Struers
Ensuring Certainty

# Imaging Package with Perfect Image 10

## For PSM-5/-10 Microscopes

Instruction Manual

**Original Instructions**

CE

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# Table of Contents

# 1 About this manual

This Instruction Manual guides you to:

- Assemble the Imaging Package for the PSM-5/-10 Microscope (microscope not included).
- Install the Perfect Image software.
- Use the Perfect Image software and the camera in your daily operations.

### About the Instruction Manual for the PSM-5/-10 Microscope

The present Instruction Manual does not apply to the PSM-5/-10 Microscope. Read the individual Instruction Manual for the PSM-5/-10 Microscope before use.

**Note**
Struers equipment must only be used in connection with and as described in the Instruction Manual supplied with the equipment.
Read the Instruction Manual carefully before use.

# 2 Imaging Package – case contents


- Aluminum case with foam-protective lining
- 10-inch touch pad with 64 GB capacity and Perfect Image Lite software
- 3MP USB-3 camera
- Other accessories, see the overview image ►6.

The case has 2 tiers, top and bottom.

At the top, the tablet, complete with the preinstalled Perfect Image software, is protected by a removable divider.

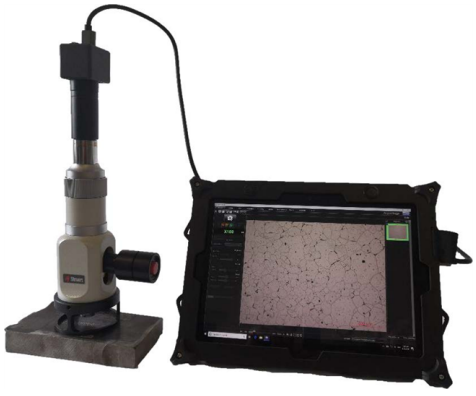
The bottom of the case houses the camera and all of the image capture accessories:


| | |
|---|---|
| **A** | USB 3/USB C 1.8m cable |
| **B** | UK electric adaptor |
| **C** | Touch pad power cable |
| **D** | US electric adaptor |
| **E** | 3MP USB-3 camera |
| **F** | 0.5X camera adapter |
| **G** | 32 GB USB key for image exports (USB C/USB A) |
| **H** | Installation key (software, drivers, licence, manual) |
| **I** | Calibration plate |
| **J** | Support strap |

# 3 Installation

## 3.1 Installation of Imaging Package (hardware)

1. Place the PSM-5/-10 Microscope (not included) on a stable surface to ensure safe operation.



2. Attach a lens to your microscope.

3. Place the microscope on the "tripod" or your XY table.

4. Check that the lighting is equipped with a battery (red switch).
5. Gently pull and twist to remove the microscope eyepiece, and store it directly in the case.

6. Slide the 0.5X camera adapter into place, replacing the eyepiece you just removed.
   A small set screw can be used to ensure a tight adjustment (small hex key).


7. Screw the camera on to the C mount (fine thread).
8. Plug one end of the USB cable into the camera, and the other into the touch pad.
9. Switch on the tablet.
10. Switch on the microscope light.
11. Launch Perfect Image (see Installation of Perfect Image (software) ►8).
12. Adjust the microscope focus by turning the grey nut.

## 3.2 Installation of Perfect Image (software)

### 3.2.1 Connect the camera to the computer with Perfect Image

**Note**
Make sure that the light for your optical equipment functions correctly and is sufficiently powerful, or adjust the lens aperture setting to provide a clearly visible live image.

1. Connect the camera to the computer's USB 3 port.
2. Run the file "Perfect Image.exe" (click or double click on the file).

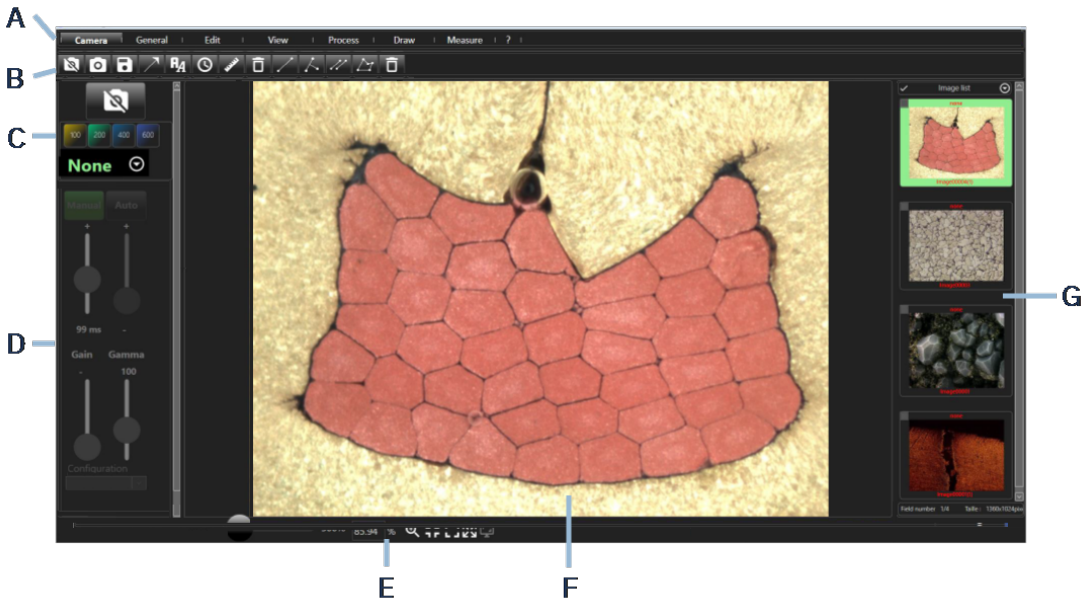
   The file is located in the C:/STRUERS directory.
3. The camera connects automatically to the computer.

For customization of settings for image storage, user preferences etc., see Camera settings ►11

# 4 Get started in the Perfect Image software

## 4.1 Overview

### Main window




**A** Menu bar

**B** Toolbar

**C** Panel for
– image capture
– calibration
– camera setup

**D** Camera settings, white balance

**E** Zoom bar, display adjustment, image storage path

**F** Main window: live image or image selected from the **Image list**

**G** **Image list** with a thumbnail panel of captured images

### 4.1.1 The toolbar

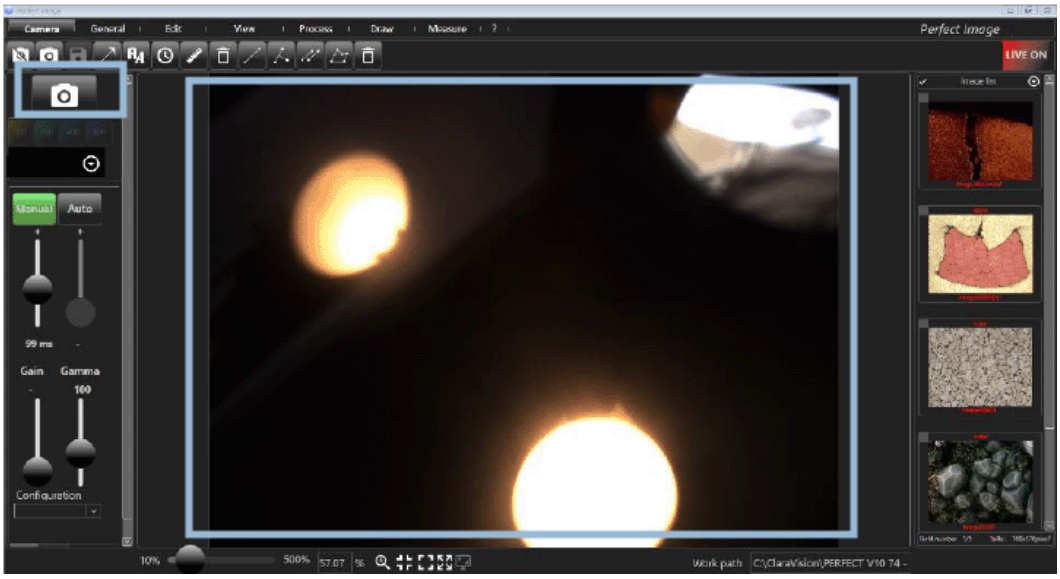
The toolbar gives you access to the most frequently used functions when you work on the images, and is located just below the **Menu bar**.

The toolbar groups together useful tools during your work.

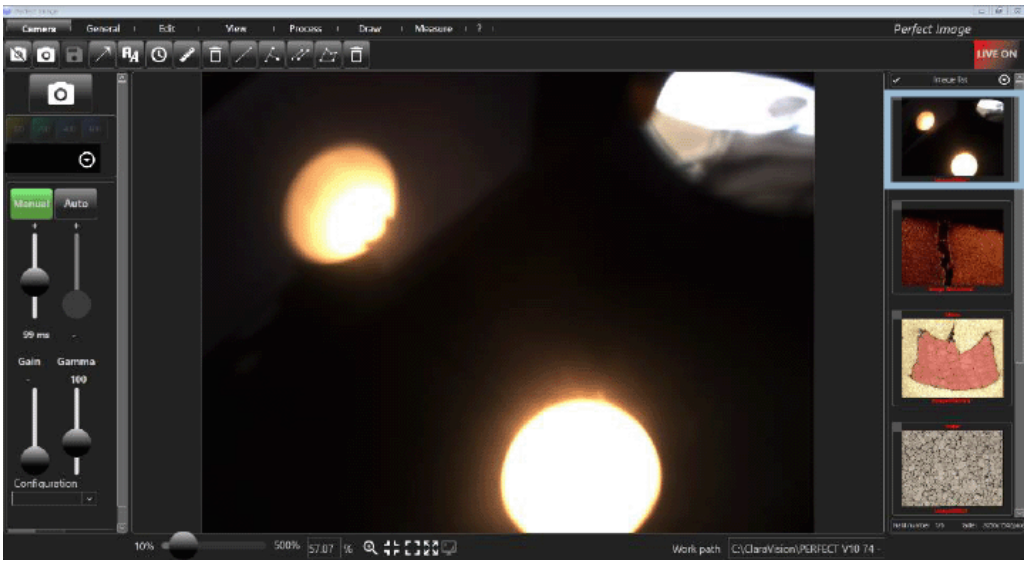
| Icon | Description |
|---|---|
|  | Inactive/active camera |
|  | Save the image |
|  | Overlays tools. See Overlay tools ►34. |
|  | Measures tools. See Measurement tools ►33. |
|  | Clear all overlays or measures on the image |

## 4.2 Capture your first image

1. Select the **Camera** tab from the **Menu bar**.
2. In the left-hand panel on the screen, click the **Capture** button to shoot what you see in the main window.



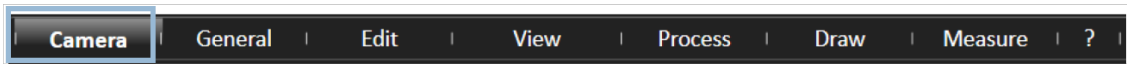

3. The image appears on the right hand **Image list** on the screen.




For more a more extensive description of the capture process, see Image capture ►27.

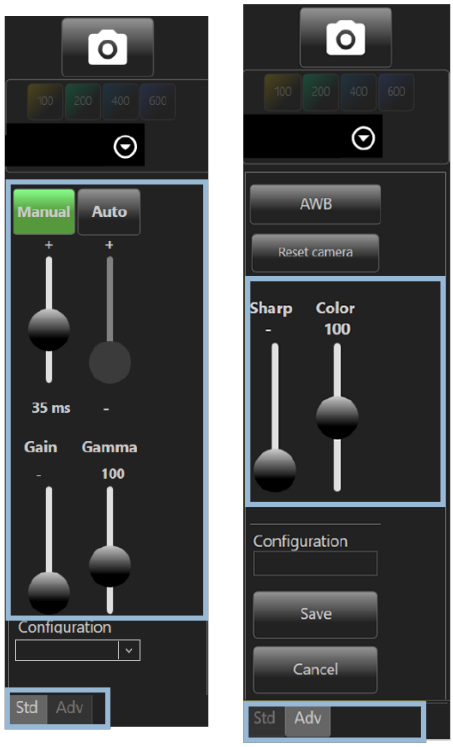
# 5 Camera settings

In the **Camera** menu, you can adjust a range of settings to optimize the image.




### Menu overviews

The menus and options highlighted in these images are explained in the rest of this chapter.




## 5.1 Standard or advanced settings

On **Std** for "standard" and **Adv** for "advanced" at the bottom of the camera settings panel, you can either choose to have standard or advanced settings.

The standard configuration is empty when you install the software, and you save your choices along the way to create your standard settings for Automatic White Balance (**AWB**), drawing and text properties, and configuration.

In the advanced configuration, you get access to settings for sharpness and color.

## 5.2 Brightness

The controls for adjusting brightness are located in the left-hand panel.

Use the sliders to adjust the settings.

### Manual

Manual brightness adjusts the exposure time of the camera (1 to 90 ms). The required time depends on the light source settings.

- At 1 ms the image will appear very dark or even black.
- At 90 ms the image may be overexposed.

### Auto

Automatic brightness makes it possible to set a desired level of illumination.

With automatic brightness you can achieve a regular level of brightness on all of your images, regardless of the light source strength.

The Perfect Image software compensates for the level of illumination:

- by increasing the contrast gain if the light is too low
- by decreasing the contrast gain if the light is too bright.

## 5.3 Contrast/image

Use the sliders to adjust the settings.

### Gain

This raises or decreases the camera's electronic sensitivity.

**Note**
High values can result in 'noise' to the image.

### Gamma

This brightens relatively dark areas on an image without overexposing areas that are already well lit.

### Sharp

This increases line sharpness, adjust the slider **Sharp**

**Note**
Increasing the sharpness can introduce 'noise' to the image.

### Color

Affects color intensity.

- The lowest values represent levels of gray.
- The higher the value, the greater the color vibrancy.

## 5.4 Automatic White Balance

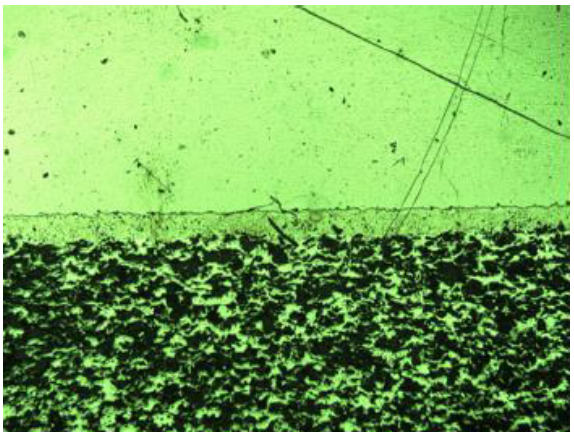
You can set the white balance for a series of images captured under the same conditions, or for separate images. Either do this automatically on **AWB**, or do it manually on the drop-down button.

1. Select **Camera** from the **Menu bar**.
2. In the left-hand panel on the screen, click the **Capture** icon.

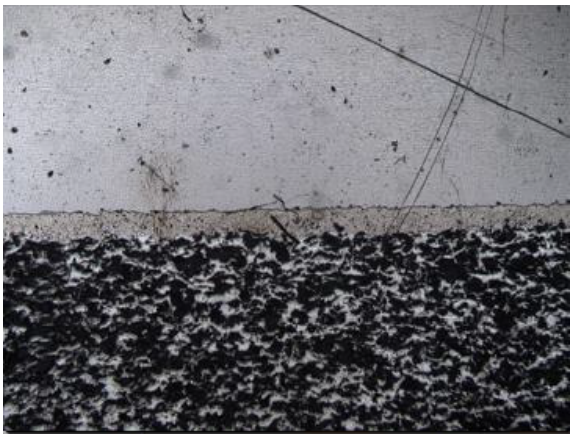
3. If needed, click **Std** at the bottom of the camera settings panel to access the settings.
4. Click on the drop-down button.


5. Click on **AWB**.
6. The button turns green.


**Before using AWB**



**After using AWB**



7. If needed, click on **Reset camera** to reset the camera to its default settings.

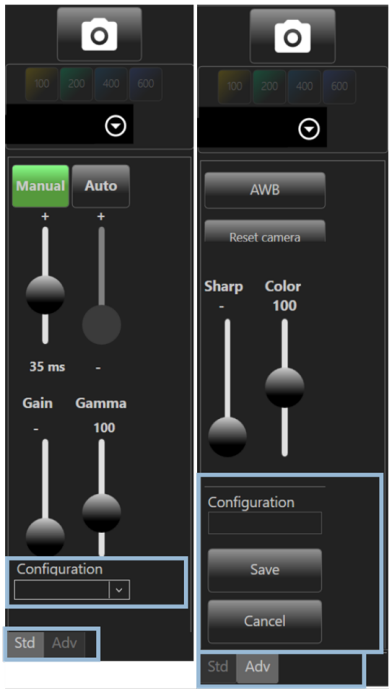
## 5.5 Save a camera configuration

You can store your new settings as configurations.

1. In the **Menu bar**, select **Camera**.
2. Create the new configuration as described.

   – To adjust the brightness, select **Std** (for "standard").

   – To adjust other settings for contrast and image (e.g. sharpness, color), select **Adv** (for "advanced").




3. In the field **Configuration**, enter a name of your choice.


**Hint**
Choose a specific name that is meaningful for later use. This makes it easier when you toggle between different configuration.

4. Click on **Save**.

### Select a stored camera configuration

1. To select a configuration you wish to apply on an image, select **Camera** from the **Menu bar**.
2. In the field **Configuration**, select a configuration from the drop-down list of available configurations

   All the memorised settings in the selected configuration are now applied automatically to all of your live images.

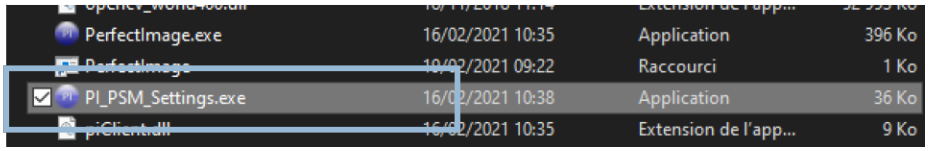
# 6 User preferences

You can customize the settings for image storage, tool display, shading etc.

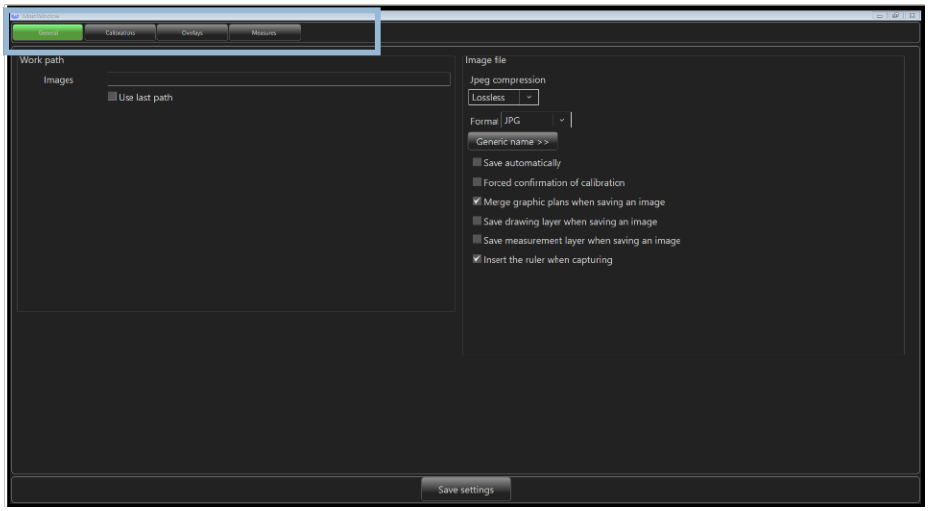
**Hint**
Set up your user preferences before using Perfect Image. If needed, change your preferences and relaunch the software.

Access the preference menu directly from File Explorer.

1. Click on PI_PSM_Settings.exe.




2. A window opens showing 4 menus, **General**, **Calibrations**, **Overlays** and **Measures**.

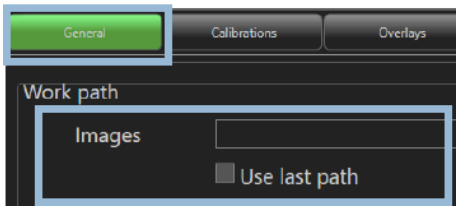



## 6.1 Define general settings

### Specify storage paths

In the menu **General**, you can specify a storage directory for all images, for example a network server directory.

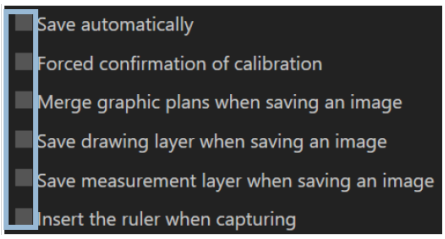
- To systematically store files in the most recent directory you have selected., use the check-box **Use last path**.




- Double-click on **Images** to indicate a personal or network directory.

**Hint**
The following check boxes are checked by default:
- **Merge graphic plans when saving an image**
- **Insert the ruler when capturing**

### Check-boxes with options




| Settings | Description |
|---|---|
| **Save automatically** | Enable the check box to save the image automatically. You will be prompted to enter a name for the image you wish to store. |
| **Forced confirmation of calibration** | Enable the check box to deactivate the magnification buttons. |
| **Merge graphic plans when saving an image** | Enable the check box to save and merge the different graphical elements on the image with the image. These elements can no longer be edited. |
| **Save measurement layer when saving an image** | Enable the check box to save the graphical elements with the image, but as a separate layer in a separate file. These elements can be edited. |
| **Insert the ruler when capturing** | Enable the check box to display a ruler over each image during image capture. |
| **Images** | You can define a storage folder (for instance a network server folder) for all images.<br>Enter the path of the folder you wish to use. |
| **Use last path** | Enable the check box to store the images in the most recently used folder |

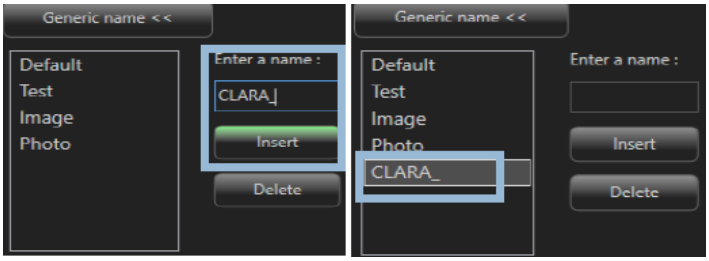
## 6.2 Define generic file names

You can create generic names that will be suggested when you save your images, such as **Image**, **Test**, **Photo** or a client or an operator name.

When you are prompted with a generic file name, you can add more text to the name, for instance an index number, to identify each image.

1. Select the menu tab **General**.
2. Click on **Generic name**.

   The options are shown on the screen.
3. Specify the required name, such as "CLARA_1".

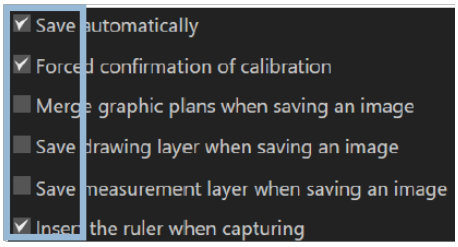



## 6.3 User preferences – examples

1. Select the menu tab **General**.

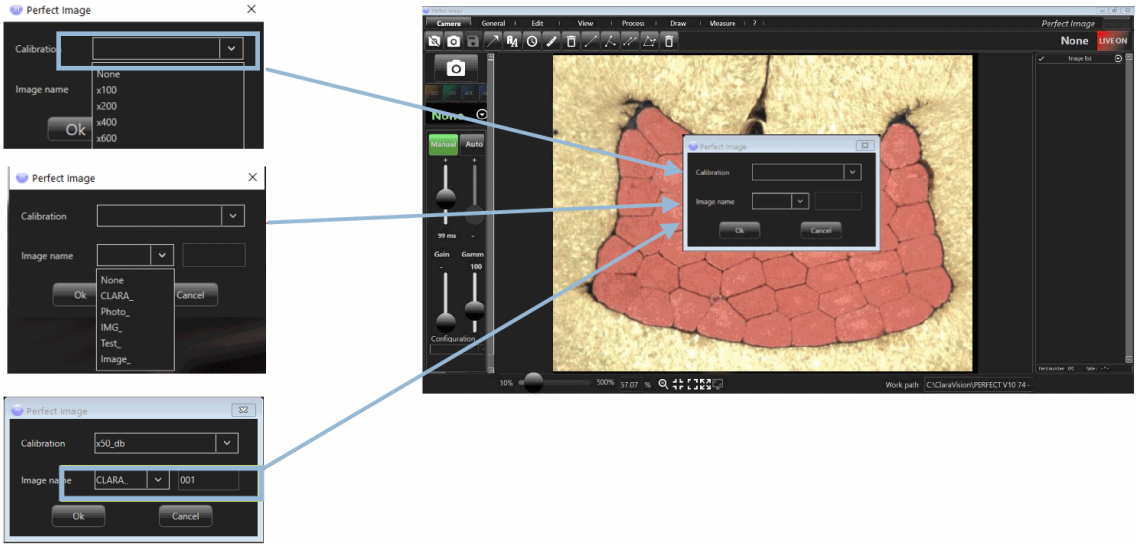
   In this example, certain preferences have been selected:

- **Save automatically**
- **Forced confirmation of calibration**
- **Insert the ruler when capturing**



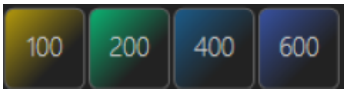

When you capture a live image, you will be prompted to select the following:

- The calibration used for the current image (x100, x200, x400, x600...).
- The generic name for the image. If needed, enter an index number like 001 or another type of identification.

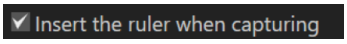



## 6.4 Calibration preferences

You can assign calibrations to these shortcut buttons:




Display the ruler systematically over your images when you capture them. See also Define general settings ►16.

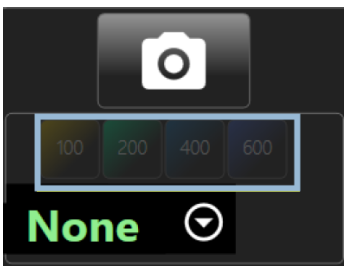


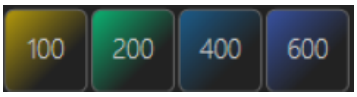

See more detailed info on calibration in Calibration ►37.

## 6.5 Magnification buttons – x100 to x600

This feature improves the usability of Perfect Image and avoids errors when you capture images.

The magnification buttons are grayed out at first and can be activated during image capture.






### Assign calibrations to the magnification buttons

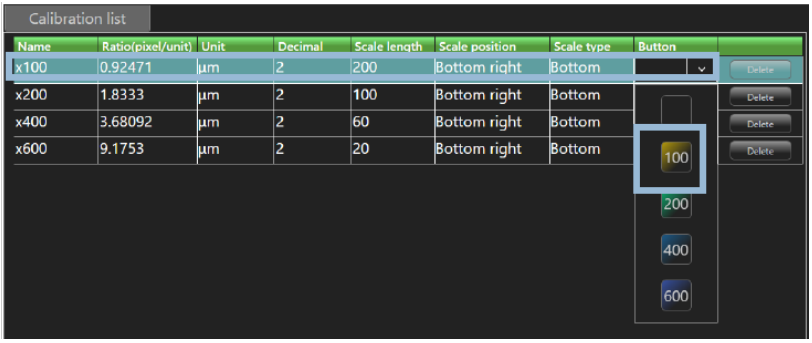
When you assign calibrations to the magnification buttons, you can also configure other functions for each of the buttons. See Button configuration ►21

1. Select the preference menu option, then click on **Calibrations**.


   The available calibrations are listed in **Calibration list**.

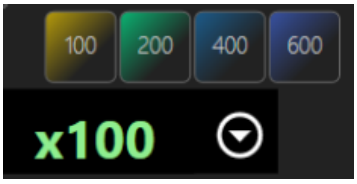
2. Select the row of the calibration you wish to assign to a magnification button.
3. Click in the cell in the selected row in the column **Button**.

   The magnification buttons are shown in a drop-down list. Unavailable buttons are grayed out.




4. Click to select the desired magnification.

   When the buttons are assigned to a magnification, they are highlighted in the menu **Camera**.




5. Repeat the operation for each of the buttons, as needed.

| Name | Ratio(pixel/unit) | Unit | Decimal | Scale length | Scale position | Scale type | Button | |
|---|---|---|---|---|---|---|---|---|
| x100 | 0.92471 | µm | 2 | 200 | Bottom right | Bottom | X100 | Delete |
| x200 | 1.8333 | µm | 2 | 100 | Bottom right | Bottom | X200 | Delete |
| x400 | 3.68092 | µm | 2 | 60 | Bottom right | Bottom | X400 | Delete |
| x600 | 9.1753 | µm | 2 | 20 | Bottom right | Bottom | X600 | Delete |

Before you close, it is important to configure other functions for each of the buttons. See Button configuration ►21.

6. Select **Save settings** to save and exit the procedure.

## 6.6 Button configuration

### Overview of calibration settings

1. Select the preference menu option and click on **Calibrations**.

   The available calibrations are listed in **Calibration list**.

| Name | Ratio(pixel/unit) | Unit | Decimal | Scale length | Scale position | Scale type | Button | |
|---|---|---|---|---|---|---|---|---|
| x100 | 0.92471 | µm | 2 | 200 | Bottom right | Bottom | X100 | Delete |
| x200 | 1.8333 | µm | 2 | 100 | Bottom right | Bottom | X200 | Delete |
| x400 | 3.68092 | µm | 2 | 60 | Bottom right | Bottom | X400 | Delete |
| x600 | 9.1753 | µm | 2 | 20 | Bottom right | Bottom | X600 | Delete |

The calibration names, their pixel/unit ratio, unit, number of decimals, scale length, scale position, scale type, and the button to which they are assigned, can all be edited here, as described below.

### Change the measurement unit

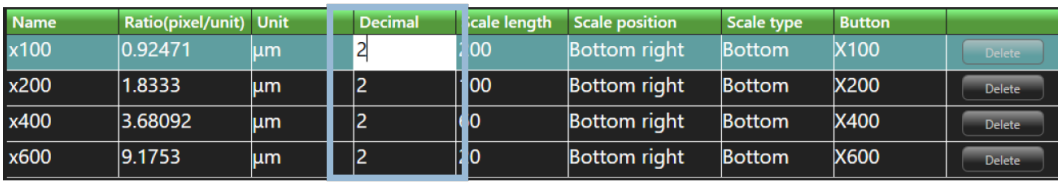
You can assign a different unit to a calibration for instance from mm to µm or from mm to cm.

1. Select the row of the calibration where you wish to change the display unit.
2. Click in the relevant cell in the column **Unit**.
3. In the drop-down list, click to select the most appropriate unit for the image being analyzed.

| Name | Ratio(pixel/un | Unit | ecimal | Scale length | Scale position | Scale type | Button | |
|---|---|---|---|---|---|---|---|---|
| x100 | 0.92471 | µm | 2 | 200 | Bottom right | Bottom | X100 | Delete |
| x200 | 1.8333 | µm | 2 | 100 | Bottom right | Bottom | X200 | Delete |
| x400 | 3.68092 | mm | 2 | 60 | Bottom right | Bottom | X400 | Delete |
| x600 | 9.1753 | cm | 2 | 20 | Bottom right | Bottom | X600 | Delete |
| | | inch | | | | | | |
| | | feet | | | | | | |

### Change the number of decimals displayed

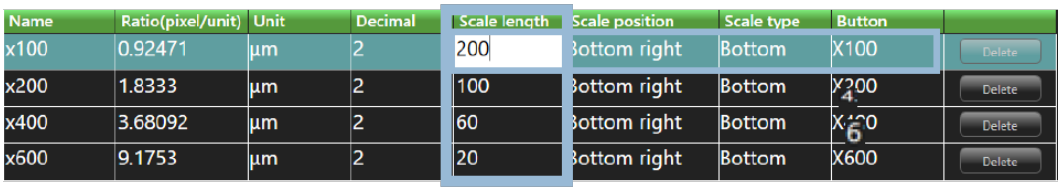
1. Select the row of the calibration where you wish to change the number of decimals used.
2. Click in the relevant cell in the column **Decimal**.
3. Enter the number of decimals you wish to use.




### Select scale length, position and type

1. Select the row of the calibration where you wish to change the number of decimals used.
2. Click in the relevant cell in the column **Scale length**.

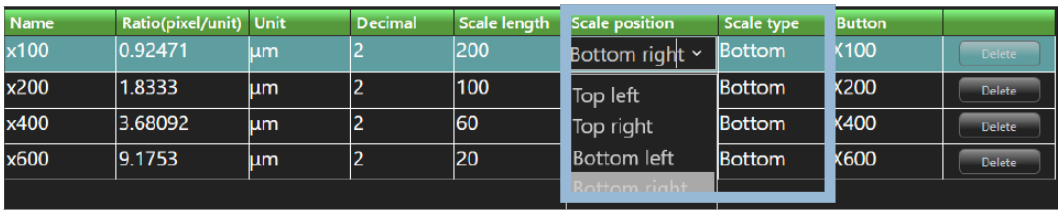
   To change the scale length, it is often preferable to use rounded scale lengths, with factors of 2 or 5 (e.g. 10, 20 mm, or 50 µm).



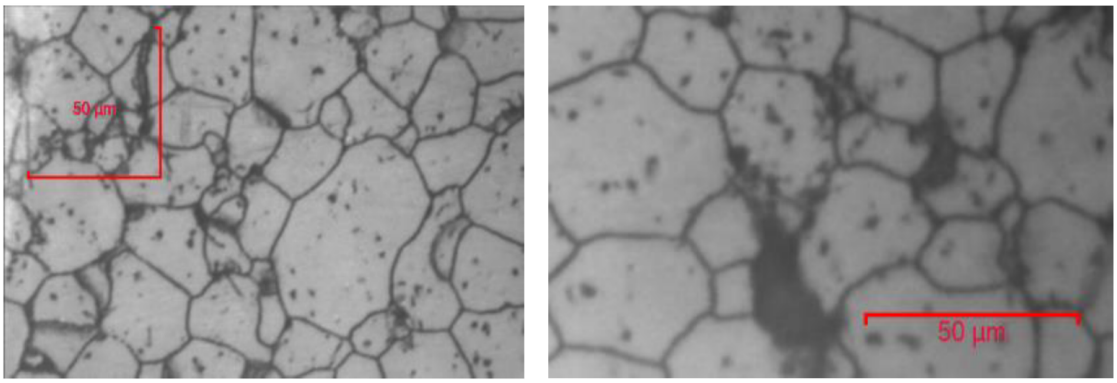

3. Click in the relevant cell in the column **Scale position**.

   To change the scale position, select a position from the drop-down list.

   **Bottom right** indicates that the scale will always be shown in the lower right hand side of the screen for the selected magnification.

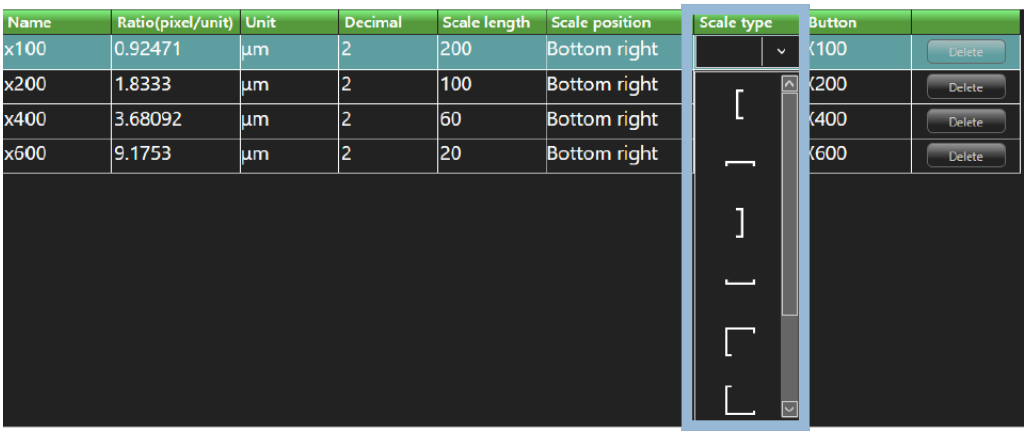


**Top left** **Bottom right**




4. Click in the cell for **Scale type** in the selected row.

   To change the scale type, you can select a simple scale (horizontal or vertical) or a double scale (2 directions).



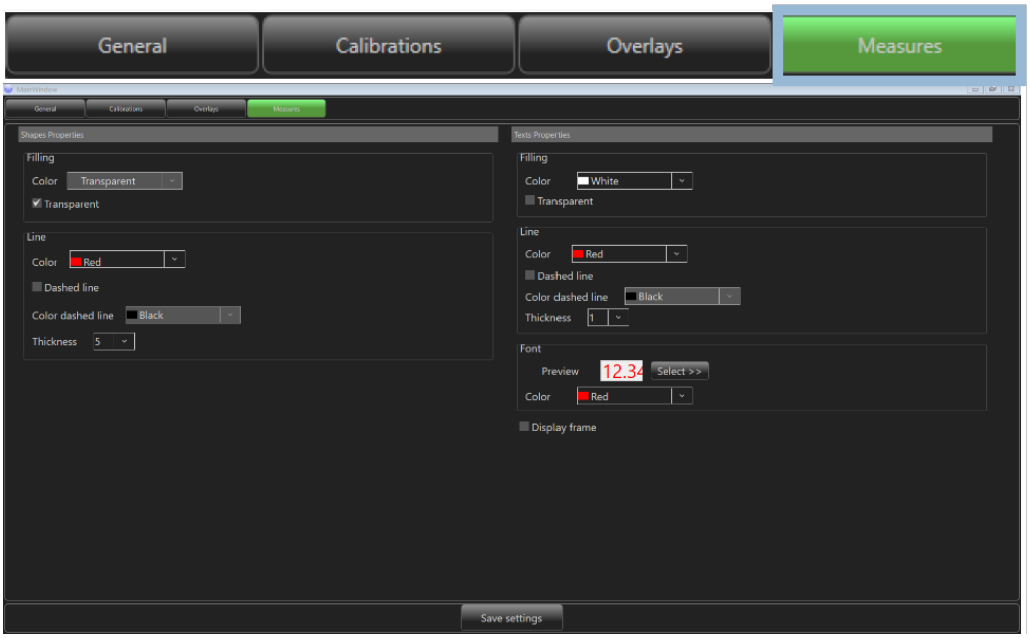

5. Select **Save settings** to save and exit the procedure.

# 6.7 Properties for measures, drawings and text

## 6.7.1 Drawing properties

### Measurement

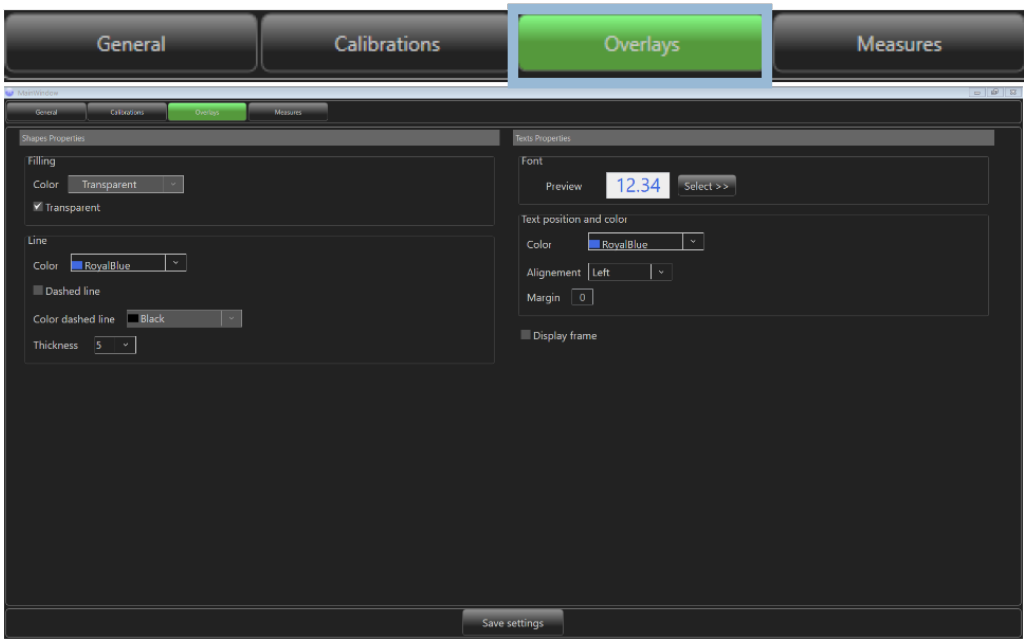
The measurements made on your images are shown in default colors. You can change the properties for these visible objects, change the default settings or those of each object.




1. Select **Measures** or **Overlays**.
2. Select **Shapes properties**.
3. Change the properties as needed.
   – Make changes to the fill type for shapes.
   – Select an outline color.
   – Check off **Dashed line** for a non-continuous outline.
   – Check off **Dash color** to change the color of the dashed line.
   – Select the thickness and color of the line.
4. Select **Save settings** to save and exit the procedure.

### Drawing

The lines, shapes and text fields are shown in default colors. You can change the properties for the visible objects, change the default settings or those of each object.



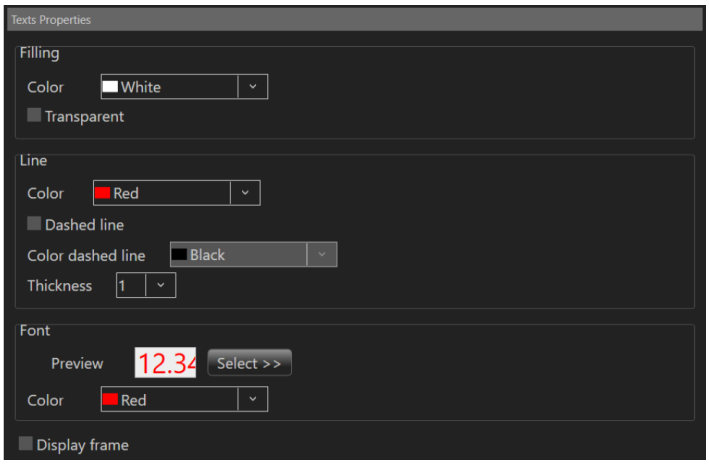

1. Select **Overlays** and **Shapes properties**.
2. Change the properties as needed.
   – Make changes to the fill type for shapes.
   – Select an outline color.
   – Check off **Dashed line** for a non-continuous outline.
   – Check off **Dash color** to change the color of the dashed line.
   – Select the thickness and color of the line.
3. Select **Save settings** to save and exit the procedure.

## 6.7.2 Text display

### Measurement

Each measurement appears with a label containing the value and unit.

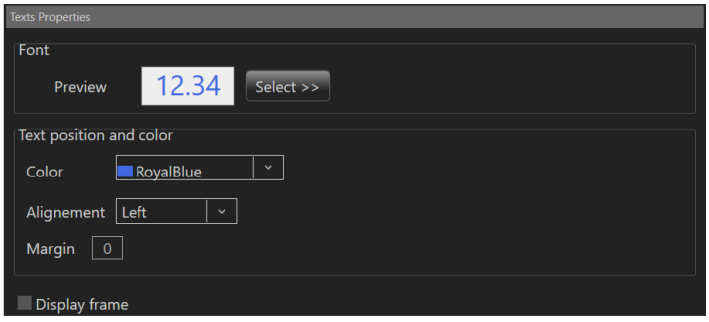
1. Select **Measures** and **Texts properties**.




2. Change the properties as needed.
   – Make changes to the fill type for shapes.
   – Select an outline color.
   – Check off **Dashed line** for a non-continuous outline.
   – Check off **Dash color** to change the color of the dashed line.
   – Select the thickness and color.
   – Select the font and color.
   – Check off **Display frame** to get a frame around the text label.
3. Select **Save settings** to save and exit the procedure.

### Drawing

1. Select **Overlays** and **Texts properties**.




2. Change the properties as needed.
   – Make changes to the fill type for shapes.
   – Select an outline color.
   – Check off **Dashed line** for a non-continuous outline.
   – Check off **Dash color** to change the color of the dashed line.
   – Select the thickness and color.

– Select the font and color.

– Check off **Display frame** to get a frame around the text label.

3. Select **Save settings** to save and exit the procedure.

# 7 Image capture

1. Set the frame, and focus on your PSM-5/-10 Microscope.

   The live image appears in the center of the screen.

2. Adjust the main light source using your optical equipment to obtain a well-lit image.

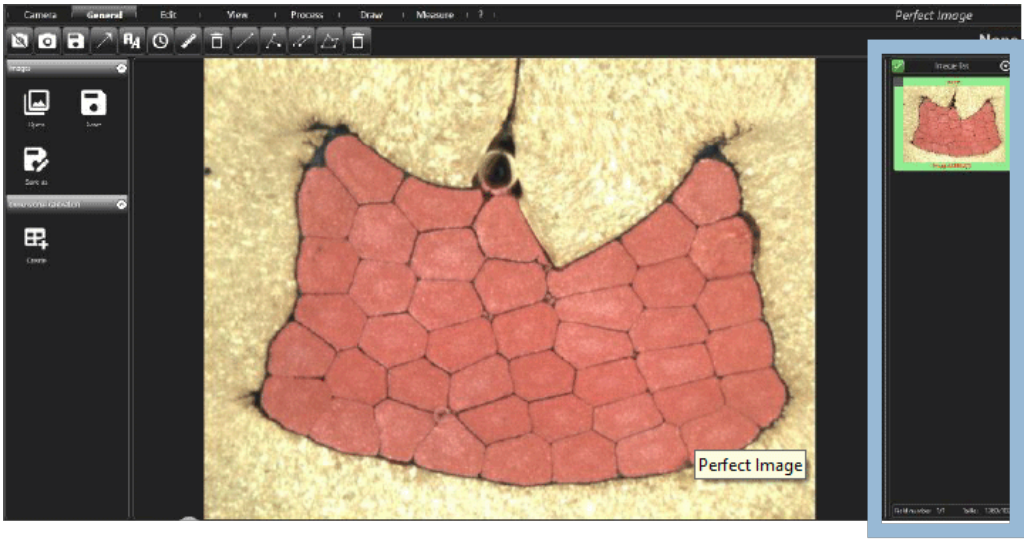
3. Adjust the standard and advanced settings for your camera.

   See Brightness ►12, Contrast/image ►13 and Calibration preferences ►19.

4. The camera is active when the **Capture** button turns green.

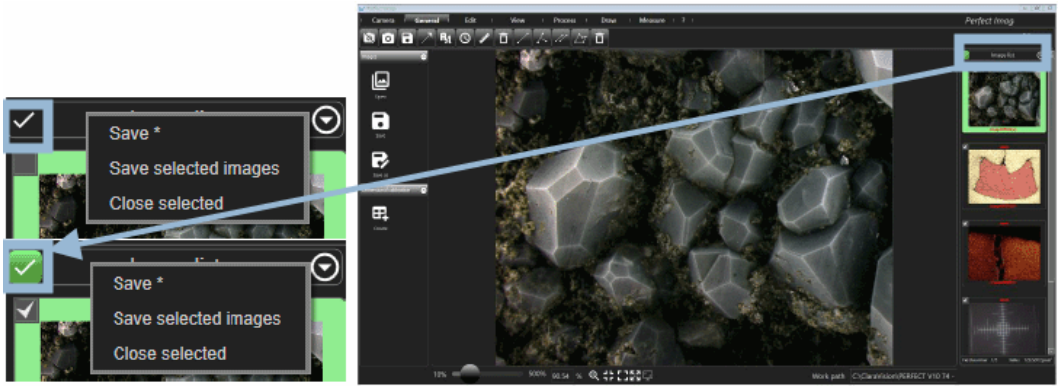
5. To capture the live image, click the **Capture** button.

6. The image is shown in the **Image list**.




7. As you capture more images, they are added to the list.

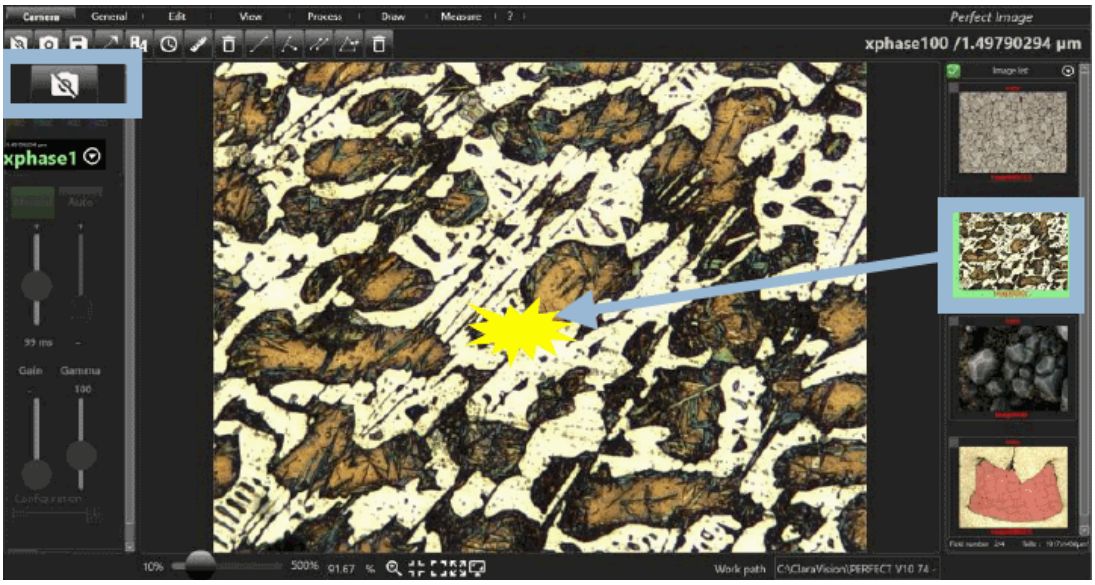
   The most recently captured image is at the top of the list. Use the slider bar to browse through the images.




8. You can save files directly from this list (see Save your images ►28).
9. Click on the check-box (it turns green) to select all of the images in the list at once.

10. If you click on an image in the **Image list**, the live camera session is set on hold.

    The selected image is displayed in the central view.




11. The crossed-over **Capture** button indicates that the live mode is paused. Click again to return to the live image.

## 7.1 Save your images

After you have captured and worked on your images using the scale ruler, adding text zones and measurements, etc., you can store you images.

### Storage location

See Define general settings ►16.

### Storage format

Images are stored in the .jpg format.

### Preferences

You can set up preferences for saving images. See Define general settings ►16.

**Note**
For the settings **Save drawing layer when saving an image** and/or **Save measurement layer when saving an image**:

When they are *enabled*, overlays and measurements are saved in separate xml overlay files that are linked to the image. When you open the image again, overlays and measurements are reapplied.

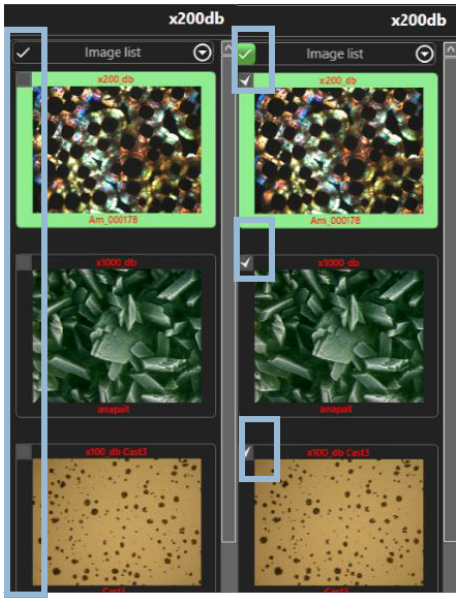
When they are *disabled*, your overlays and measurements are not saved. To prevent your overlays and/or measurements from being lost, you must enable **Merge graphic plans when saving an image**. When this merge setting is used, the graphical elements are "burned" into the image, and can no longer be deleted or edited. Use **Save as** to leave the original image intact.

### Easy image storage

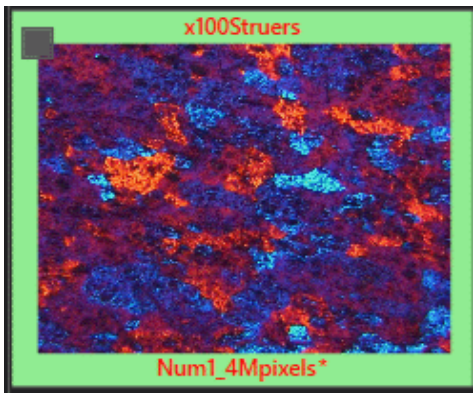
When you capture an image, it is stored temporarily in the panel **Image list**.

You may store a large number of them, but in practice you should ensure that they have been written to some form of storage medium.

When you click on an image in the panel **Image list**, it is framed in green to indicated that it is selected.



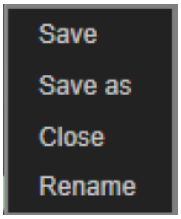
An asterisk (*) in the file name indicates that the image has not yet been saved.




Always make sure that you have saved the required images correctly and in their correct folders.

### Save one image

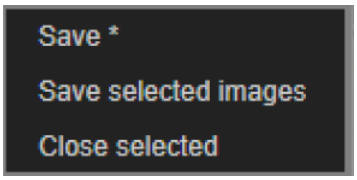
1. Right-click on the image in the panel **Image list**.
2. Select **Save** or **Save as**.




3. The image is saved.
4. If needed, enter a name of your choice.

### Save several images simultaneously

1. Enable the check box in the left-hand corner of each of the images in the panel **Image list**.
2. Click the drop-down list in the panel **Image list**.
3. Select **Save selected images**.




### Close several images simultaneously

1. Enable the check box in the left-hand corner of each of the images in the panel **Image list**.
2. Click the drop-down list in the panel **Image list**.

3. Select **Close selected**.

# 8 Add measurements and annotations to images

You can place both text boxes with annotations over your images, and you can take measurements. You can also take measurements on live images.

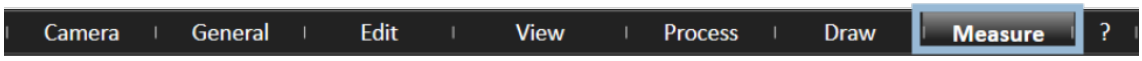
## 8.1 Make a measurement on an image

You can carry out measurements on live images and image files.

1. Capture one or more images. See also Capture your first image ►10.
2. Select the level of magnification. See also Apply a calibration to an image ►40.


3. Click on the image on which you wish to carry out measurements.

   The image is shown in the center of the screen.
4. Select **Measure** in the **Menu bar**.




5. Click on **Tools** in the left-hand side.
6. Now choose a tool for the measurement you wish to do.

   See Measurement tools ►33.
7. Save the image, see Save your images ►28.

### Example

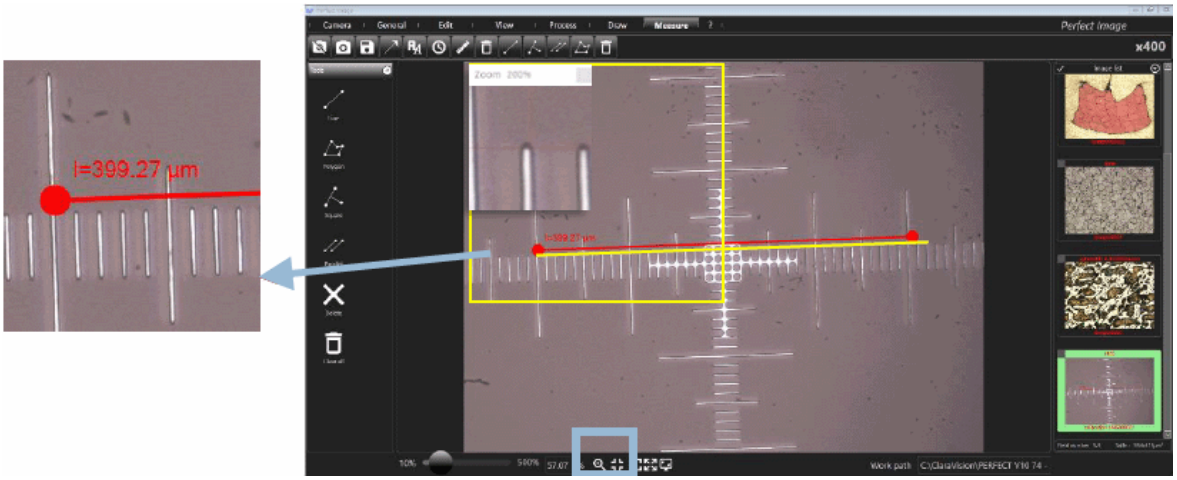
*To measure the length of a segment*

1. Select the **Line** tool. The icon turns green.


2. Draw a segment on the image.

   The segment displays the measured value.

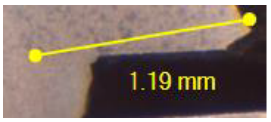
3. Use function key **F6** or the zoom icon to zoom in on the mouse cursor on the screen if you need a more precise measurement.



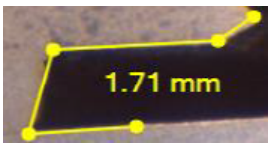

4. Save the image. See Save your images ►28.

## 8.2 Measurement tools

### For distance and length

| Icon | Description | |
|---|---|---|
|  | **Line**<br>Shows the length of a segment.<br>• Click on a point.<br>• Drag the mouse, and release the mouse at the desired length. |  |
|  | **Square**<br>Draw a reference segment.<br>• Click on a point.<br>• Drag the mouse, and release the mouse at the desired length. A perpendicular line is shown.<br>• Click to indicate the extreme point of the perpendicular line. The distance from the end point to the reference line is shown. |  |
|  | **Parallel**<br>Draw a succession of segments.<br>• Click on a point.<br>• Drag the mouse, and release the mouse at the desired length. A second straight parallel line appears.<br>• Select and move the segments as needed. The value shown indicates the distance between the two parallel lines. |  |

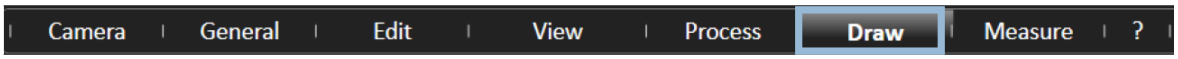
### For surface areas

| Icon | Description | |
|---|---|---|
|  | **Polygon**<br>Shows the surface area.<br>• Click on points to draw a succession of segments.<br>• Double-click after the last segment.<br>• The final point will join the first to complete the shape. |  |

## 8.3 Draw an overlay or make an annotation to an image

With the overlay tools, you can add arrows, text boxes, date and time stamps or a scale ruler over your image files.

1. Select **Draw** in the **Menu bar**.




2. In **Annotation**, select a tool for the overlay you wish to create.

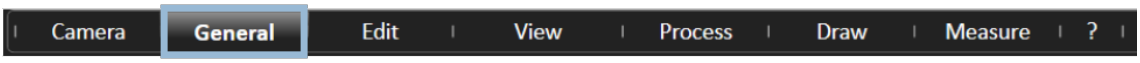
   See Overlay tools ►34.

3. Save the image, see Save your images ►28.

## 8.4 Overlay tools

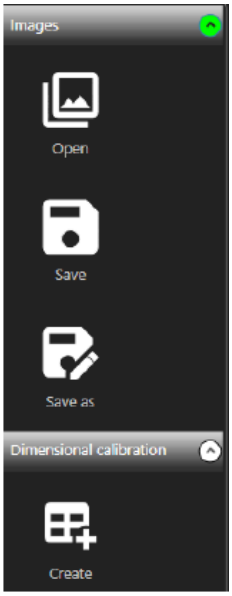
| Icon | Description |
|---|---|
|  | **Arrow**<br>• Click to place the point of the arrow at the object and stretch it until the length of the arrow length is obtained. |
|  | **Text**<br>• Draw a rectangle in the area of the image where you want to insert a text box.<br>• Enter your comment in the text box. |
|  | **Date/Hour**<br>• A pop-up window invites you to choose the date and time format you want to insert. |
|  | **Ruler**<br>• Insert the ruler. |
|  | **Delete**<br>• Erase the last tool used. |
|  | **Clear all**<br>Clear all overlays/annotations on the image. |

# 9 Images




## 9.1 Open and save

In **General** and **Images**, you find the functions open and save.




### Open

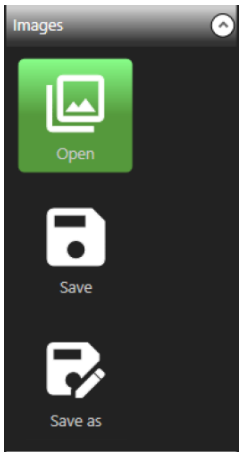
Allows you to open jpeg files, old images taken with Perfect Image. See Dimensional calibration ►37.

### Save, Save as

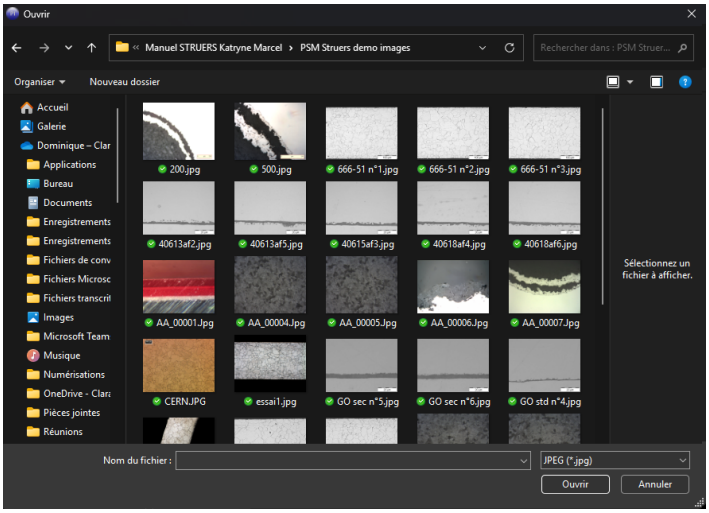
These buttons are active when images are present in the list of images. **Save as** allows you to rename your image.

## 9.2 Open one or more stored images

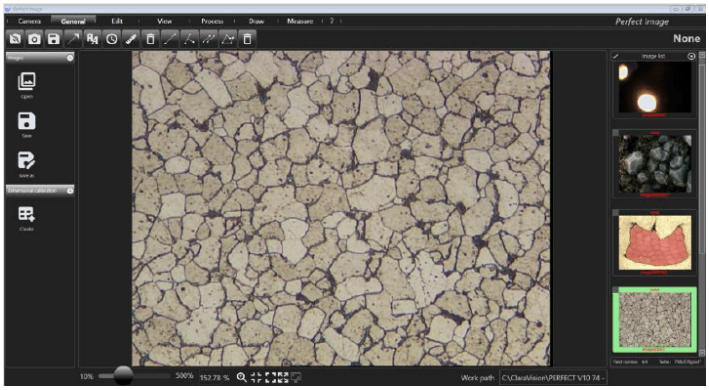
1. Expand the **Images** panel, and select **Open**.




2. Browse to the desired folder.

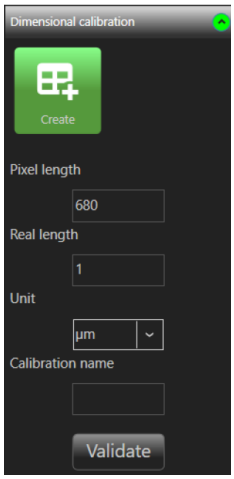



3. Select the image or images you wish to open.
4. Click **Open**.
5. The image or images are shown in the **Image list**.



## 9.3 Dimensional calibration

In the **Dimensional calibration** menu, you can create a specific calibration that you can use to make precise measurements on your images having the same calibration. See Calibration procedure ►38.




# 10 Calibration

It is important that you carry out system calibration so you have a measurement tool for use with a microscope or a stereo microscope.

Every lens and every position on a magnifier has its own calibration.

The calibration used during the capture is saved with the image.

### Calibration information

Each image stores the calibration factor that was used when the image was captured, in the meta-data for the .jpg file.

**Hint**
The calibration is specific to each lens or position.

You can assign a calibration of your choice to any image you take using Perfect Image.

The calibration applied to images taken with previous versions of Perfect Image will still be accessible. For instance, the magnification factor for a given image will be applied when new measurements are taken.

**Hint**
When you re-open an image file that has an individual calibration (its own pixel/µm ratio), the software displays the length/pixel ratio next to the file name in the **Image list**.

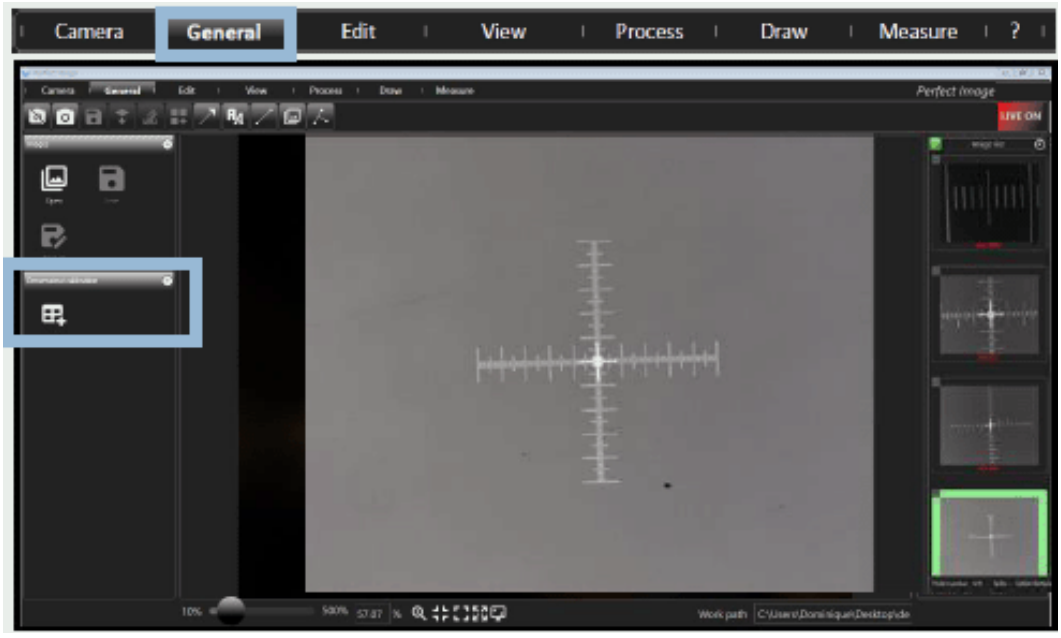
## 10.1 Calibration procedure

**Hint**
Calibration can also be carried out on a live image, using the same procedure. Do not change the fields during the process.

### Procedure

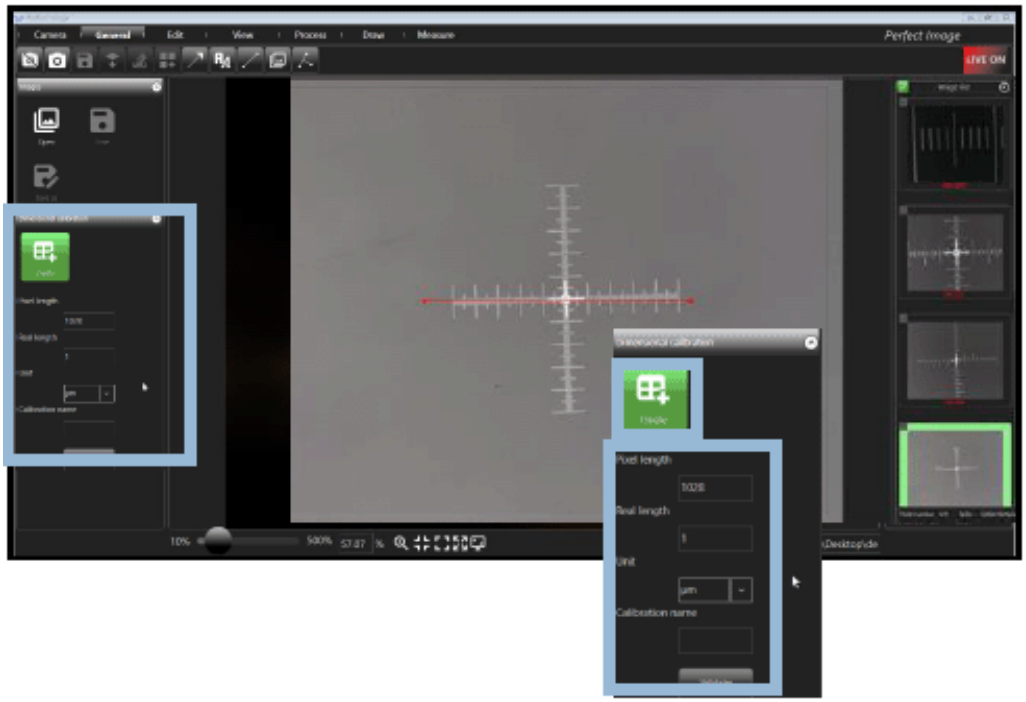
1. Launch Perfect Image.
2. Place a stage micrometer under the lens.
3. Capture the image. See also Image capture ►27.

4. Click on the captured image in the **Image list**. The image is shown in the center of the screen.
5. Select the tab **General** in the menu bar.




6. Click on the **Create** icon in the panel **Dimensional calibration**.

   The button turns green, and data fields appear on the screen.



7. A segment is shown on the image.

> **Hint**
> To accurately position the extremities of the red calibration segment, press the **F6** function key or click the **Magnify** icon in the zoom area to call up a 200% zoom window near the mouse cursor.
>
> 
>
> Now you can accurately position the extremities of the red calibration segment.

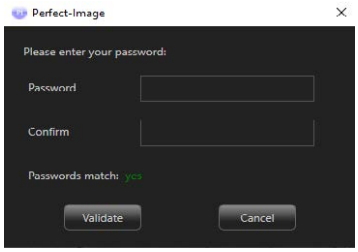
8. Move and stretch the segment to match the scale markings on the stage micrometer or ruler.

> **Hint**
> To achieve perfect horizontal and vertical lines, press and hold the **Shift** key (upper case) as you adjust the segment extremity.
>
> Make sure you take into consideration the thickness of the line on the stage micrometer.

9. Adjust the segment length to the highest number of scale graduations that are visible on the screen.
10. Make a note of the number of selected graduations.
11. The value in **Pixel length** represents the segment length in numbers of pixels.

> **Note**
> Do not change this value.

12. Enter the value in **Real length** in the panel **Dimensional calibration**.
13. In **Unit**, select the unit type you wish to use. See Change the measurement unit ►21.
14. In **Calibration name**, enter a name for this calibration, for example "x100".
15. Click on **Validate**.




16. If needed, protect the calibration with a password in order to avoid changes or deletions by unauthorized users. If you do not wish to set a password, leave the fields blank.
    – Click on **Validate**.

Calibration is now complete for this lens.

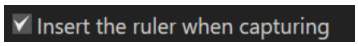
Repeat the procedure for other lenses.

## 10.2 Calibration scale display

### Procedure

1. Select **General**.


2. Check off **Insert the ruler when capturing**.




A cross hair-shaped ruler is shown over each image. See Button configuration ►21

## 10.3 Apply a calibration to an image

You can apply a calibration (magnification) to an image.

### Procedure

1. From the menu bar, select **Camera**.
2. Select an image from the **Image list**, or the live image.
3. Either click on one of the magnification buttons from x100 to x600. See Magnification buttons – x100 to x600 ►19.

Or select one from the drop-down list containing the calibrations you have created.


4. The calibration is applied to the image.

   For scale display, see Calibration scale display ►40.

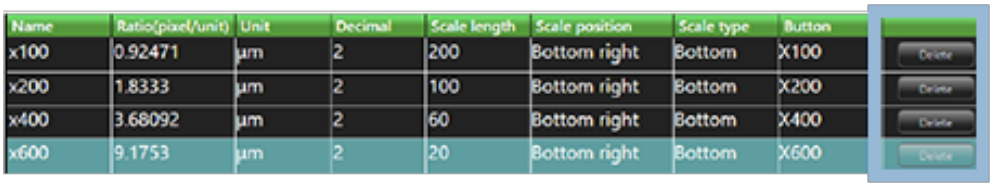
   The calibration is used the next time you open the image.

## 10.4 Delete a calibration

You can delete an existing calibration.

1. Select **Calibrations**.

   The available calibrations are listed in the **Calibration list**.



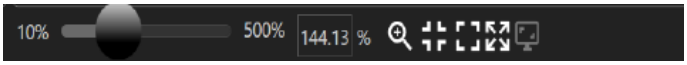
| Name | Ratio(pixel/unit) | Unit | Decimal | Scale length | Scale position | Scale type | Button | |
|---|---|---|---|---|---|---|---|---|
| x100 | 0.92471 | µm | 2 | 200 | Bottom right | Bottom | X100 | Delete |
| x200 | 1.8333 | µm | 2 | 100 | Bottom right | Bottom | X200 | Delete |
| x400 | 3.68092 | µm | 2 | 60 | Bottom right | Bottom | X400 | Delete |
| x600 | 9.1753 | µm | 2 | 20 | Bottom right | Bottom | X600 | Delete |

2. Select the row of the calibration you wish to delete.
3. Click on **Delete** in the selected row.

   Any buttons that were related to a deleted calibration will be grayed out and can be used for new calibrations (see Button configuration ►21).

# 11 Zoom bar

In the **Zoom bar**, you can adjust how the image is displayed on the screen.



### The slider

The slider spans from 10% to 500% which how much you can zoom in and out of the image.

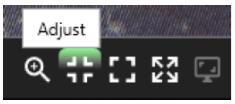
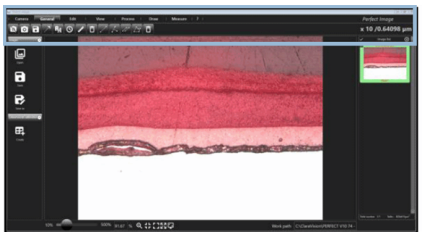
*To adjust the zoom factor:*

- Either click and drag with the cursor to adjust the zoom factor


- Or enter a specific value in the zoom factor field.


100% zoom equals full scale.

### The zoom icons

| Icons | Function |
|---|---|
| Magnifying glass | Use this icon or F6 to zoom in to the area around the mouse pointer. |
| **Adjust**<br>  | Adjusts the image to the view window (fit to window) |
| **Full-scale**<br>  | Enables you to adjust the image to 100% of its size, in which case you must use the up/down and left/right scroll bars to visualize the image in the window. |
| **Full screen**<br>  | Enables the image to take up more space on the screen, by hiding the menus. Click on the icon again to return to normal mode.<br>The menu bar disappears to let you see only the tool bar, and the image appears bigger on the screen.<br>   |

| Icons | Function |
|---|---|
| **Display on scale**<br>  | This icon is grayed out if the image does not have a specified magnification.<br>If you open an image with a known calibration, this icon will be available.<br>  <br>This icon enables the image screen to be displayed to scale. For example, for an image taken at x100 with a field size of 1500µm, the field will be displayed on screen with a size of 1500*100=150 000µm=150mm.<br>Note, that the screen which is taken into account, is the main computer screen (your laptop for example). |

**Equivalences for microscopy fields depending on lenses and magnifiers (x10)**

| Magnifiers | Equivalences for microscopy fields |
|---|---|
| X5 (x50) | ~ 3000µm |
| X10 (x100) | ~ 1500µm |
| X20 (x50) | ~ 750µm |
| X50 (x50) | ~ 150/200µm |
| X100 (x1000) | ~ 75/100µm |

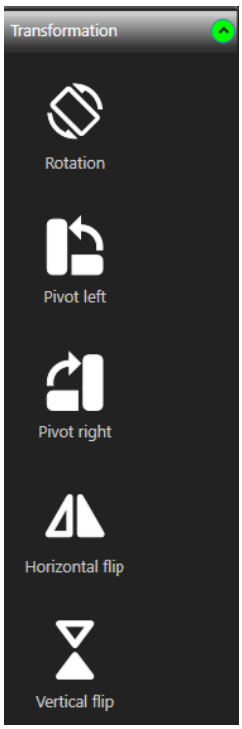
# 12 View


The **View** menu enables you to adjust how the image appears on the screen, to rotate it as required and to access tools in the zoom bar.

## 12.1 Transformation

1. Select **View** from the **Main menu**.

2. If needed, expand the **Transformation** panel.




### The buttons

| Icon | Function |
|---|---|
| **Rotation**  | • Click to rotate an image to a correct angle. See the example below. |
| **Pivot left**  | • Click to rotate the image counter-clockwise. |
| **Pivot right**  | • Click to rotate the image clockwise. |
| **Horizontal flip**  | • Click to flip the image horizontally. |
| **Vertical flip**  | • Click to flip the image vertically. |

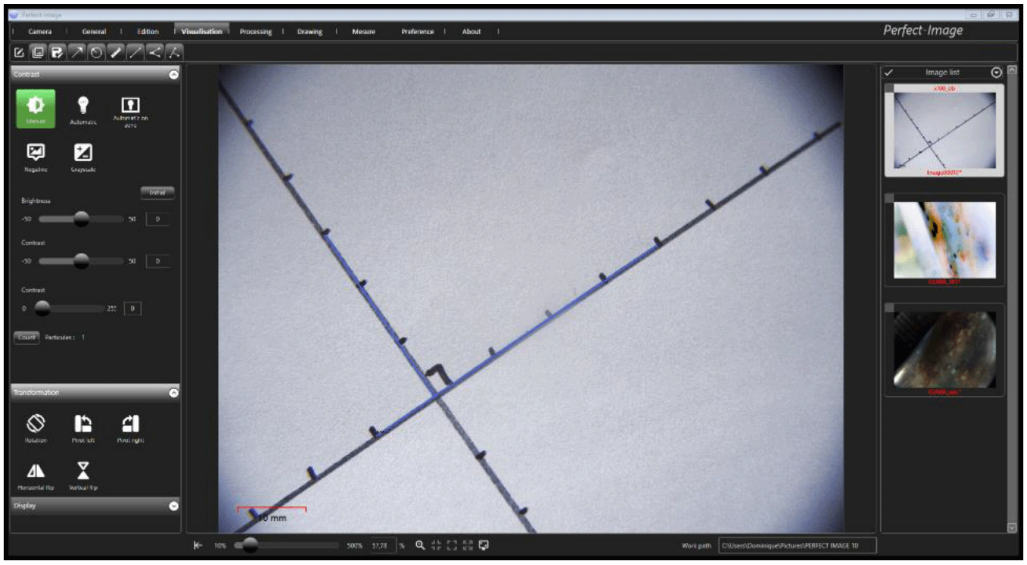
### Rotate an image

Rotating an image is useful if a horizontal reference appears not to be angled correctly.

*Example*

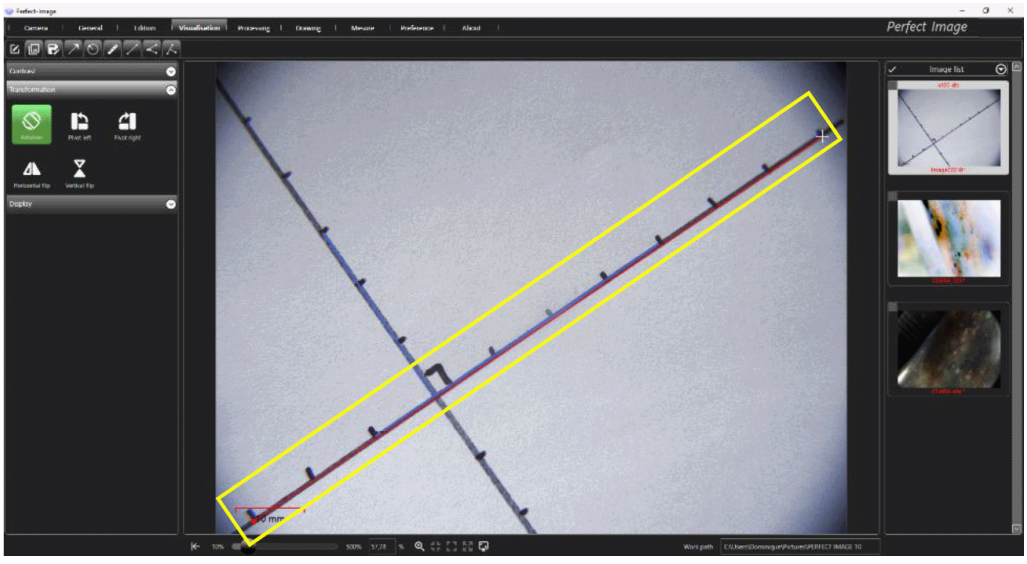
In the example, two perpendicular lines have been drawn.

1. Click on the **Rotation** button to rotate the image.

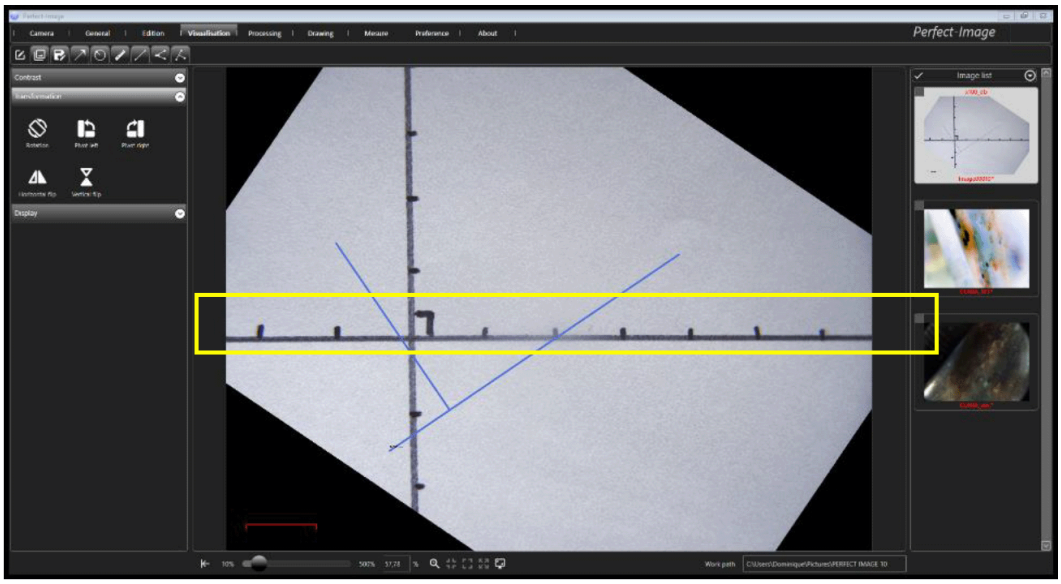



2. The button remains green.
3. Draw a line over the segment that should be horizontal on screen.

   The reference line does not appear to be straight.

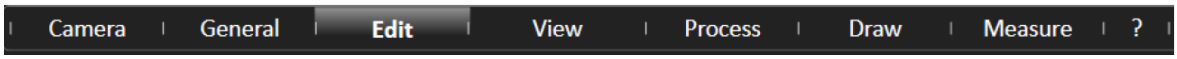



4. In this example, the blue straight angle indicates where the reference point was before the rotation.



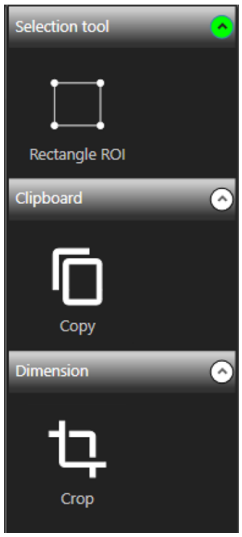

For information on how to reframe the image, see Rectangle ROI ►47.

# 13 Edit the image



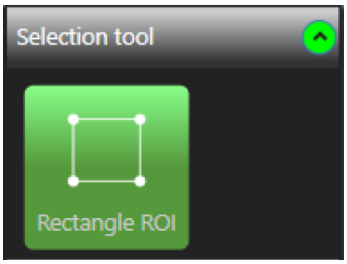

The **Edit** menu gives you access to carrying out editing operations directly on the image (cropping, framing, removing zones).

Use these functions when the image requires specific editing, such as capturing images with metallographic grains or cast images, or with other materials with specific characteristics.



# 13.1 Rectangle ROI

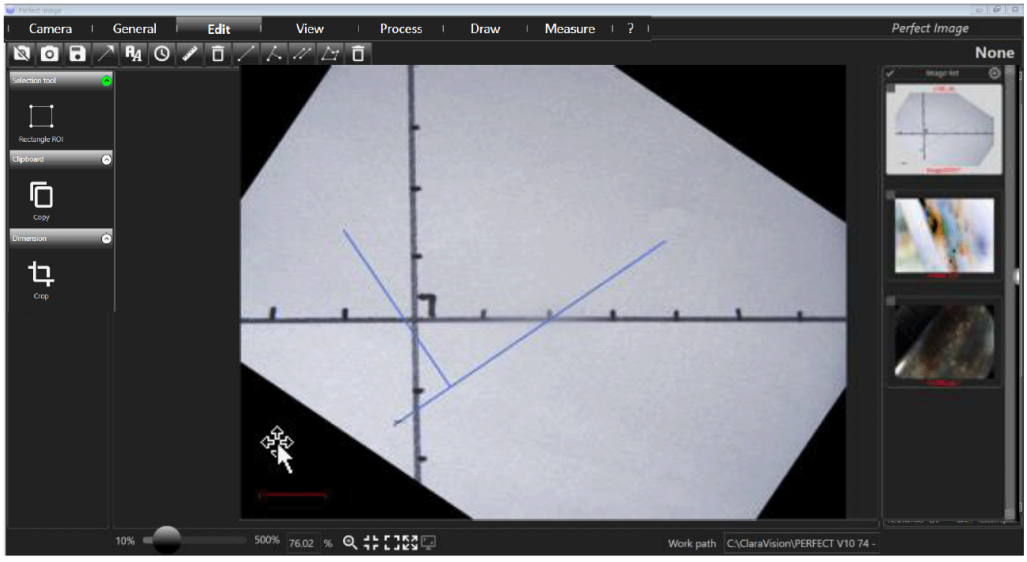
In **Selection tool**, you can select **Rectangle ROI**. ROI stands for "Region of Interest", in other words you can define a zone that is of specific interest, directly on the image.



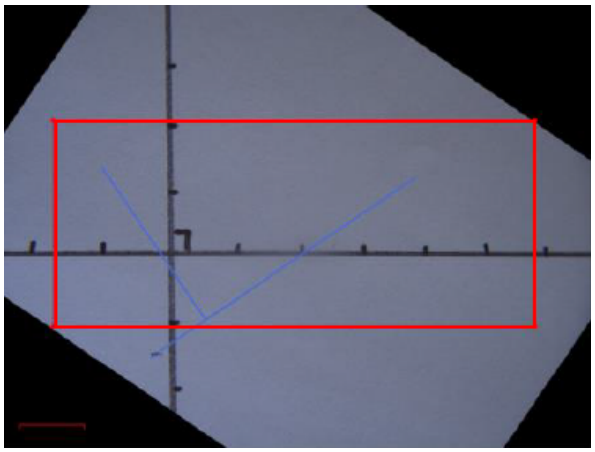

### Example

We use the same example as in "Rotate an image" in Transformation ►43.

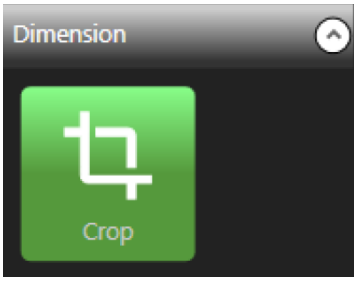
We notice that an image has been rotated and black triangles mark up the screen where the original image was placed before being rotated. You can clean up the image around the point of reference to get a "tighter" image.




1. Select the image you wish to edit. In this example, an image has been rotated.
2. Select the tab **Edit** from the main menu.
3. In **Selection tool**, select **Rectangle ROI**.
4. Draw a rectangle on the image to clear the image of the unwanted black triangles. This is the the region of interest, ROI.



5. To create a new image from this selection, expand the **Dimension** panel, and select **Crop**.



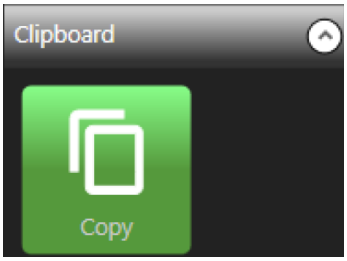

6. A new image is created and shown in the **Image list**.


7. Edit, annotate, measure, and save the image as needed.

## 13.2 Copy a selected ROI area/Region Of Interest

1. In **Selection tool**, select **Rectangle ROI** to draw a rectangle on the image. This is the ROI (the region of interest).

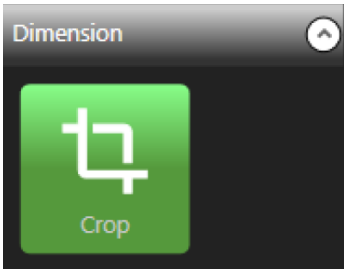
2. If needed, expand the **Clipboard** panel.
3. Click on **Copy**.




4. Paste the copied area in another image.

## 13.3 Crop an image

From a selected zone on the image (usually a rectangular shape), use the **Crop** tool in **Dimension** to create a new image that excludes any unwanted elements.

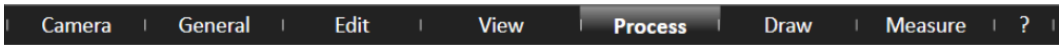



### Examples of use

- For grain size analysis, this tool can be used to isolate a representative area.
- For a GS cast image with graphite nodules.

# 14 Process

The **Process** menu gives you access to processing tools for shading the image.




# 14.1 Shading

**Hint**
You can assign a separate shading to your lenses every time you capture an image.

### Shading an image

With **Shading**, you can adjust the image to correct unevenness, due, for instance, to a lighting issue. You can establish a corrective overlay (mask) for each lens, for each calibration, in fact.

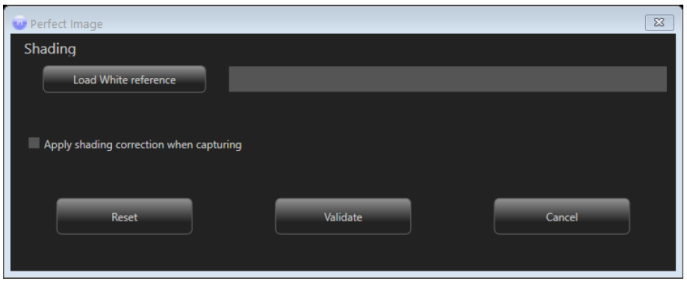
### Beforehand

1. Take “white” reference images (that is with a white surface) with each of the lenses with which you want to apply the shading correction ("adjust" the shading).
2. Place a white object in the field of the camera, illuminated at the saturation limit, the image must show the light homogeneity issues without being saturated, like the below image.

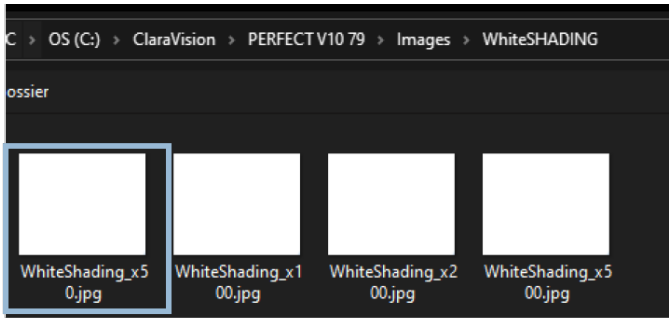
3. Save these images in a folder. You will come back to them later in the procedure.
4. See how to specify storage paths in Define general settings ►16.
5. Click on **Calibration**.


6. Select the desired calibration.

7. Click on **Shading** in the relevant row and cell.
8. A window opens, and you can click on **Load White reference**.

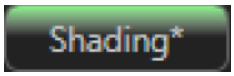



9. Point to your socalled white-reference image folder.
10. Select the baseline image made with the concerned lens (here objective x50).




11. If necessary, check off the box **Apply shading correction when capturing** to automatically apply the shading correction to each capture with this lens.
12. Click on **Validate**.

    An asterisk appears in superscript on the shading button for this objective.



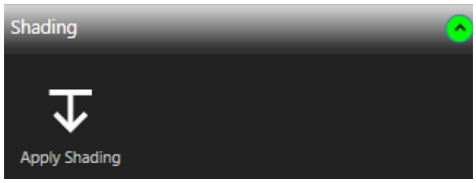

13. Proceed in the same way for each objective.

### Apply shading manually

If you have not checked off the box **Apply shading correction when capturing** (as described above), you must manually apply the shading correction to each capture with the lens in question.

1. Capture your images in the usual way.
2. Select **Process** and **Shading**.

3. Click on **Apply Shading**.




4. The correction is applied to the selected image.

# 15 Manufacturer

Struers ApS
Pederstrupvej 84
DK-2750 Ballerup, Denmark
Telephone: +45 44 600 800
Fax: +45 44 600 801
www.struers.com

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| | |
|---|---|
| en | For translations see |
| bg | За преводи вижте |
| cs | Překlady viz |
| da | Se oversættelser på |
| de | Übersetzungen finden Sie unter |
| el | Για μεταφράσεις, ανατρέξτε στη διεύθυνση |
| es | Para ver las traducciones consulte |
| et | Tõlked leiate aadressilt |
| fi | Katso käännökset osoitteesta |
| fr | Pour les traductions, voir |
| hr | Za prijevode idite na |
| hu | A fordítások itt érhetők el |
| it | Per le traduzioni consultare |
| ja | 翻訳については、 |
| lt | Vertimai patalpinti |
| lv | Tulkojumus skatīt |
| nl | Voor vertalingen zie |
| no | For oversettelser se |
| pl | Aby znaleźć tłumaczenia, sprawdź |
| pt | Consulte as traduções disponíveis em |
| ro | Pentru traduceri, consultați |
| se | För översättningar besök |
| sk | Preklady sú dostupné na stránke |
| sl | Za prevode si oglejte |
| tr | Çeviriler için bkz |
| zh | 翻译见 |

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