GUIDE | TAGARNO IMAGE ANALYSIS / PARTICLE ANALYZER
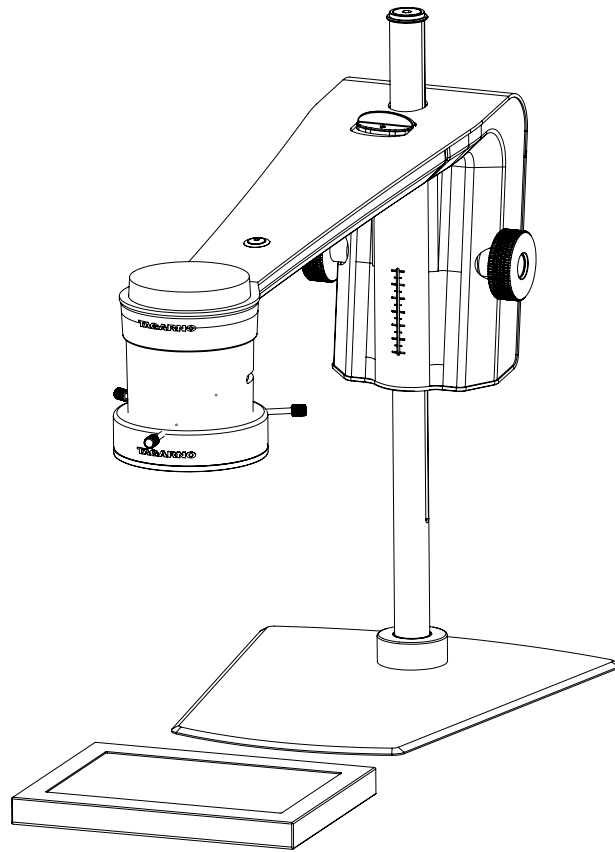
CONTENTS

The Particle Analyzer enables you to objectively analyze/validate the shapes in a sample directly on a TAGARNO digital microscope.

TAGARNO

1. ASSEMBLING

2. TOOLBOX

Light settings
To get the best results, it is crucial that the right accessories is present and that the settings are rightfully adjusted.
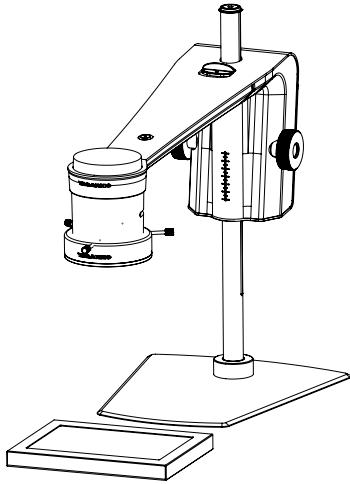
Equipment needed:
Back light
Ring light white
Basic or Advanced control box (external lighting)

This enables the app to run objective and reproducable analyses.

The microscope light settings are automatically set to auto exposure.

Step 1
Start by placing the pellets on a backlight as shown below.

This will eliminate shadows and help the application distinguish between the pellets and the surface they are placed on.

Step 2
Adjust the intensity of the microscope light to eliminate reflections.
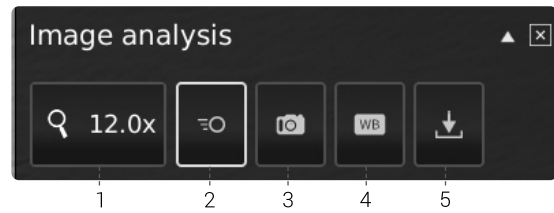
Step 3
Mount a Ring light white from TAGARNO on the microscope as described in the TAGARNO Ring light white user guide.

Step 4
Adjust the light settings to the right intensity using the preferred control box.

1. Magnification level
Use a keyboard or the control box to choose magnification level.

2. Live View
Use this button to toggle between live and snapshot.
In Live mode, the live camera image is active. In Still Image mode, the latest snapshot will be shown.

3. Snapshot
Use this button to take a snapshot of the live image. The snapshot will not be saved automatically. The snapshot is used for toggling between "Live and Still Image mode".

4. White balance calibration (WBC)
Perform an automatic white balance adjustment in order to get colors displayed correctly on screen. There must be a white object present in the camera field of view when the white balance is being adjusted. A white balance calibration is made each time the camera is turned on to adjust to the given light conditions. A white balance calibration must also be made every time the light conditions change.

NB! If the camera field of view does not contain a white object when the unit is turned on, the white balance will be incorrect and it will be necessary to perform the white balance adjustment process as described previously.

5. Save Image
This button provides the possibility to save the current view with graphics. When activated, the information panel will also appear from the saved image (see pt. 15).

When saving an image, an information window will appear for a few seconds showing the file name and storage location.

The image will be saved on the inserted USB memory stick. If a USB memory stick is not attached, the image is saved internally on the microscope, provided the share file mode is turned on in General settings.

2. OPERATION

OPERATION (1/3)
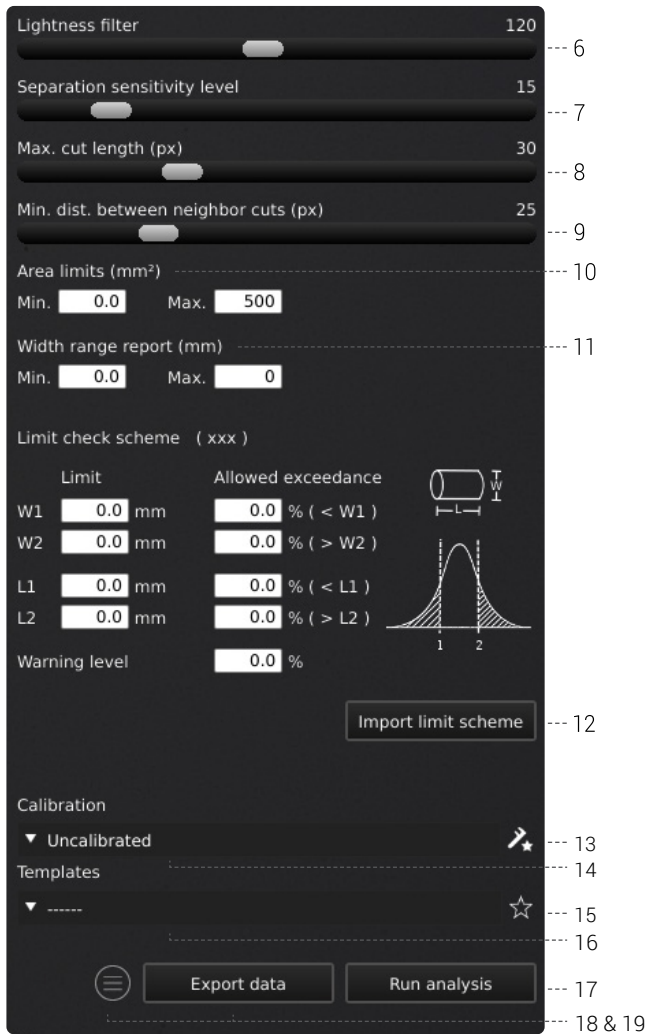
Choose values
Start by running the analysis and then choose values by sliding the bar or typing in the number field by using a connected keyboard.

6. Lightness filter
Use this slider to define what lightness level separates the sample from the background.

7. Seperation sensitivity level
Use this slider to enable the application to detect if two pellets are overlapping. That is, define when the application must count a detected pellet as two instead of one.

8. Max cut length (px)
This slider defines the maximum cut length in pixels.

9. Min. distance between neighbor cuts (px)
This slider defines the minimum distance between cut starting points.

10. Area limits (mm2)
Define minimum and maximum area values of interesting pellets to be identified by the application.

11. Width range report (mm)
Define minimum and maximum width of pellets that you want to know the percentage of in the total pellet count.
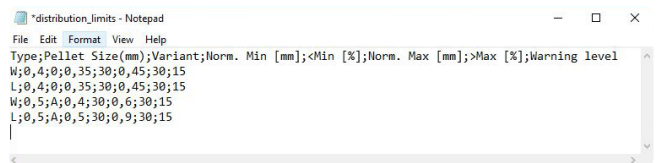
12. Import limit scheme (optional)
For a more detailed analysis about the size of pellets, specify their width and length limits, including how many pellets (in percentage) are allowed to exceed those limits and at what percentage level you want to be warned about the sample nearing those limits. All of this can be done manually or by importing a limit scheme.

You create a limit scheme by writing a CSV file with the following column headers seperated by semicolons in the first row:
- Type
- Pellet size (mm)
- Variant
- Norm. Min [mm]
- <Min [%]
- Norm. Max [mm]
- >Max [%]
- Warning level

Now, add as many configurations/rows as you need (each configuration needs two rows) and specify the following values for each configuration: limits, allowed exceendance and warning level.

Here's an example of a CSV file:

Complete the limit scheme by saving it as a CSV file with the following name: distribution_limits.csv.

You can now move the file to the root of a USB memory stick, connect it to your microscope and click Import limit scheme. If your file contains more than one configuration, choose the required configuration by double-clicking it.

Below is a screenshot of an imported limit scheme.

13. New calibration
Increase the measurement accuracy by performing a dotgrid calibration with a predefined dot grid calibration sheet before running an analysis. During the calibration, the software will automatically compensate for lens curve distortion and non-linearity and carry out calculations with a precision of sub-pixels.

1. Before clicking the New calibration button, select a suitable magnification level. A separate window will now appear.
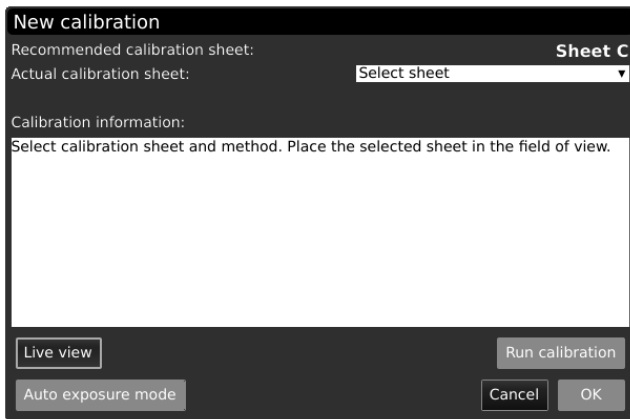
2. Depending on current zoom level and close-up lens, the app will recommend a calibration sheet for the calibration. Place the recommended calibration sheet straight under your microscope, so that the top row of dots is visible.

    Here is the list of the range covered by each TAGARNO calibration sheet.

| Sheet | Range [mm] | | Range [inches] | |
	min	max	min	max
A	204	340	8.03	13.39
B	123	204	4.84	8.03
C	74	123	2.91	4.84
D	44	74	1.73	2.91
E	26	44	1.02	1.73
F	16	26	0.63	1.02
G	10	16	0.39	0.63
H	6	10	0.24	0.39
I	3	6	0.12	0.24

3. Let the app know that the correct sheet has been placed under the microscope by selecting the recommended calibration sheet in the drop down under Actual calibration sheet
4. Click Run calibration and check if the result says PASS.

Note! If the calibration sheet is placed incorrectly, the calibration will fail. If the Result says FAIL, switch to Live view to adjust the position of the calibration sheet and recalibrate by pressing Run calibration again.

5. When the calibration is complete, click OK to save the new calibration and close calibration state
6. Click Cancel to close without saving the calibration

Note! To delete a saved calibration, click on the Recall dropdown menu and then choose the X icon next to the calibration in question.

14. Recalling a calibration
The application will store and recall a calibration, so that you do not have to recalibrate every time the software has been closed. To choose a saved calibration, select it in the Recall dropdown menu in the top menu bar.

NB: When you readjust a calibration, the camera focus locks. This means that you might have to readjust the physical distance between the camera and the object you are looking at (focus height) to display the image sharply.

When recalling a calibration, it is important that you use the same close up lens as during the initial calibration. Only calibrations with the chosen lens will be available in the drop down menu.

15. Save template
•   Click on the star symbol to save a template using the current zoom level, slider positions and limits
•   State preferred name and press save

The template is now saved and available for later use.

16. Recall template
Recall a saved template by clicking on the list and choosing the template of your choice.

Delete a template by pressing the X at the right of each saved template.

17. Run analysis
Choose this option to run an analysis of the current image and get indications of the pellet shapes and dimensions within the sample.

The analysis will always be performed using a still image which is automatically captured during the analysis process.

18. Particle Analyzer result

When an analysis has been performed, the pellets will be outlined with a green rectangle and displayed on a black background.

The result includes the length and width mean, median and standard deviation of all identified pellets, including the total count of pellets in the sample.

If a limit scheme has been used, a green checkmark or red cross indicates whether the pellets fall within or outside the defined limits. A yellow exclamation mark will be displayed if the pellets fall within the allowed exceedance percentage but exceed the Warning level percentage.

As default, the analysis results will be shown in a table. Click the icon to display the results as a yellow and blue graph instead.

If a specific pellet has been selected/invalidated, the information panel will also include measurements of that specific pellet.
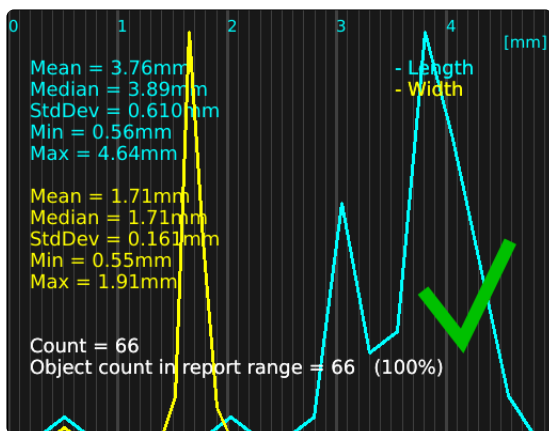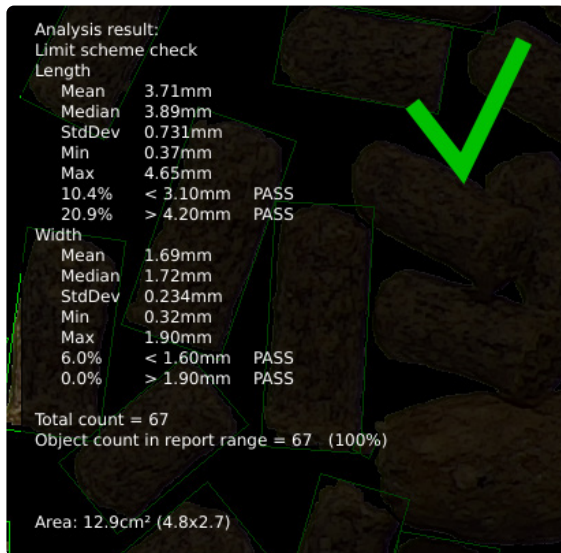
19. Export data

The analysis results can be exported using the Export data feature. Exported data can be imported to a spread sheet for easy comparison of pellets within and across samples.

The analysis results are automatically saved on a USB memory stick if inserted. If a USB memory stick is not attached, the image is saved internally on the microscope, provided the share file mode is turned on in General settings.