

OLYMPUS

Instructions

Sample Holders

OLYMPUS CIX100 Cleanliness Inspector System

Optical Microscope Accessory

English

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1 Sample holders for the OLYMPUS CIX100 Cleanliness Inspector System

1.1 Introduction

The OLYMPUS CIX100 Cleanliness Inspector System includes a sample holder for the inspection of particles on filter membranes with a diameter of 47 mm. With optional additional accessories, filter membranes of different diameters (25 mm, 47 mm and 55 mm) with either white or black background, particle traps and tape lift samples can be analyzed in your CIX100 system. This manual describes how to integrate each of these optional sample holders and sample types to your CIX100 system for optimal usability.

1.2 Intended use

All sample holders and accessories mentioned in this manual are intended for the inspection of technical cleanliness. It is mandatory to follow the sample preparation procedure for each type of sample, which is described according to the applications and the standard used. Follow the mounting instructions for each sample type as outlined in this manual. All sample holders are designed for use under normal environmental conditions. Use under oxidative or acidic environmental conditions as well as high temperatures should be avoided.

1.3 About these instructions

These instructions are part of the documentation for the OLYMPUS CIX100 Cleanliness Inspector System. Further information about the operation of the OLYMPUS CIX100 Cleanliness Inspector System can be found in the CIX100 System Setup Guide and in the CIX ASW software documentation. Read all of the other instructions for the components of the system carefully.

1.4 Available sample holders and sample types

E9701689 HW-CIX-FH-25B

E9701690 HW-CIX-FH-47B

E9701691 HW-CIX-FH-55B

E9701692 HW-CIX-FH-25W

E9701591 HW-CIX-FH-47W

E9701592 HW-CIX-FH-55W

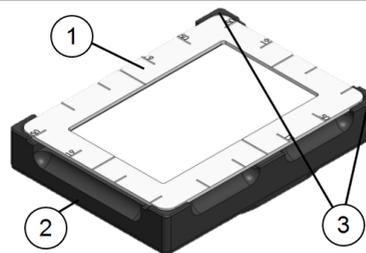
Sample type name in CIX ASW software:
uncovered membrane



- (1) clamp
- (2) desk (white or black)

E9701695 HW-CIX-HTL

Sample type name in CIX ASW software: **tape lift**



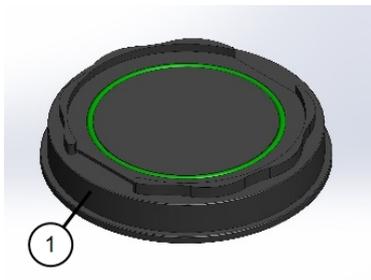
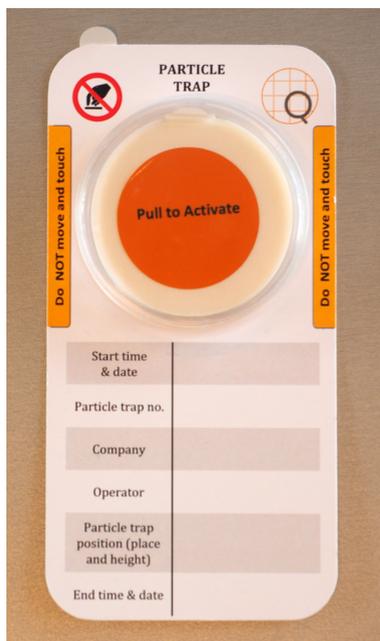
- (1) metallic frame with marks for tape widths 50 mm and 19 mm
- (2) black base with white surface
- (3) back side marked with dots

E9701696 HW-CIX-HPT

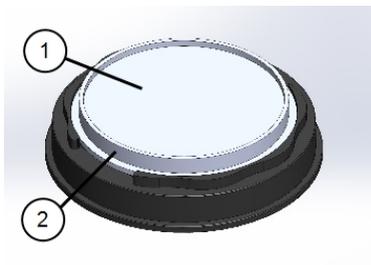
Sample type name in CIX ASW software: **particle trap**

E9701688 HW-CIX-PT-10

Particle traps



- (1) Black base with a green rubber as sample stabilizer



- (1) Open particle trap with sticky surface
- (2) Plastic container

The following table gives an initial indication of which sample holder is recommended for which application in the CIX100 system.

Article number	Article code	Short article description	Examples of application fields
E9701689	HW-CIX-FH-25B	Holder with black desk for filter membranes with 25 mm diameter	Holdings with black background can be used to inspect all opaque membranes- for example cellulose nitrate.
E9701690	HW-CIX-FH-47B	Holder with black desk for filter membranes with 47 mm diameter	The main advantage of the holders with black background is that they do not have any coating making them resistant when aggressive solvents are used.
E9701691	HW-CIX-FH-55B	Holder with black desk for filter membranes with 55 mm diameter	
E9701692	HW-CIX-FH-25W	Holder with white desk for filter membranes with 25 mm diameter	Holdings with white background can be used to inspect all opaque membranes.
E9701591	HW-CIX-FH-47W	Holder with white desk for filter membranes with 47 mm diameter	The white coating can be damaged by aggressive solvents. The main advantage of the white background holders is the inspection of woven membranes without showing artifacts from the holder when looking through the mesh.
E9701592	HW-CIX-FH-55W	Holder with white desk for filter membranes with 55 mm diameter	
E9701695	HW-CIX-HTL	Holder for tape lift inspection	Investigation of cleanliness in which the particles are lifted from the surface with an adhesive tape..
E9701696	HW-CIX-HPT	Holder for particle trap inspection	Environment analysis by monitoring particles depositing on a particle trap in a defined time. The particle traps compatible with CIX100 are not included.

OLYMPUS CIX100 Cleanliness Inspector System

E9701688	HW-CIX-PT-10	Particle traps	Particle traps can be used to monitor and collect particle contaminations in the working environment with a defined exposure time. The particle traps can be ordered as a box of ten traps.
E9701694	HW-CIX-SIFP	CIX100 alternative stage insert (not compatible with sample holders listed above)	This stage insert is a flat plate which can be mounted to the CIX100 stage. This is useful when CIX100 is to be used for metallurgy. The samples can be placed on top of this flat plate.

2 Safety

For all samples used in the CIX100 system, make sure to follow all the instructions concerning size and weight specified in the System Setup Guide. Please read the CIX100 System Setup Guide carefully before using your CIX100 system or installing new hardware to your system.

2.1 Symbols and safety instructions



The exclamation mark and the word ATTENTION indicate situations where irreparable damage to the product can occur if ignored.



The warning sign and the word CAUTION indicate dangerous situations that can lead to light injuries if ignored.

! ATTENTION

Device damage through overloading the stage

The maximum permitted load of the stage must not exceed 2 kg. Overloading the stage can hinder the movement of the stage or damage the microscope. Make sure that the weight of the stage insert (e.g. multi-sample holder), samples and sample holders (e.g. filter holder) in total does not exceed the maximum permitted weight of 2 kg.

! ATTENTION

Device damage from oversize or unsuitable samples

Samples that exceed the maximum permitted height can damage the lenses or the stage. Make sure that the height of the sample doesn't impair the movement of the objectives. Do not use any samples that prevent the free movement of the nosepiece and the installed objectives. Pay attention to the different lengths of the objectives when moving the nosepiece. Make sure that the sample does not protrude the sides of the microscope stage.

! ATTENTION

When the CIX100 stage is moved or the objective is changed, make sure that the objectives do not touch the sample or sample holder at all. This is particularly important when a new sample type has been mounted.

! ATTENTION

When the stage is moved, either actively by the user or automatically by the system, make sure that the current sample and sample holder do not impede the movement of the stage. When the CIX100 software is used or the joystick is used to control the stage movement, make sure that nothing hinders the movement of the system.

! ATTENTION

When mounting or unmounting a sample, please make sure that the stage is moved such that the distance between objectives and sample position you are working on is maximized. Before returning control of your system to the software again after changing a sample, make sure that the distance between stage Z-position and range of motion for the objectives is sufficient for all XY-positions of the stage.

! ATTENTION

Make sure that the filter desk of the filter holders and the white surface of the sample holder for tape lift samples are clean and free of dust. Do not touch these surfaces directly to avoid fat transmission. If necessary, clean the surfaces with compressed air or with a dust free lens paper and a few drops of alcohol. Please pay attention to the safety instructions for the substances applied.

 CAUTION**Pinching hazard!**

When the stage moves, gaps appear. This creates a pinching hazard. Make sure that you are not within the stage's range of movement when it is moving. Try never to put your hands or fingers into any gaps.

3 Setup of OLYMPUS CIX100 Cleanliness Inspector System at time of delivery

The CIX100 system is delivered in a state ready for the inspection of dark and reflective particles on white, matt filter membranes.

The standard filter holder for membranes of 47 mm diameter is included and can be used directly with a filter membrane. Also, all other filter holders where the filter is not covered can be directly used in your CIX100 system without recalibration. The sample type is referred to as uncovered membrane. Additional filter holders can be ordered. Two filter holders can be mounted to your CIX100 system simultaneously.

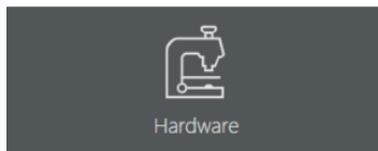
For convenient use of samples with different reflectivity than a matt white filter membrane, e.g. made of cellulose nitrate, it is sensible to redo the white balance calibration. Whether a white balance recalibration is recommended can be seen when the filter membrane is inspected in the regular inspection workflow. If the surface of the filter membrane has a bluish cast, the white balance calibration should be redone on a clean section of the filter membrane.

No other change in the software settings is to be done for the inspection of uncovered membranes.

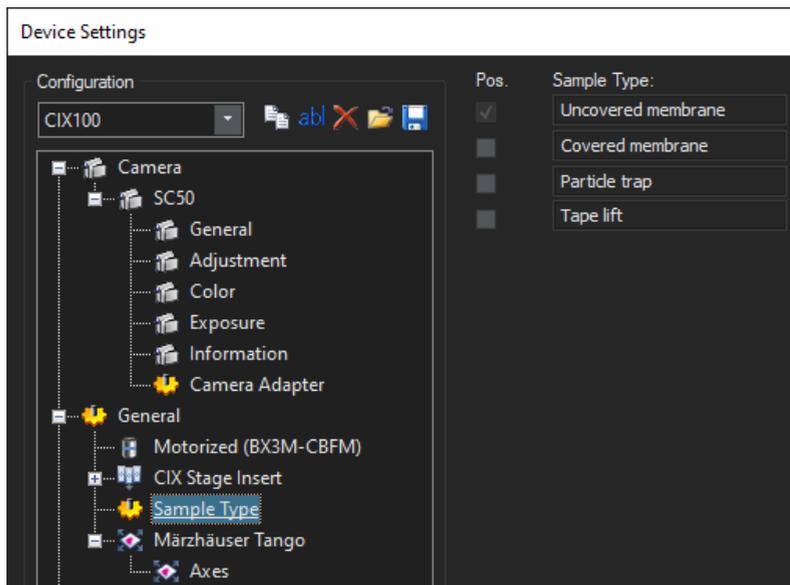
4 Adding new sample types to your CIX100 system

For adding new sample types (available with CIX ASW software version number 1.5.2 or higher), please make sure to log into CIX ASW software as administrator. Then you have full access to the system configuration on the start page of your CIX ASW software.

1. On the start page, click the [Hardware] button.



- The [Device List] dialog box opens.
2. Click the [OK] button.
 - The [Device Settings] dialog box opens.
 3. In the [Device Settings] dialog box, select the [Sample Type] entry.



- On the right, you find a list of possible samples. [Uncovered membrane] refers to the standard precalibrated filter membrane

sample, which is always activated in the CIX100 system.

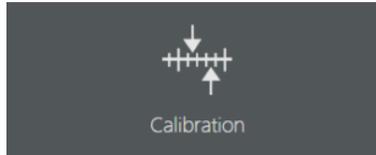
4. Select the appropriate other sample type or types you want to activate. If you are unsure, please compare with the list of sample types and holders you find on page 4 of this manual and click [OK].

Pos.	Sample Type:
<input checked="" type="checkbox"/>	Uncovered membrane
<input type="checkbox"/>	Covered membrane
<input type="checkbox"/>	Particle trap
<input checked="" type="checkbox"/>	Tape lift

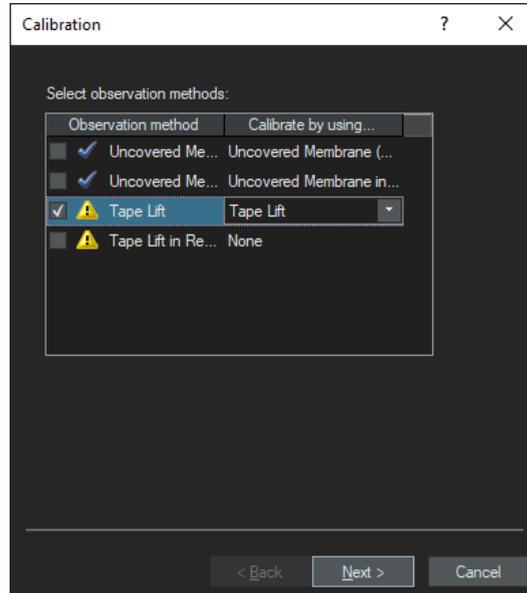
5 Calibrating Shading Correction for a new sample type

Please make sure to log into the CIX ASW software as administrator. Then you have full access to the system configuration on the start page of your CIX ASW software. Insert a clean cellulose membrane to your system with one of the sample holders. Calibrate the stage limits with this sample as described in the CIX ASW software's help.

1. On the start page, click the [Calibration] button.

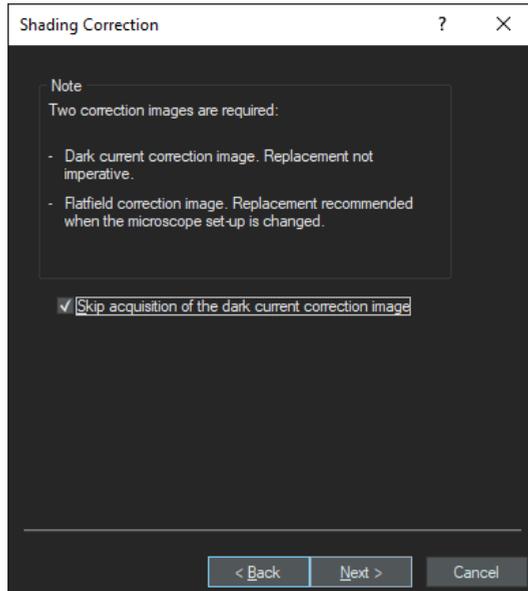


2. In the [Calibrations] dialog box, select [Shading Correction] and click [Calibrate].
 - In the following dialog box, you find a list of observation methods. In your CIX100 system, each observation method represents a list of software settings optimized for the analysis under specific optical conditions. Each sample type requires its own observation method. If your system is equipped with a real color slider, two observation methods will have to be calibrated for each sample type for optimal results. The observation method with real color slider is named after the particle type appended with "in Real Color Mode" and is always listed below the observation method for the respective particle type without real color slider.

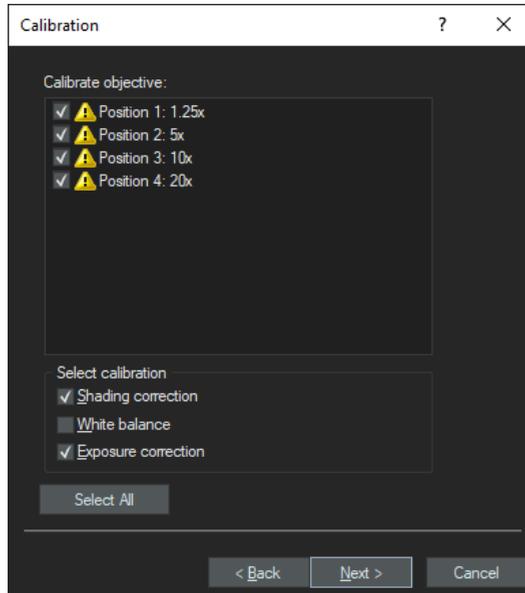


- Each observation method is marked with a tick if the shading correction has been performed already and marked with a yellow exclamation mark if the shading correction is still missing.
3. Select an observation method which is still undefined. If you start on top, you will start with the new sample type without real color slider selected. Click [Next>] to continue.

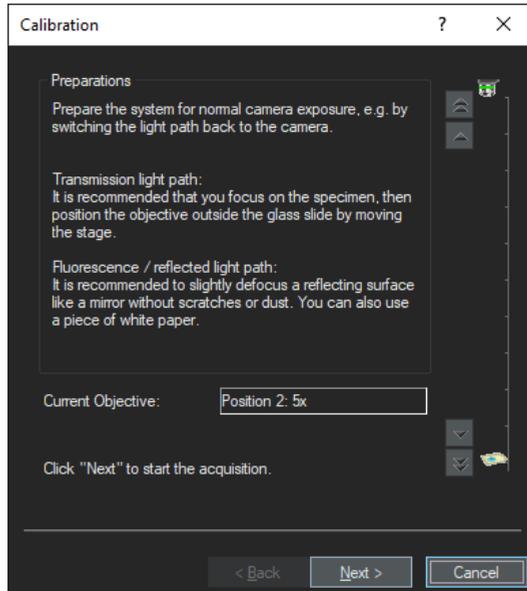
4. Skip the acquisition of the dark current correction image. The dark current calibration does not need to be repeated here as it was already calibrated during installation (i.e. keep the check box checked) and click [Next>].



5. Select all check boxes in the following dialog except [White Balance] and click [Next >].
 - All objectives your CIX100 system is equipped with are listed in this dialog and must be calibrated. Standard objectives are 1.25x, 5x and 10x.

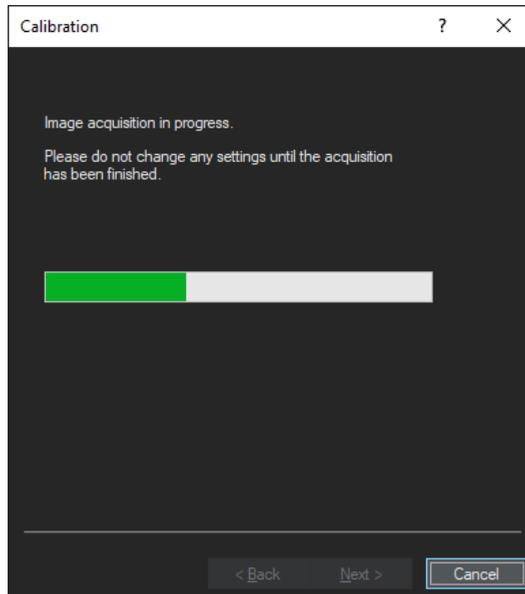


6. Go to an empty part of the sample and defocus such that no structures are visible any more on the display area on the left side.



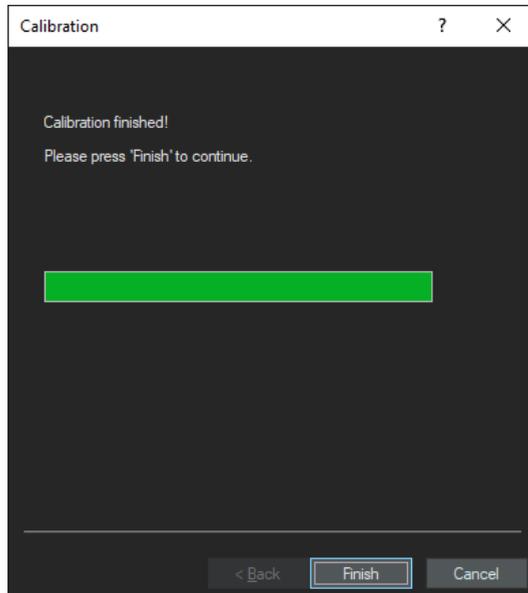
Usually, this can be done by moving the stage a low position of the Z-range. A Z-movement can either be performed by joystick or by the buttons in the "Calibration" dialog box. The relative position of the sample in the calibrated Z-range is displayed on the right side.

7. Click [Next>] to allow the system to acquire the correction images for all objectives in your system.
 - A green bar indicates the progress. Do not change any settings until the acquisition has been finished.

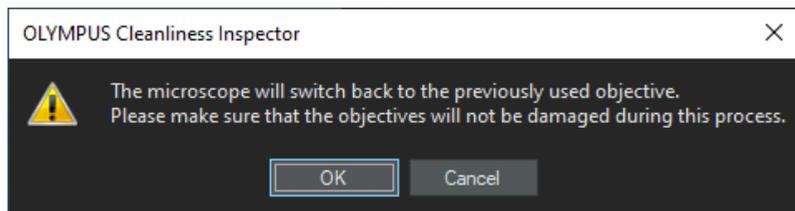


8. Follow the software instructions in the dialog box and click [Next >] to continue with the following objective.

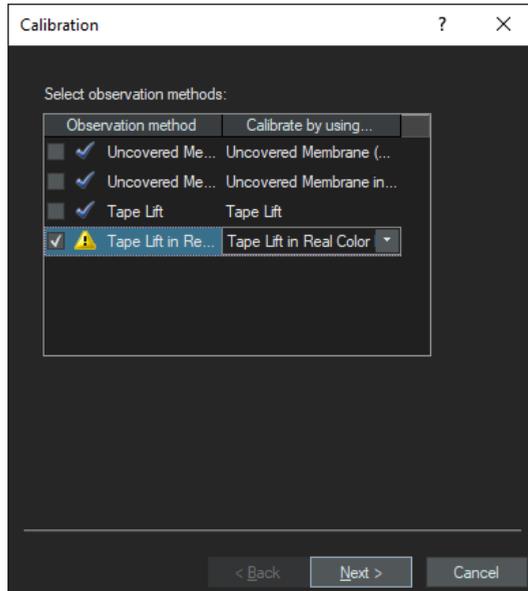
9. Click [Finish] when all images have been acquired.



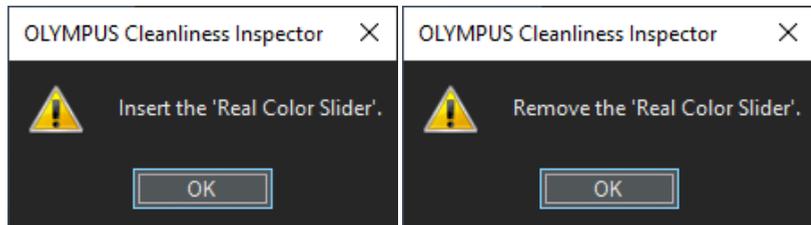
10. Follow the instruction in the message and click [OK].



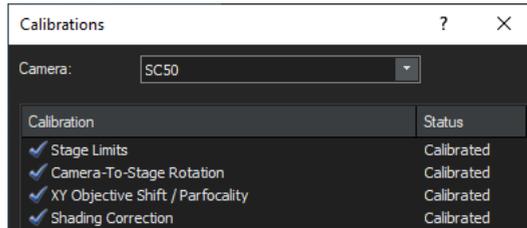
- Repeat these calibration steps until the shading correction is calibrated for all observation methods listed in the calibration dialog box.



Whenever the Real Color Slider is applied for a calibration, the system will remind you to insert or remove the real color slider with a pop-up window. Please follow these instructions and click [OK] after you have inserted or removed the slider.



12. When the process is finished successfully, the [Shading Correction] entry will be marked with a blue tick in the [Calibration] dialog box indicating that a white balance has been performed for all observation methods now.



6 Calibrating White Balance for a new sample type

Make sure to log into the CIX ASW software as administrator. Then you have full access to the [System configuration] on the start page of your CIX ASW software. Calibrate the stage limits as described in the CIX ASW software's help. Insert the new sample type with the new sample, which you activated in the [Hardware] > [Device List] > [Device settings] dialog box as described in chapter "Adding new sample types to your CIX100 system" on page 13. These may be

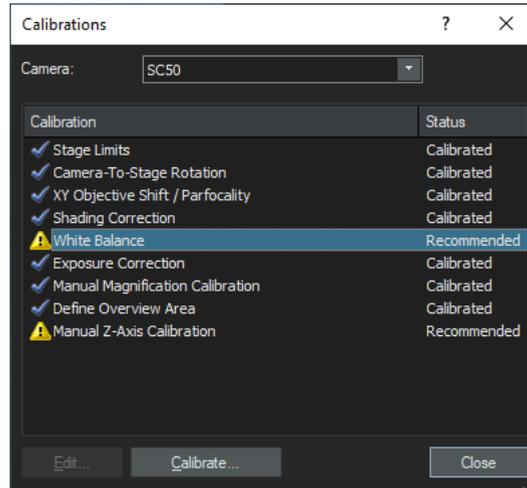
- tape lift,
- particle trap, or
- covered membrane.

For a list of samples and applications, please refer to chapter "Available sample holders and sample types" on page 5 of this manual.

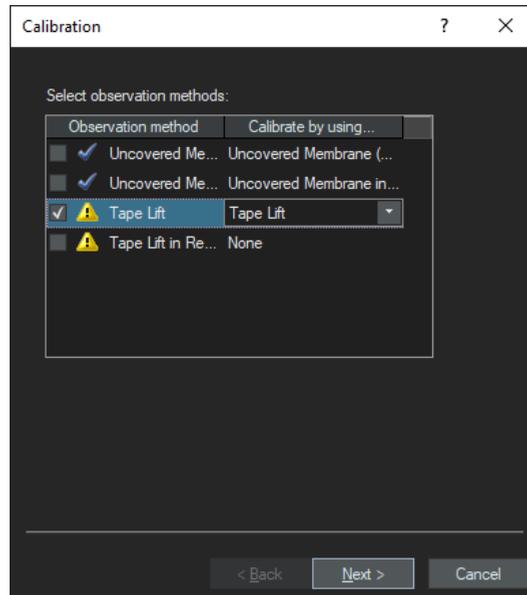
1. Click the [Calibration] button on the start page of CIX ASW.



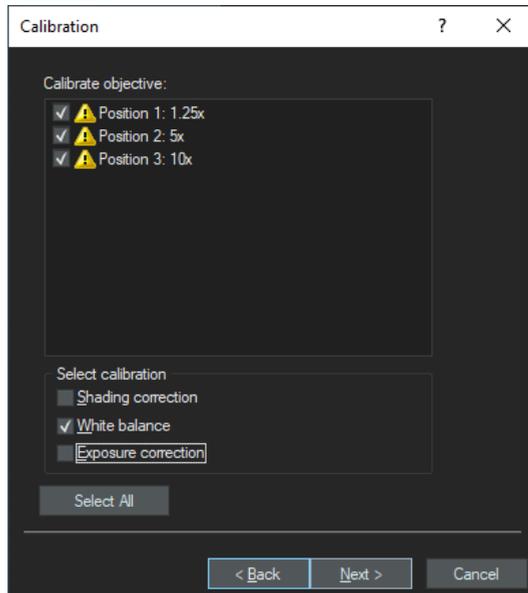
- If the white balance is not yet calibrated for all sample types and observation methods, [White Balance] will be marked with a yellow exclamation mark.



2. Select [White balance] and click [Calibrate].
 - In the following dialog box, you find a list of observation methods. In your CIX100 system, each observation method reflects a list of optimized software settings for the analysis under specific optical conditions. Each sample type requires its own observation method. If your system is equipped with a real color slider, two observation methods will have to be calibrated for each sample type for optimal results. The observation method with real color slider is named after the particle type appended with "in Real Color Mode" and is always listed below the observation method for the respective particle type without real color slider.

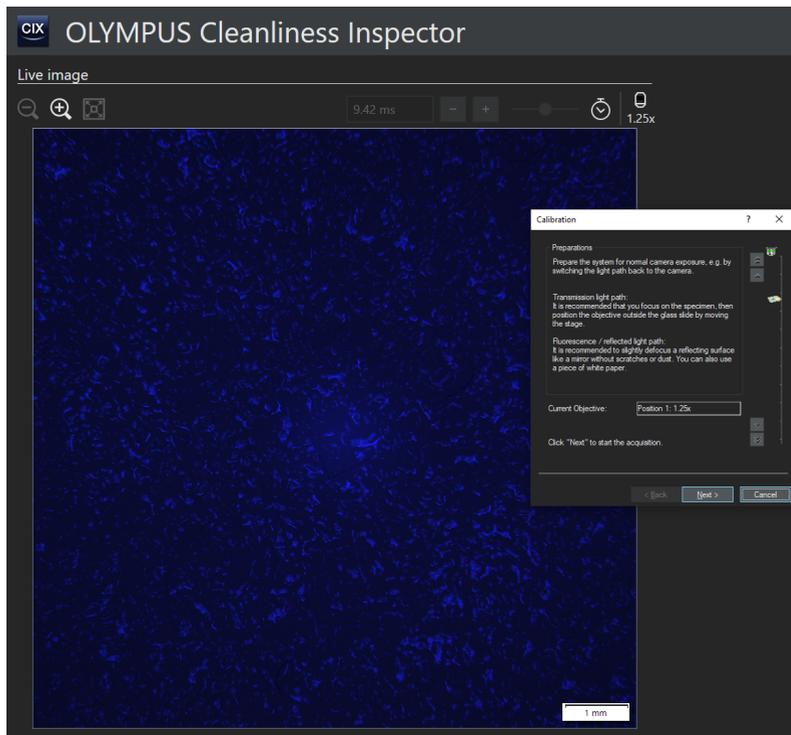


- Each observation method is marked with a tick if the white balance has been performed already and marked with a yellow exclamation mark if the white balance has not yet been performed.
3. Select an observation method which is still undefined. If you start on top, you will start with the new sample type without real color slider selected.
 4. Make sure that the matching sample type is mounted. If not, carefully mount the sample following the safety instructions in the chapter "Safety" on page 9.
 5. Click [Next>] to continue.
 6. Skip the acquisition of the dark current correction image. Dark current calibration does not need to be repeated here as it was already calibrated during installation (i.e. keep the checkbox selected) and click [Next>].
 7. Select all check boxes in the following dialog except [Shading Correction] and [Exposure Correction] and click [Next >].

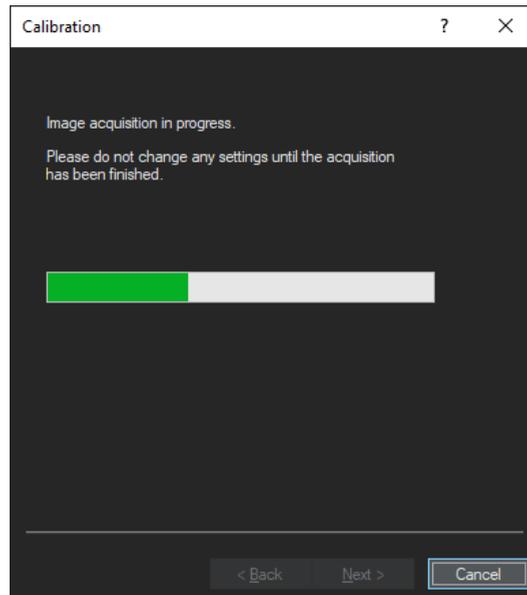


8. All objectives your CIX100 system is equipped with are listed in this dialog box and must be calibrated. Standard objectives are 1.25x, 5x and 10x.

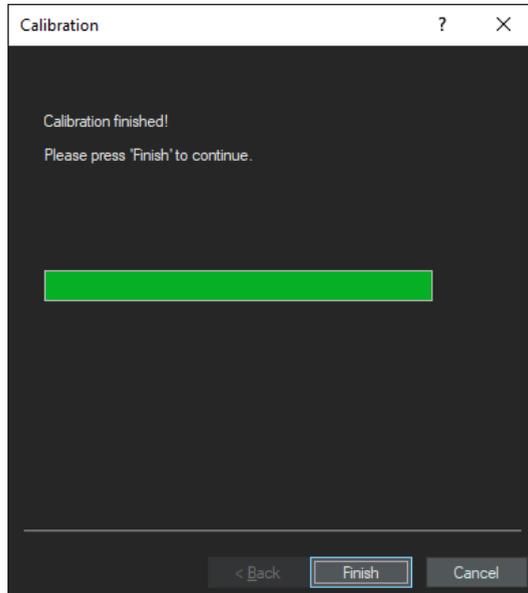
9. Approximately focus the sample and image a clean part of sample without any particulate contamination.



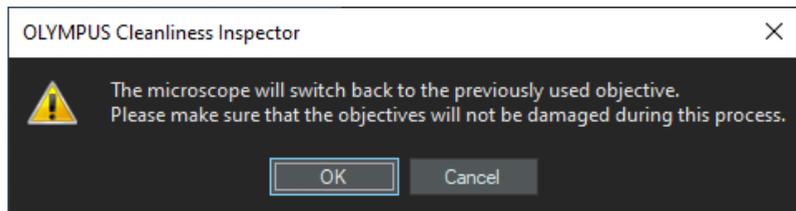
10. Follow the instructions of the pop-up windows until all images are acquired.
 - A green bar indicates the progress. Please do not change any settings until the acquisition has been finished.



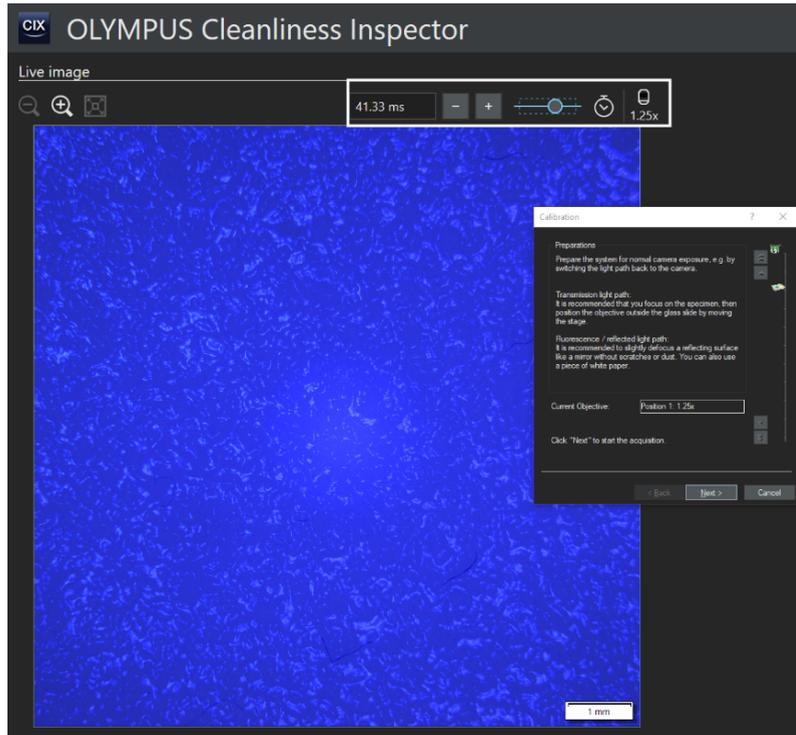
11. Click [Finish] when all images have been acquired.



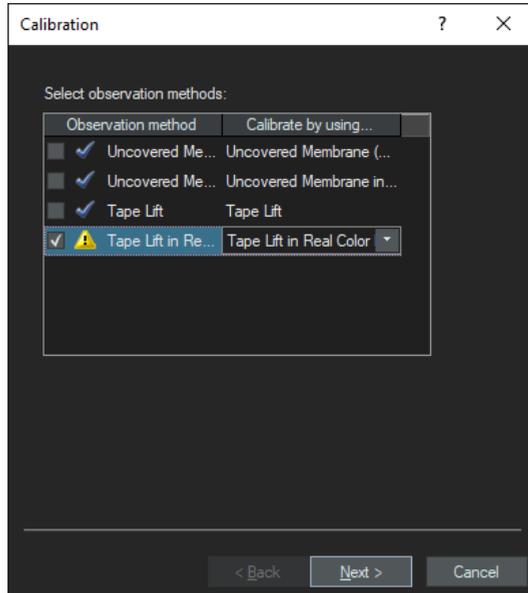
12. Follow the instruction and click [OK].



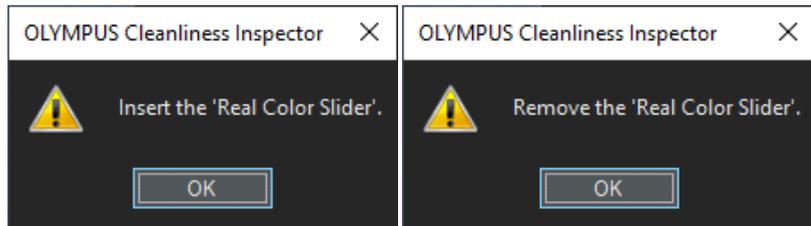
13. If the sample was underexposed for a certain objective, repeat the process for the respective objective and increase the exposure time before acquiring the image.



14. Repeat these calibration steps until the white balance is calibrated for all observation methods listed in the calibration dialog box.



Whenever the Real Color Slider is applied for a calibration, the system will remind you to insert or remove the real color slider with a respective pop-up window. Please follow these instructions and click [OK] after you have inserted or removed the slider.



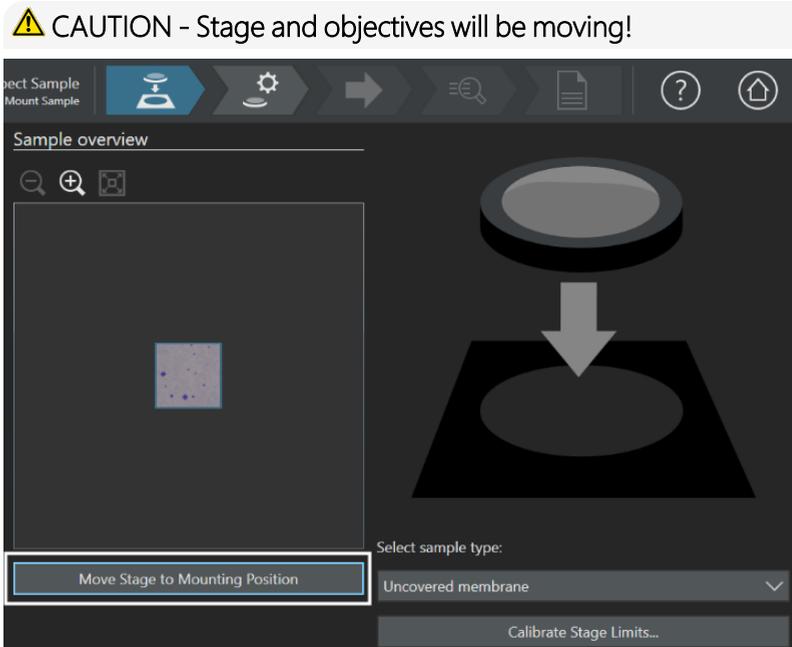
15. When the process is finished successfully, the [White Balance] entry will be marked with a blue tick in the [Calibration] dialog box indicating that a white balance has been performed for all observation methods now.
16. Now it is recommended to perform the [Check System] workflow.

7 Performing an inspection with different sample types with a CIX100 system

Before starting an inspection with a sample type other than uncovered membrane, please make sure that all steps listed in this manual have been followed carefully, i.e. [Shading Correction] and [White Balance] calibration have been performed for each observation method.

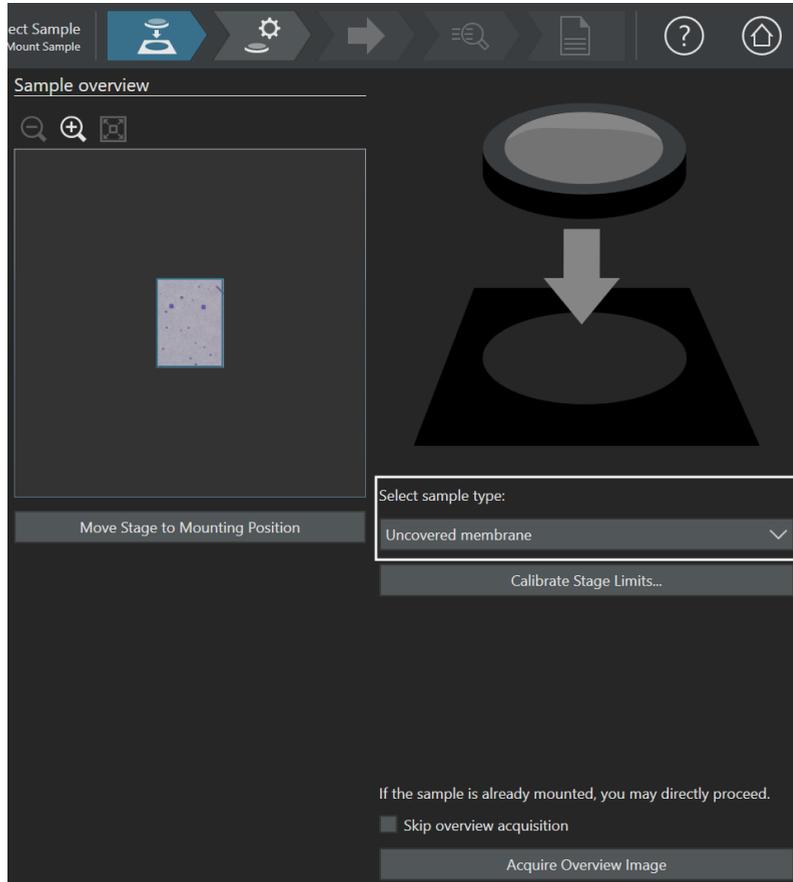
Here, only the steps in a standard inspection configuration are explained which are specific when new sample types have been added to the system. For all other functionality of your CIX100 software, please refer to the CIX ASW software's help.

1. Start a sample inspection.
2. If you want to change the sample, select [Move Stage to Mounting Position].



3. Mount your sample. Be careful to only mount samples suitable for the stage limit calibration that was calibrated before, i.e. the sample must not hit the objective during the stage movement back to the initial inspection position.

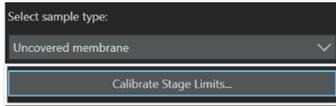
- Having activated additional samples in the [Hardware] > [Device List] > [Device Settings] dialog box, each of these new sample types will be listed in a drop down menu. Select the sample type you are currently using. By default the last sample type used with your CIX100 system will always be activated here.



Usually, it is not necessary to calibrate stage limits in this dialog box when EVIDENT CIX100 accessories are used. If you have trouble finding the autofocus during the [Inspect Sample] workflow, it may still be useful to recalibrate the stage limits at this step for optimal calibration for your sample type. A recalibration will modify the Z-range movement.

To do this, click [Calibrate Stage Limits].

 **CAUTION - The stage is moving!**



Follow the instructions given by the dialog box and described in the CIX ASW software's help. For a recalibration of Z, mark [Z Axis] in the appropriate step. After the calibration, your system automatically returns to the [Mount Sample] step of your inspection workflow.

Now you are ready to continue with your sample inspection. For details, please refer to the CIX ASW software's help.

8 Best Practices for the versatile sample holders for your CIX100 system

For your convenience, all sample holders have been designed such that a stage limit calibration with the standard filter holder for filter membranes will also be applicable to other sample types.

If your usual application does not use the standard filter holder, it is recommended to do the stage calibration, which is compulsory every time the system starts, using your preferred sample holder.

8.1 Mounting and inspection of filter membranes in the CIX100 system

A filter membrane inspection is the standard application of a CIX100 system. 6 different filter holder types for different sizes of filter membranes and backgrounds of the membrane are available. They are all used identically.

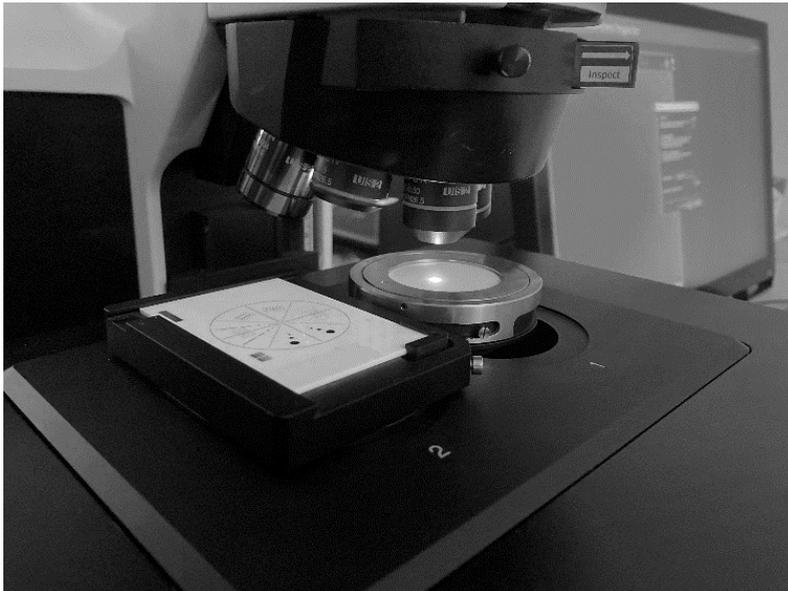
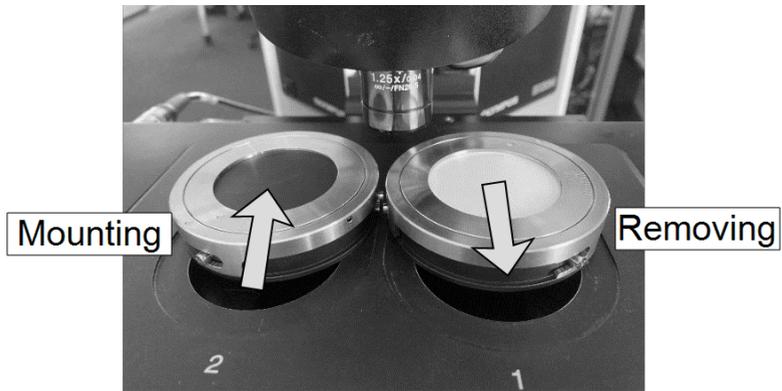


To open the filter holder, rotate the clamp, remove any filter from the desk, place a new filter centrally on the desk.

Then slide the filter holder into sample position 1 of the CIX100 stage insert by placing it at the front of the stage insert and sliding it backwards.

If two filters are to be inspected in a row, place the second filter in the same way at sample position 2 (left) of your stage insert.

To remove the holder, slide it to the front and then lift the holder.



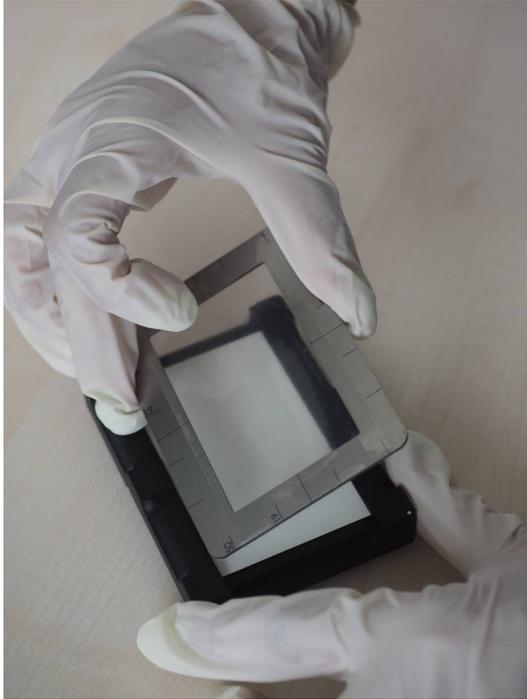
8.2 Mounting and inspection of tape lift samples in the CIX100 system

It is recommended to follow the instructions described in the ASTM E1216-11 standard reapproved in 2016 for tape lift inspection with the CIX100 system. The recommended type of tape is 3M No. 480. It is not guaranteed that other types of tapes can be used with the CIX100 system.

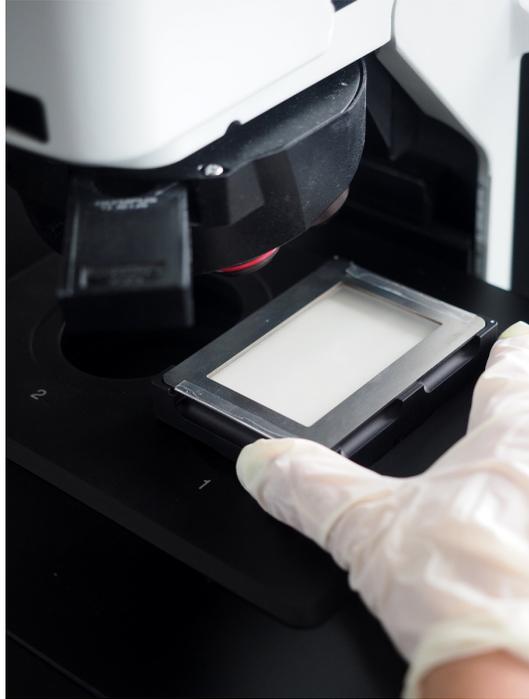
1. To mount the tape to the sample holder, place the frame on the holder such that the markings 50 and 19 face upwards.



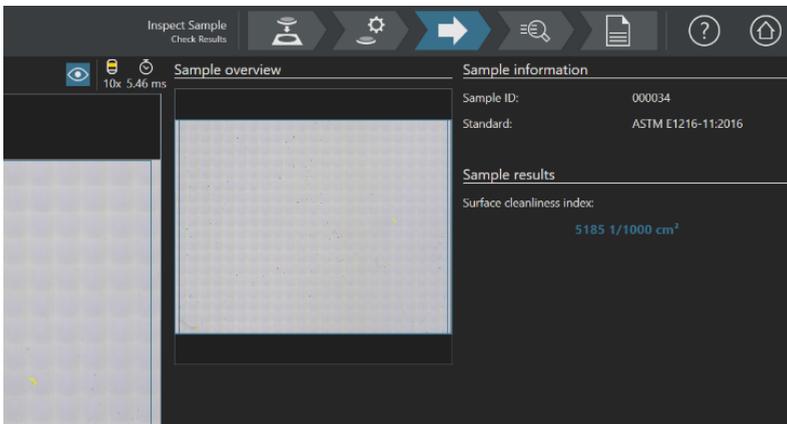
2. Glue the tape to the frame such that the 50 mm wide tape is inside the respective markings. Make sure that the sample is as flat as possible and be careful not to stretch the tape while mounting.



3. After mounting cut protruding sections of the tape.
4. Rotate the frame such that the sticky side of the tape faces upwards. The frame is secured by magnets.
5. Slide the tape holder into the CIX100 stage insert in position 1 in the same way as the standard filter holder. The dots imprinted in the sample holder base should be at the rear of the stage.



If a rectangular inspection area is to be used, specify this in the inspection configuration. Also, a fixed inspection area size can be defined in the inspection configuration.

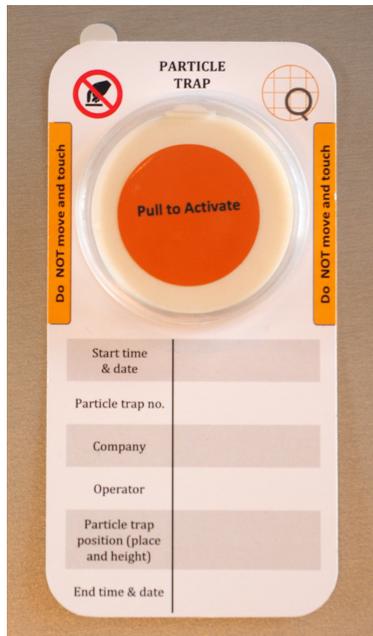


8.3 Mounting and inspection of particle trap samples in the CIX100 system

Only use particle traps recommended by EVIDENT for application in the CIX100 system. The “HW-CIX-HPT” holder is specifically for use with the “HW-CIX-PT-10” particle traps, which is a pack of ten traps.

Having gathered and fixed particles on the trap by following the instructions given on the particle trap card board, remove the trap from the card board and open the trap container before starting inspection.

Put the particle trap on the holder as it's shown in the images. The provided green rubber on the holder stabilizes the sample during inspection and protect it from any possible movement.









9 Exchanging the stage insert of a CIX100 system for metallurgical applications

When wanting to inspect metallurgical samples, it may be sensible to exchange the stage insert with a stage insert without openings for sample holders. When wanting to remove the stage insert, follow all instructions given in the stage manual.

Push the stage insert to the front left (towards the red dot marking) and subsequently lift the stage insert starting with the right back edge.



Be careful not to affect the clamps fixing the stage insert.

When placing samples for metallurgy on the stage, keep in mind that the Z-range might not be suitable for the sample height. Carefully follow all safety instructions.

Detailed information regarding the stage insert can be found in the manual delivered by the stage insert itself.

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