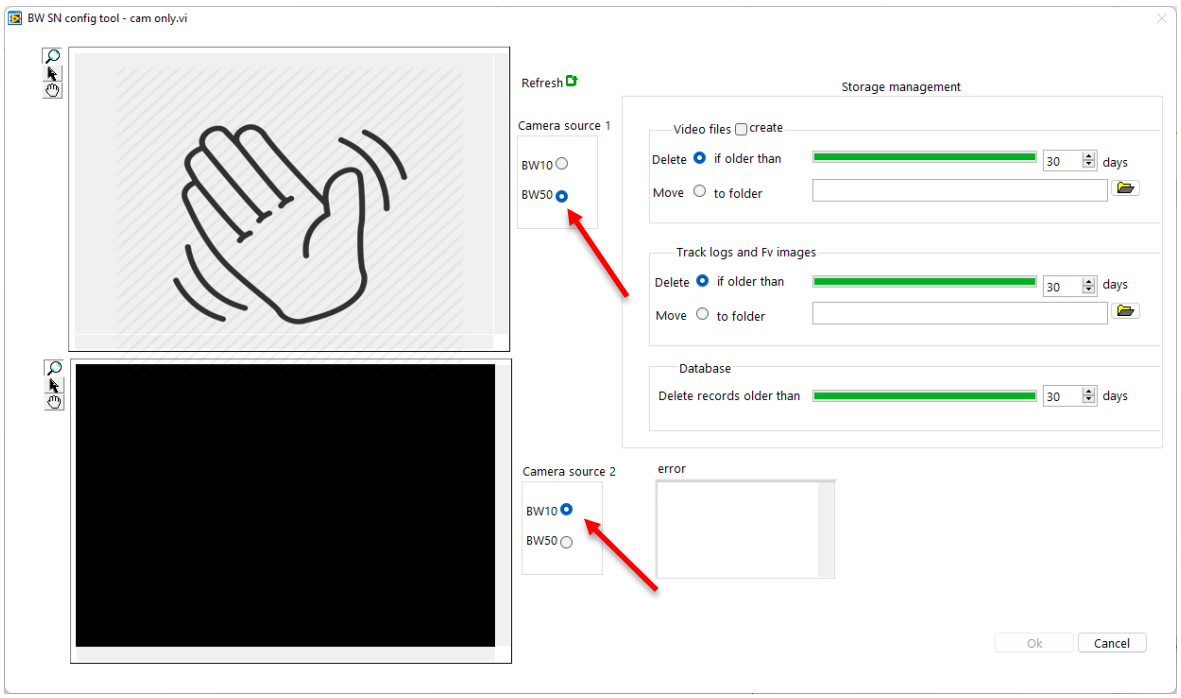


The Configuration Tool for BW50 and BW10 can be used to:

a. Identify which camera is the BW50 camera, and which is the BW10 camera. The software will remember this setting, and it only has to be done once. NOTE: If the radio buttons are disabled, the system has been able to automatically identify the cameras. Adjustment of camera settings is described in section 8.1.1.

   In order to identify the two cameras, the computer must be connected to the BallastWISE system as described in 3.1. Identify the BW50 camera by waving your hand over the BW50 chamber slot. The video stream that shows your waving hand is from the BW50 camera source. If not automatically selected, set the radio button to BW50 for this source by clicking the radio button next to the image window. In the example below, camera 1 is the BW50 camera source.

   The BW10 video stream will be black if the lid over the BW10 fixture is closed, as shown in the example below.



b. Handle video files created during analysis. BallastWISE can automatically delete data older than a specified date or it can automatically move files to a specified location e.g. a USB disk. NOTE: if video creation is selected, care must be taken to ensure that the disk drive does not fill up as videos take up a lot of storage.
c. Handle track log files created during analysis. BallastWISE can automatically delete data older than a specified date or it can automatically move files to a specified location e.g. a USB disk.
d. Configure how long Database records should be kept.
e. BW50 pump timing settings. These can be used for modifying the time it takes to fill or empty a chamber. If the chamber is not filled completely during analysis, increase the fill time setting. Increase the empty time if the chamber is not completely emptied between analysis. Decrease the fill time setting if unnecessary time is used for filling. Decrease the empty time if unnecessary time is used for emptying.
f. Display explanations of configuration errors in the error box.

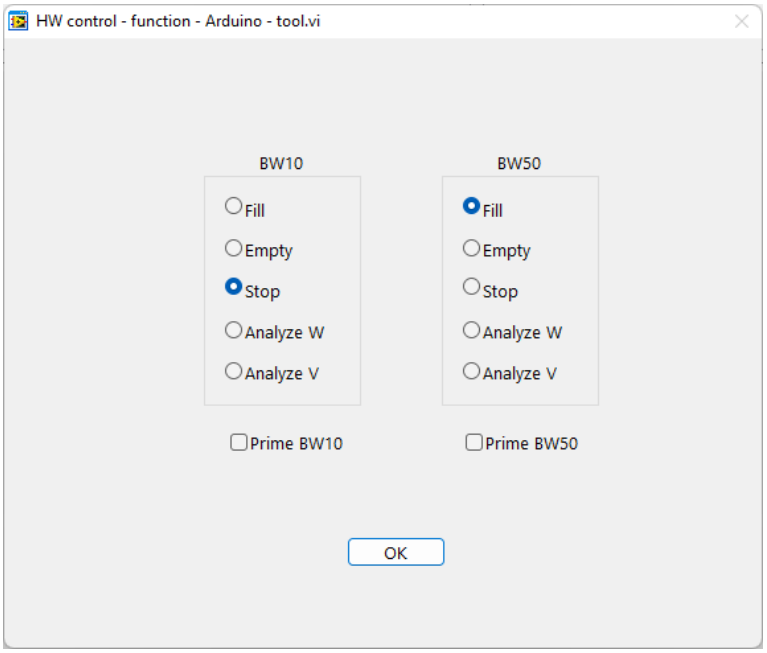
9.3 CONTROL TOOL



This function is rarely used, but it is helpful if other programs access the cameras (e.g. IC capture).

Control tools for BW10 and BW50:

- **Fill** – fills the measuring chamber
- **Empty** – empties the measuring chamber
- **Stop** – Stops the ongoing process
- **Analyze W** – White/red light on
- **Analyze V** – Violet blue light on
- **Prime** – increases filling time to fill any empty tubes



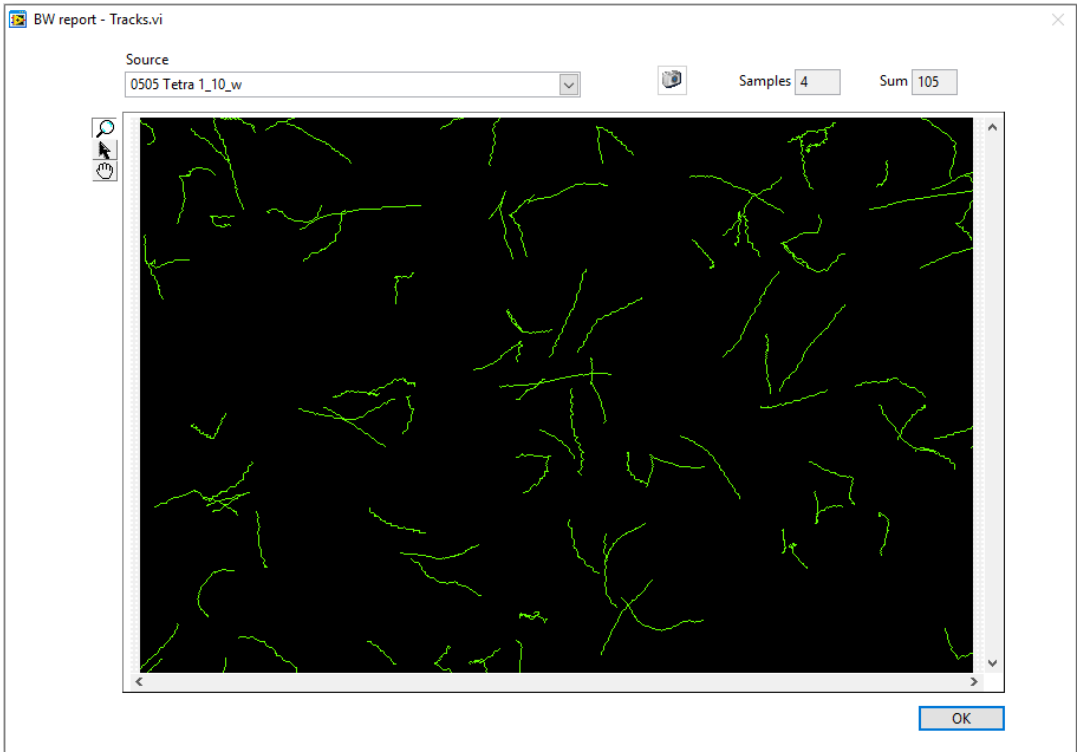
9.4 TRACK VIEWER



The Track Viewer function is a very useful tool, which will show cumulated tracks from subsamples for the selected analysis. The analysis can be selected in the **Source** drop down menu.

Please note the importance of creating unique names to help finding and selecting data.

The number of samples contained in the track plot is shown. The sum of tracks is also shown.

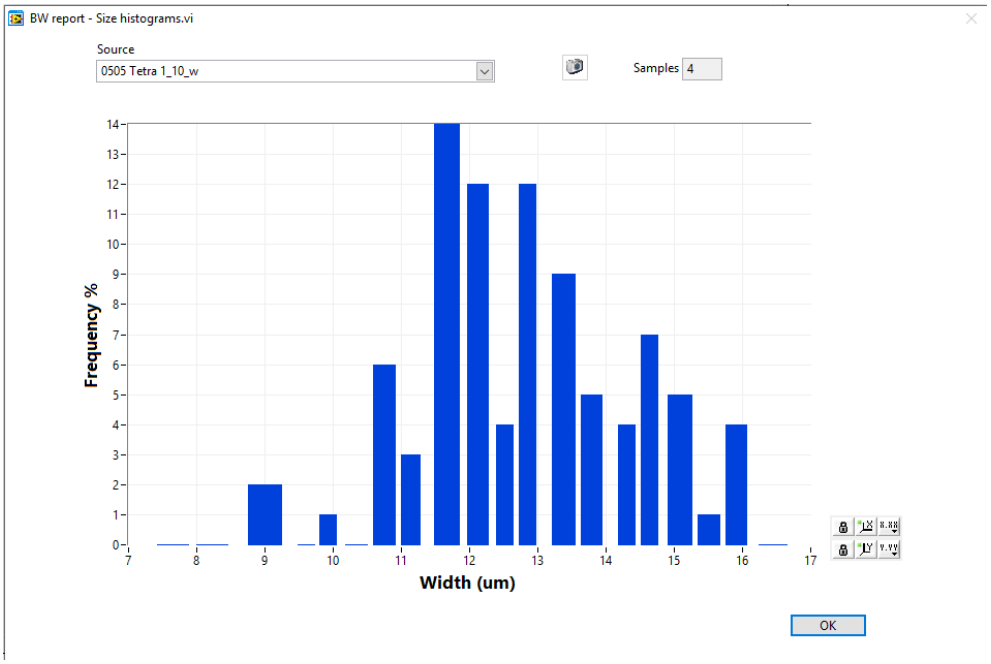

BW report - Tracks.vi
Source
0505 Tetra 1_10_w
Samples 4
Sum 105
OK

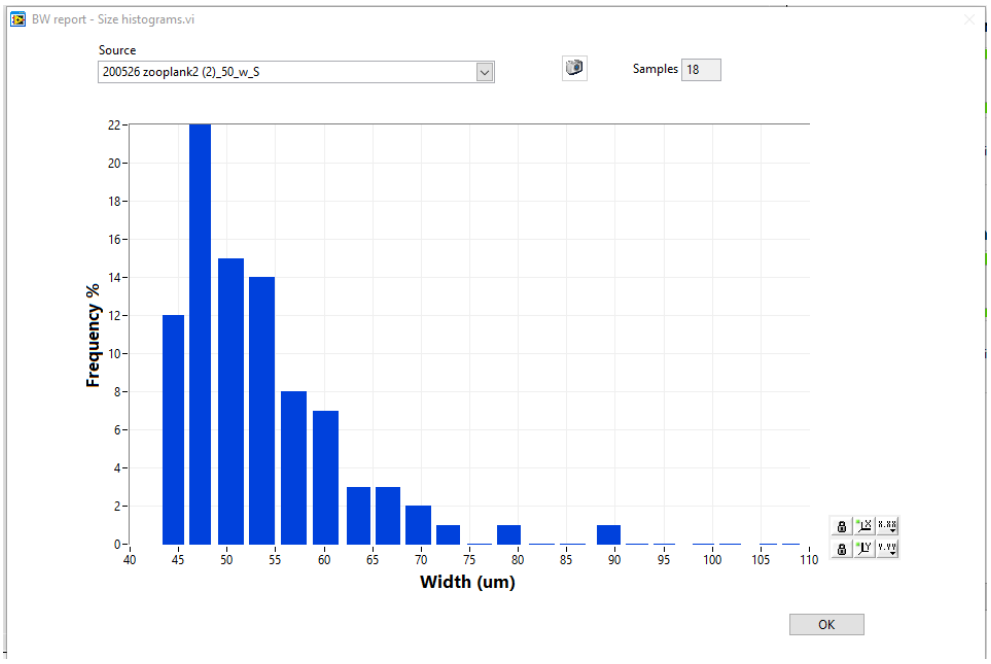
9.5 ORGANISM SIZE VIEWER



The Size Viewer function will show organism sizes cumulated from subsamples for the selected analysis. The Analysis can be selected in the Source drop down menu. Please note the importance of creating unique names to help finding and selecting data. The number of samples from which the tracks are cumulated is shown.

Examples of size distributions of organisms between ≥10 to < 50µm µm and ≥50µm are shown below.





9.6 HISTORY - TABLE OF RESULTS

History

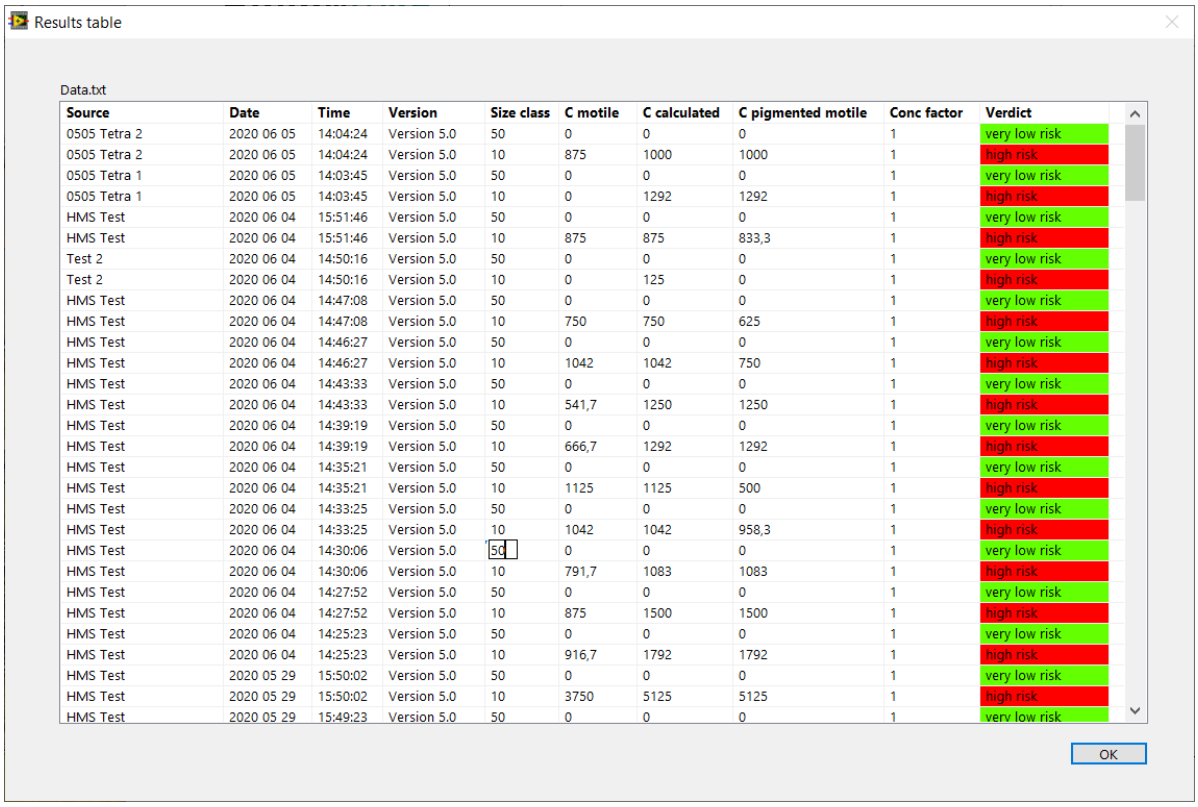


The results are saved in a database and a Table of results.

The Data File location is: Documents/Ballastwise

Detailed data are shown:

- C motile: Concentration of all motile organisms tracked in white/red light
- C calculated: Estimated number of organisms based on motile and fluorescent concentrations
- C pigmented motile: Concentration of pigmented motile organisms tracked in violet light



Source	Date	Time	Version	Size class	C motile	C calculated	C pigmented motile	Conc factor	Verdict
0505 Tetra 2	2020 06 05	14:04:24	Version 5.0	50	0	0	0	1	very low risk
0505 Tetra 2	2020 06 05	14:04:24	Version 5.0	10	875	1000	1000	1	high risk
0505 Tetra 1	2020 06 05	14:03:45	Version 5.0	50	0	0	0	1	very low risk
0505 Tetra 1	2020 06 05	14:03:45	Version 5.0	10	0	1292	1292	1	high risk
HMS Test	2020 06 04	15:51:46	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	15:51:46	Version 5.0	10	875	875	833,3	1	high risk
Test 2	2020 06 04	14:50:16	Version 5.0	50	0	0	0	1	very low risk
Test 2	2020 06 04	14:50:16	Version 5.0	10	0	125	0	1	high risk
HMS Test	2020 06 04	14:47:08	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:47:08	Version 5.0	10	750	750	625	1	high risk
HMS Test	2020 06 04	14:46:27	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:46:27	Version 5.0	10	1042	1042	750	1	high risk
HMS Test	2020 06 04	14:43:33	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:43:33	Version 5.0	10	541,7	1250	1250	1	high risk
HMS Test	2020 06 04	14:39:19	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:39:19	Version 5.0	10	666,7	1292	1292	1	high risk
HMS Test	2020 06 04	14:35:21	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:35:21	Version 5.0	10	1125	1125	500	1	high risk
HMS Test	2020 06 04	14:33:25	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:33:25	Version 5.0	10	1042	1042	958,3	1	high risk
HMS Test	2020 06 04	14:30:06	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:30:06	Version 5.0	10	791,7	1083	1083	1	high risk
HMS Test	2020 06 04	14:27:52	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:27:52	Version 5.0	10	875	1500	1500	1	high risk
HMS Test	2020 06 04	14:25:23	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 06 04	14:25:23	Version 5.0	10	916,7	1792	1792	1	high risk
HMS Test	2020 05 29	15:50:02	Version 5.0	50	0	0	0	1	very low risk
HMS Test	2020 05 29	15:50:02	Version 5.0	10	3750	5125	5125	1	high risk
HMS Test	2020 05 29	15:49:23	Version 5.0	50	0	0	0	1	very low risk

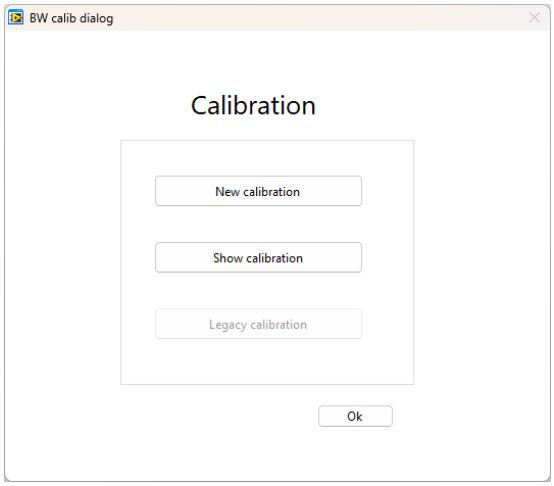
9.7 CALIBRATION



The calibration procedure requires a dedicated calibration kit available at MicroWISE. The purpose of the Calibration kit is to check that a BallastWISE unit is in focus and that the camera exposure and gain settings match the light intensities of the respective LED sources. This is achieved with target chambers that are a part of the kit and by allowing tolerances on metrics within reasonable limits. The metrics used are match scores (for BW50) and average sizes and standard deviations on microspheres of known sizes (BW10). You can use any computer to perform the calibration of a particular BallastWISE unit.

Note: You must be online to perform a calibration. Calibrations are stored both locally and on a secure server.

Open the Calibration tool:

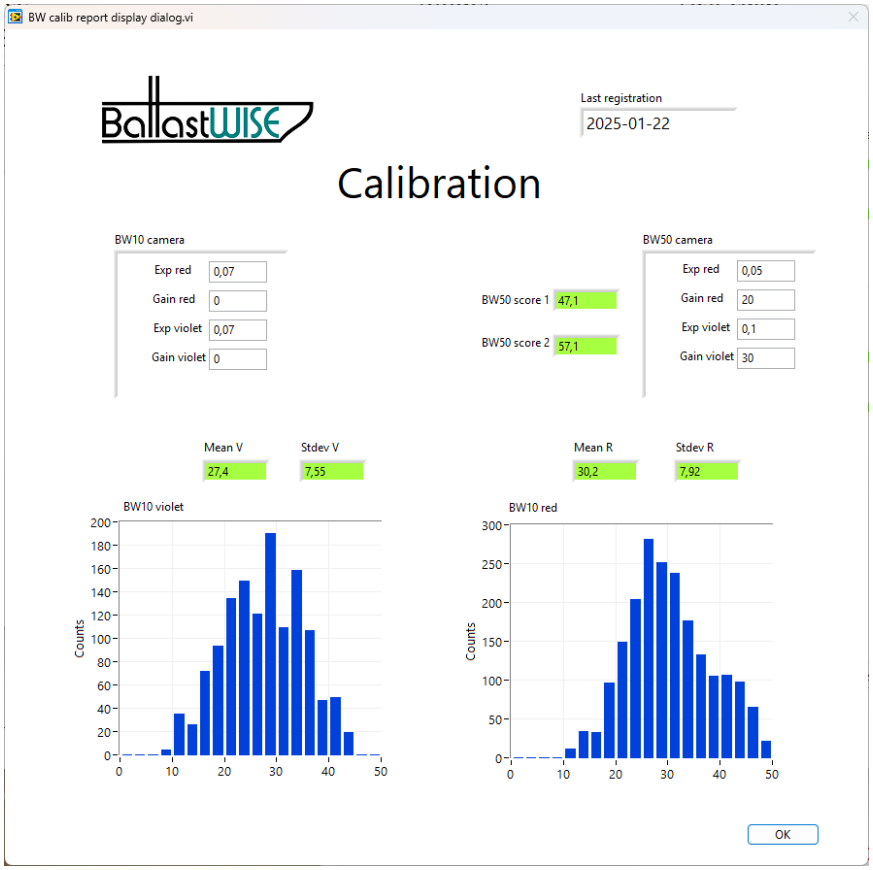


Create a new calibration:



1) Insert the two target chambers into their respective fixtures. **NOTE**: Make sure that the BW10 target is seated correctly as it can be a tight fit.
2) Make sure that the BW50 camera shows the BW50 chamber. Swap cameras if that is not the case using the Swap Camera check box.
3) Click through the 3 green buttons on the right of the panel to measure:
    a) Two BW50 "A" patterns
    b) BW10 size and distribution in violet light (fluorescence)
    c) BW10 size and distribution in amber light (moving targets)
4) To measure c), gently squeeze the tubing to set the microspheres in motion simulating moving targets. Continuously squeeze and let go until a bell shaped histogram is developed.
5) If only few microspheres are visible during b) and c), or if the size histograms are not well defined in a bell shape, remove the target and flip it a half turn. This results in the microspheres floating up through the chamber and across the optimum depth of view zone. The microspheres have a slightly lower density than the liquid that they are suspended in.
6) If the measurements are too small in steps b) or c), increase the exposure time or the gain value prioritizing exposure over gain. Bead sizes are approximately 25µm. If the measurements are too large, decrease gain followed by exposure. These settings have range limits. A bios towards measurements slightly on the large side is favourable.
7) When all 6 metric fields have turned from yellow to green (acceptable values within acceptable limits) the Ok button at the bottom of the panel will become enabled. Click on it commit the calibration. Select Cancel to exit without changes.

The saved calibration is shown when selecting Show calibration:



If the Legacy calibration button is enabled, it means that you have a legacy (old version) calibration on your machine. You can choose to keep using it and it is still possible to edit the settings by clicking on the Legacy calibration button. As soon as you have created a new calibration, the legacy calibration will be deleted.

9.8 Fv img – Variable Fluorescence Image Viewer



Phototrophic organisms are quantified by an imaging PAM method (iPAM) in addition to motion analysis. Each subsample is exposed to a low intensity flash followed by a high intensity flash.

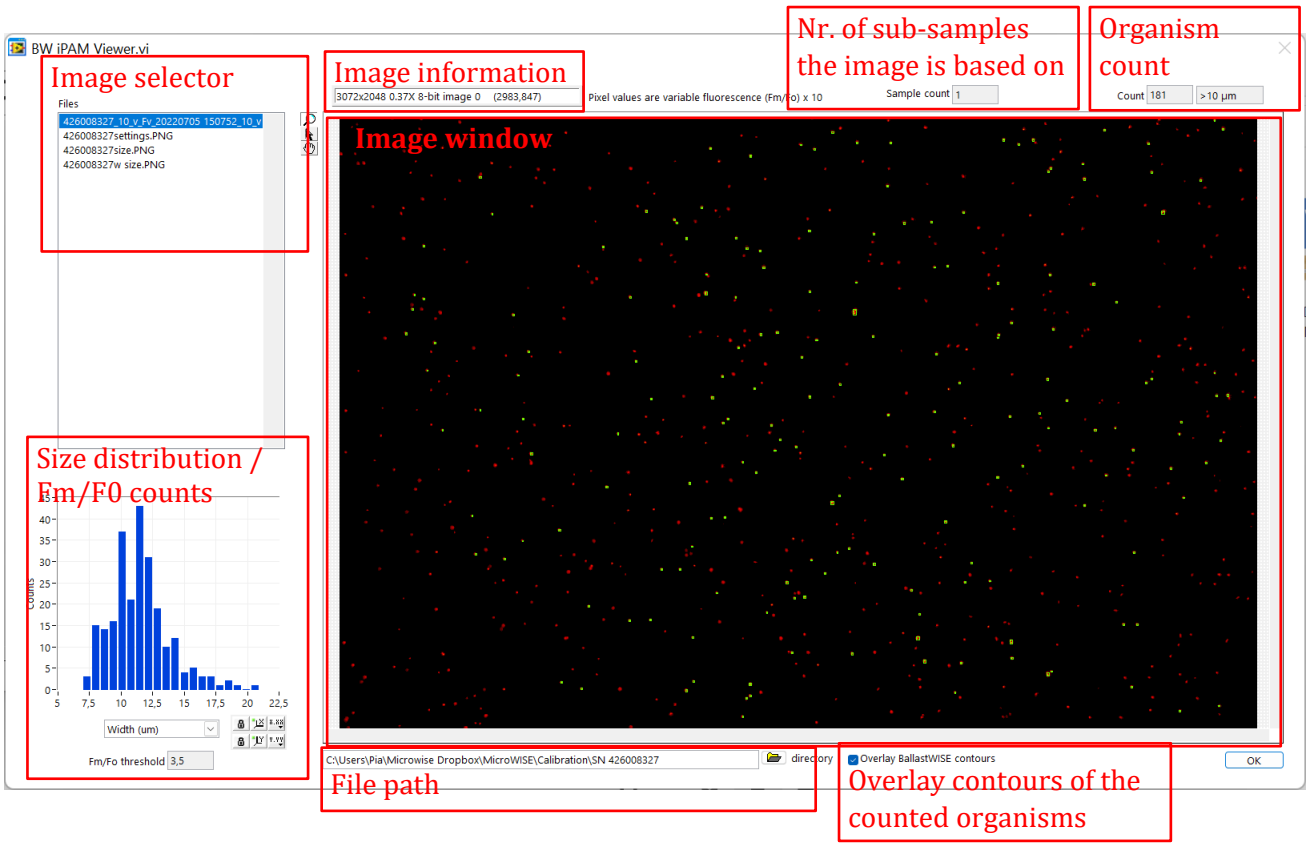
Following each flash, the fluorescence signals produced by the phytoplankton cells are captured by the video camera in a single frame. **Fo** is the minimum fluorescence intensity following the low intensity flash, **Fm** is the maximum fluorescence intensity following the high intensity flash. The variable fluorescence value (**Fv**) equals **Fm/Fv**. The number of live phytoplankton cells is the sum of cells where Fv ≥ 3.5.

9.8.1 Visualization of Fv

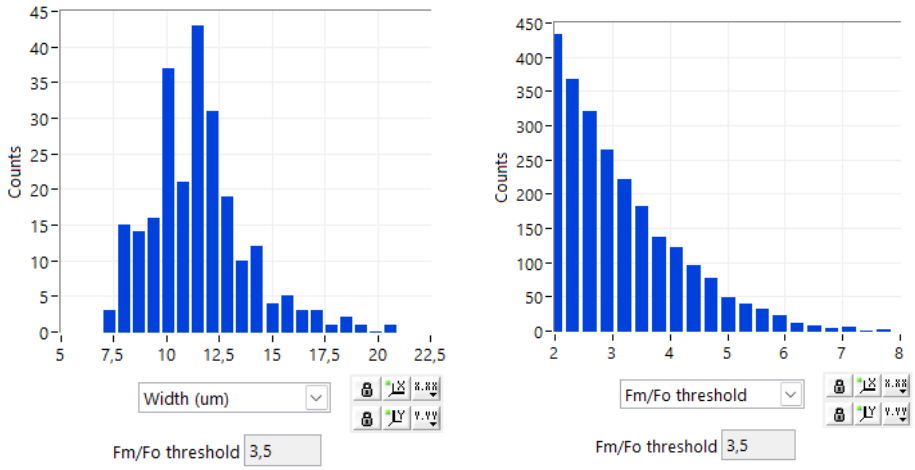
Results of an iPAM analysis are visualized in the Fv Image Viewer. All image files within the given directory as shown in the list box top left. Any one image can be selected at a time. Ballaswise adds false colors to enhance contrast and Fv values are multiplied by 10 ((Fm/F0)x10) to allow viewing images in other applications in grey scale. Images in a directory other than the default directory can be viewed by specifying their location in the directory field situated under the image view.

9.8.2 iPAM overlay contours

Contours of phototrophs are shown if the width is ≥ 10µm and if Fv ≥ 3.5.



9.8.3 Size distribution and Fm/F0 counts

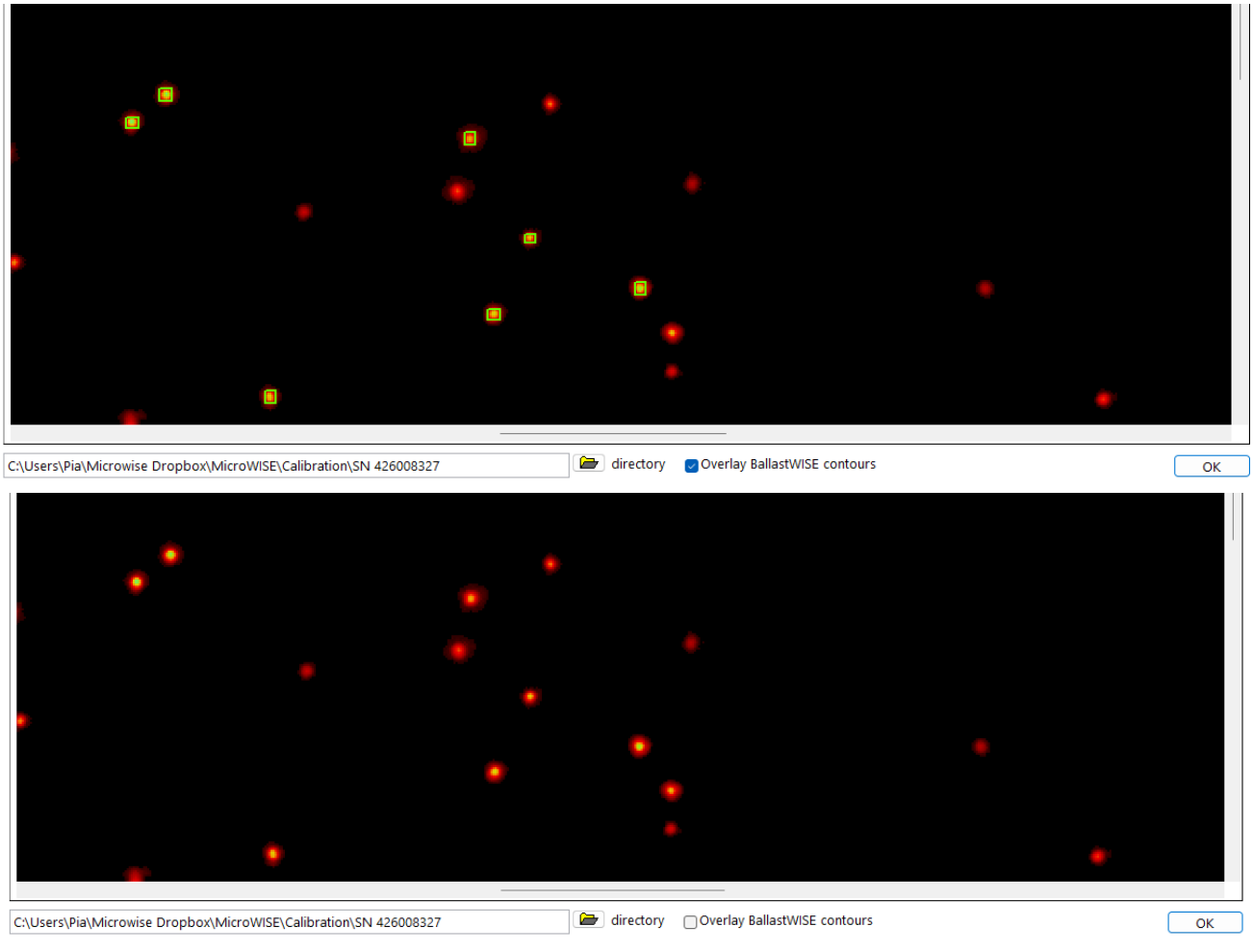


The **Width** histogram shows the size distribution of all organisms which have Fm/F0 values greater than the threshold value. The Fm/F0 threshold histogram shows counts at different Fm/F0 threshold values.

9.8.4 Show or hide the Overlay BallastWISE contours of the counted organisms

The overlay contours of the counted phototrophs are shown by default. The overlay contours can be deselected.

Only phototrophs with an Fm/F0 threshold over 3.5 and with a minimum width of 10 µm will be counted and will be highlighted in the image window. Selecting and deselecting Overlay BallastWISE contours will show which phototrophs have an Fm/F0 over 3.5 and a minimum width of 10 µm.



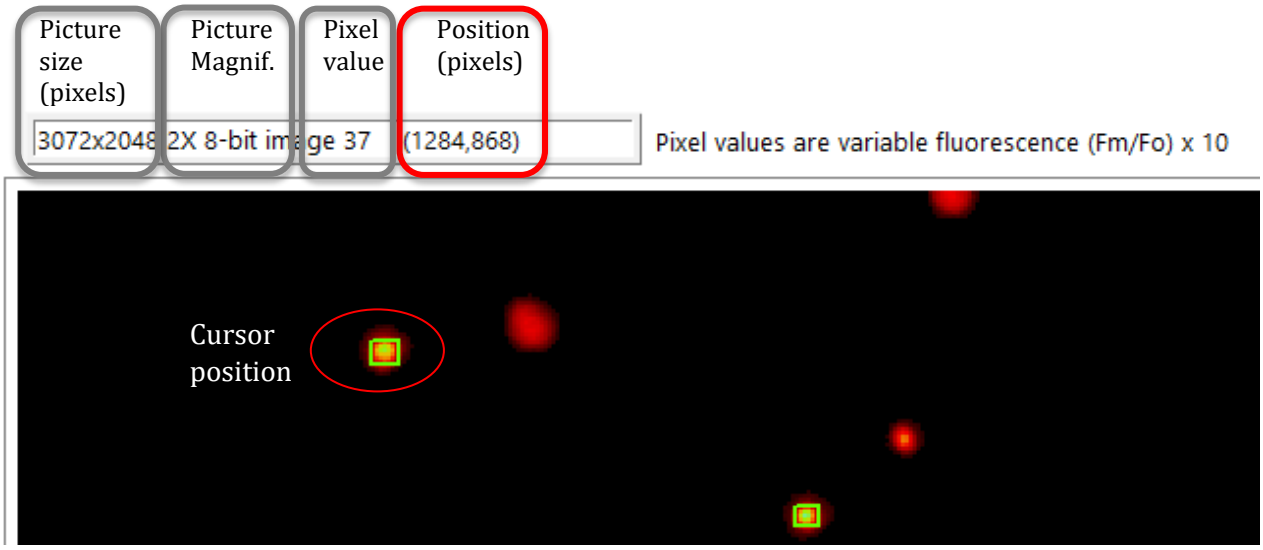
9.8.5 Counted phototrophic organisms

Only phototrophs larger than the given minimum size displayed in the top right corner are included in the count. The counts are displayed next to the size fraction. This is the actual count from the number of subsamples given in the "Sample Count" field and should not be confused with the concentration. NOTE: Sample count only includes subsamples with counts greater than zero.



9.8.6 Image information

The Pixel values are a visualization of the variable fluorescence (Fm/F0)x10 shown in the Fv image viewer. The Pixel values can be read by placing the cursor over the area of interest. In the example below the cursor (black cross) is placed over one of the contours, and the Fv x10 value is shown in the box to the left over the image viewer. Contours of phototrophs are shown if the width is ≥ 10 µm and if the pixel value is ≥35 (Fv ≥ 3.5x10). The picture size, magnification and position of the cursor is also shown.

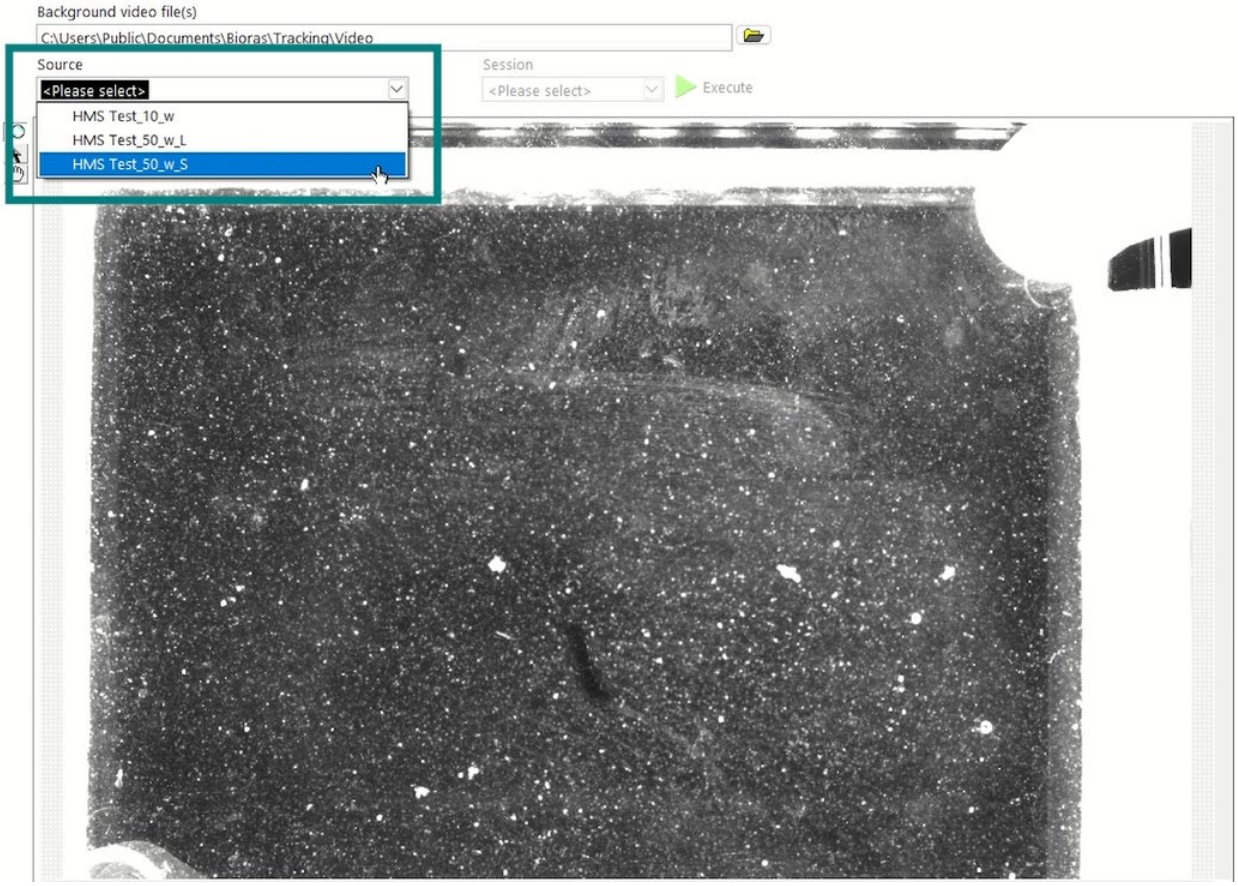


9.9 VIDEO REVIEW TOOL

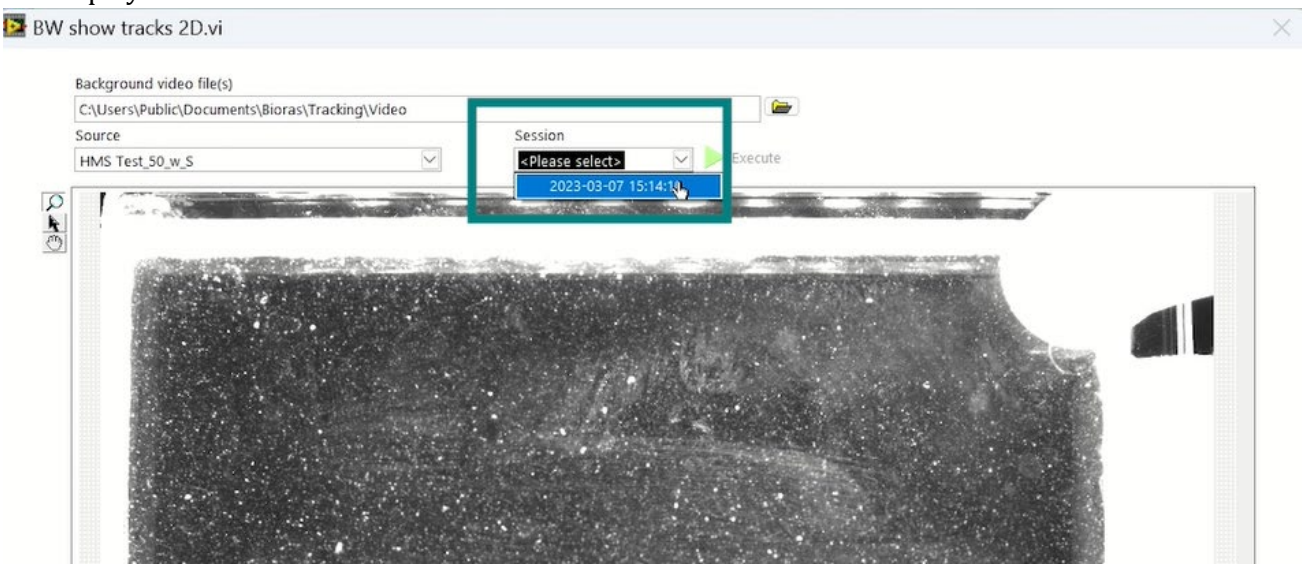


The video tool lets you review results that are based on tracking by overlaying tracks on the corresponding video. This requires that you have enabled video recording in the Configuration tool. This tool allows you to verify that tracks are truly based on swimming organisms and not artifacts such as drifting particles or bubble vibrations.

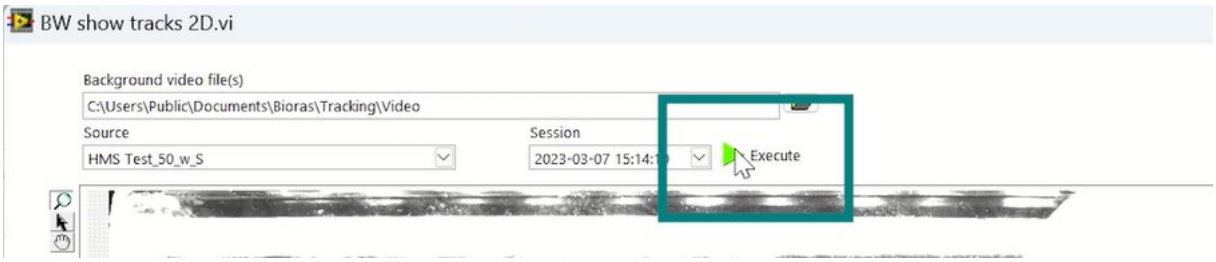
After running your test, you can select a video to review under Source:



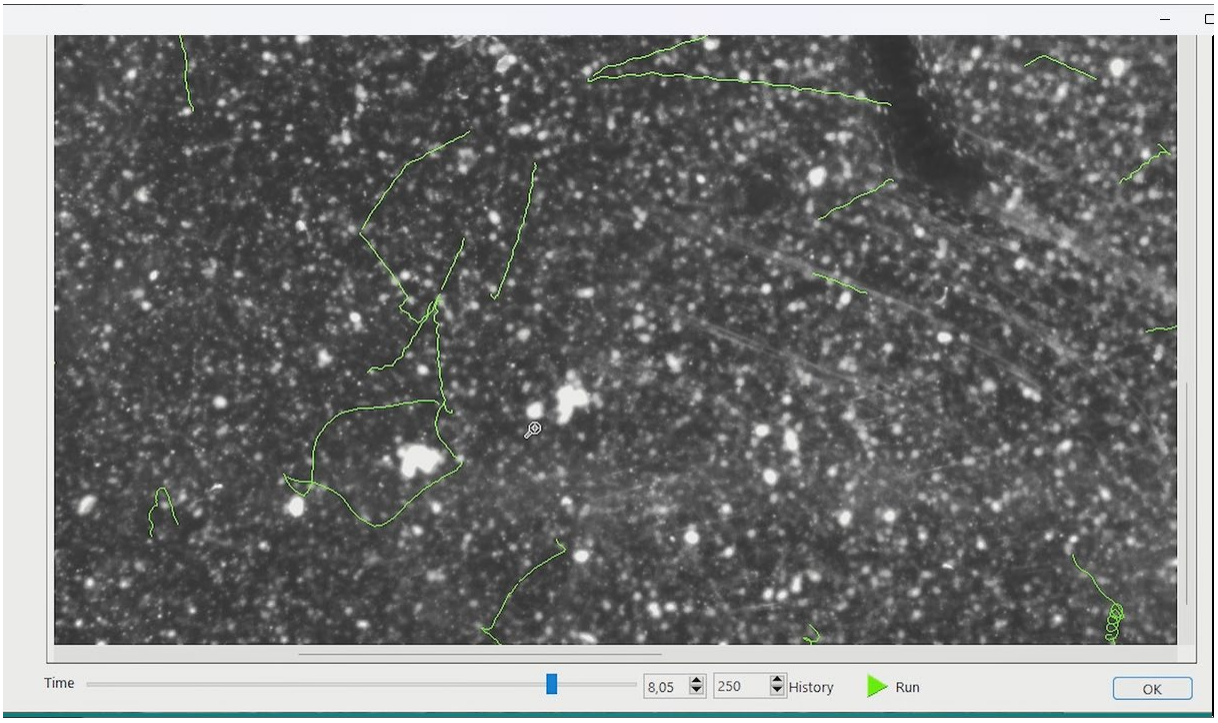
Under Session the sub sample to be reviewed must be selected. Only videos that contain registered tracks are displayed:



Click the green Execute arrow next to the Session selector to start the video review:

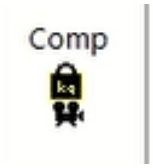


History is the length of the track tail that is displayed. The tracks are shown as green lines. You can manually scroll through the video using the Time scroll bar or click on the Run button to automatically play the video. Moving organisms are clearly seen as soon as the video starts running.



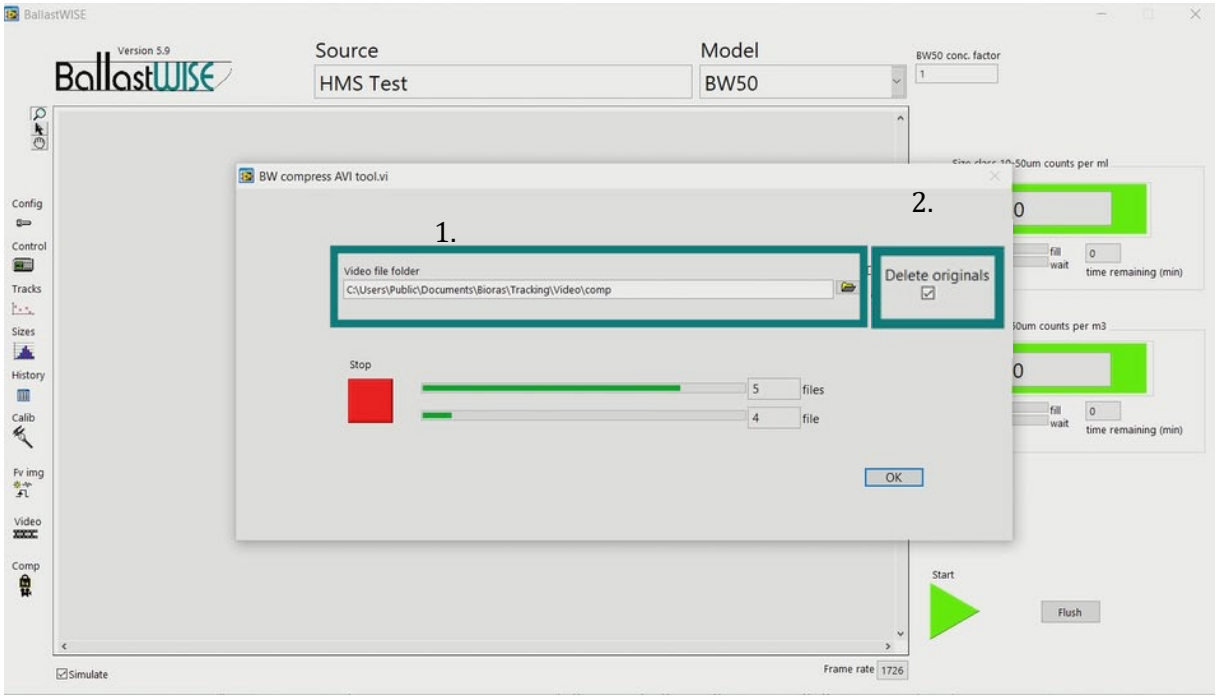
You can also zoom in and out using the Zoom tool (see section 9.1.1).

9.10 Compression AVI tool



The video compression tool is useful for storing the videos, or for sending the videos for an expert to review, as the un-compressed video files are large. The compression will remove some visual information, but it will reduce the storage size by about 20x. You can still use compressed videos in the Video Review tool.

1. Click the Compress tool in the toolbar, and then select the folder that contains the videos that you want to compress. The default video folder is shown. If you have moved videos to another folder, select it before starting the compression process.
2. Define if the original video should be deleted after compression.
3. Click on the Start button. You can stop or pause the compression anytime and continue afterwards.



10 TRAVELLING WITH BALLASTWISE

BallastWISE is a precision instrument that is sensitive to impacts, such as falling onto hard surfaces. BallastWISE is not designed to be shockproof.

When travelling by plane with BallastWISE it should be taken as hand luggage, and should NOT be checked in. Checked-in luggage will invariably be exposed to rough handling, which may cause damage to the instrument.



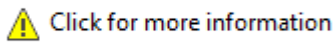


The BallastWISE filter unit does not contain any optical parts, and can be checked in when travelling by plane.

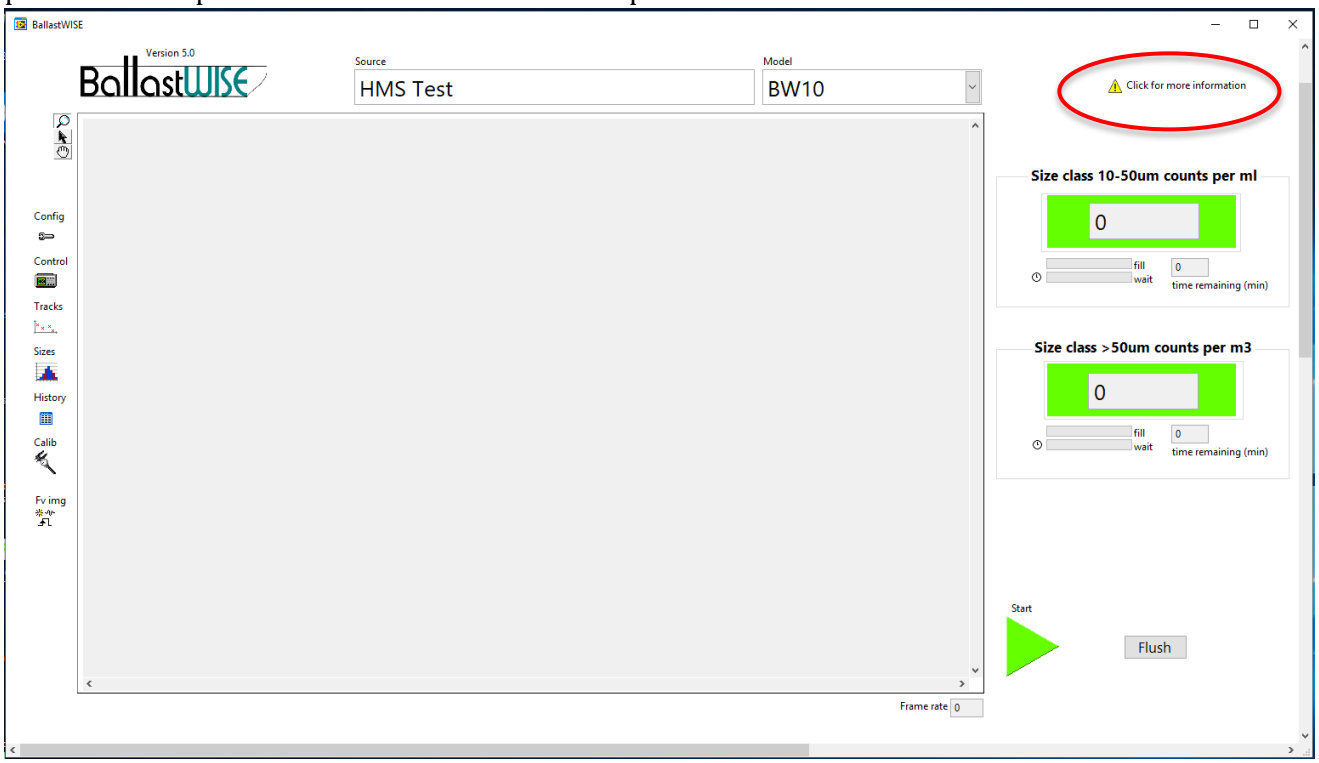
11 TROUBLESHOOTING

In case of an error, a warning icon will appear at the top right of the BallastWISE window. Click on it to get more information on what might be wrong. Below are some situations that might occur and how they can be fixed.

11.1 ALERT ICON



The Alert icon indicates a problem that prevents proper analysis. Click on the icon and read the error message carefully. Closing the error dialog will perform a reset of the system, which may solve the problem. If the problem continues restart the computer.



11.2 MISSING CAMERA OR SERIAL NUMBER MISMATCH

A camera has been replaced and needs to be registered.
A camera might need resetting under certain circumstances.
The Configuration was opened and saved without the USB connection and/or power.
In all cases, use the Config utility in the Tools menu to check or fix the problem.

11.3 SLOW PERFORMANCE

If you have a computer with a small SD drive and you save videos or accumulate data over a very long period of time, the hard disk will eventually fill up.

See disk status by right-clicking Windows C:drive in the file explorer and select Properties. The disk status will be shown. If the disk is full or almost full videos or data should be moved to another disk or deleted.

Where BallastWISE data is stored on the computer is described in Section 8 BALLASTWISE DATA STORAGE LOCATION

11.4 Bubbles in the BW50 chamber

Tiny bubbles of 1mm or so in diameter are no problem. If larger bubbles are seen, check for leakages in the chamber and/or tubing. Larger bubbles can cause false positive counts. .

11.5 Convection flow in chambers

If track images show any sign of convection flow (straight tracks moving in the same direction, around the edges of the chamber), it is usually because a tube is not placed correctly in the pump head, or the pump head is not properly closed. Make sure that the tubing fits into the tube guides and check that the tubes are pushed properly down into the pump head.

Convection flow can also occur due to wear. If the measuring chambers have been re-used for lab tests or during training sessions, the tubes may be worn-out. If so, replace the tubing immediately and repeat the test.

Tubes will eventually wear out where they are placed in the pumps and should be replaced every ten tests. Tubes can be detached and reversed to double their life span.

Always use new measuring chambers and tubes for critical tests.

12 TRAINING VIDEOS AND CERTIFICATION

The BallastWISE instruction videos can be found in the MicroWISE website:

https://microwise.eu/login/elearning/

COURSE 1: SETTING UP YOUR BALLASTWISE TEST

In this course, we will go through how to set up your BallastWISE test, from hardware to software. Once you have completed this course, you will be comfortable setting up the BallastWISE test.

COURSE 2 : RUNNING YOUR BALLASTWISE TEST

In this course, we will go through how to run your BallastWISE test, both hardware and software. Once you have completed this course, you will be comfortable running up the BallastWISE test on both large and small fractions.

COURSE 3: FILTERING YOUR BALLAST WATER

In this course, we will go through how to set up and run your MicroWISE filtration unit.

COURSE 4 : ADVANCED TOOLS FOR SUPERUSERS

While it is relatively simple to run a ballast water analysis with BallastWISE, the instrument also has more advanced tools which most users will not need. We recommend that there should be one superuser assigned for a given instrument, so they can adjust settings as needed.

TROUBLESHOOTING

Learn how to identify and solve problems, which otherwise could lead to faulty results in your ballast water analysis. This section is divided up into the possible issues, you may face.

BALLASTWISE END USER CERTIFICATION TEST

If you haven't already you should go through the BallastWISE tutorials above before starting this test.

The certification test can be found at: https://microwise.eu/login/elearning/