Solar**Unsoiled**®

Microscope How-To Guide

Updated May 2026

Questions or concerns? Email, call, or text:

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Overview and Purpose of Microscope Imagery

This microscope tool is used to quickly and easily **assess soiling losses** on site. This is performed in one of the two cases below:

Routine Microscope Imagery Collection

When: Usually done during preventative maintenance checks while already on-site for other O&M or during site cleanings.

Quantity: 30 images are taken across the site to get representative samples of soiling.

Why: These routine image collections are used to calibrate Solar Unsoiled's soiling models and make cleaning decisions.

Soiling Snapshots

When: Specific imaging locations for a site are requested, and a site visit is planned to complete this.

Quantity: ~150-450 total images across the site are taken (30 images per imaging location).

Why: These images are used to map soiling losses at the site and identify nonuniformities across different locations.

Before Going Into the Field

- Make sure the microscope is charged.

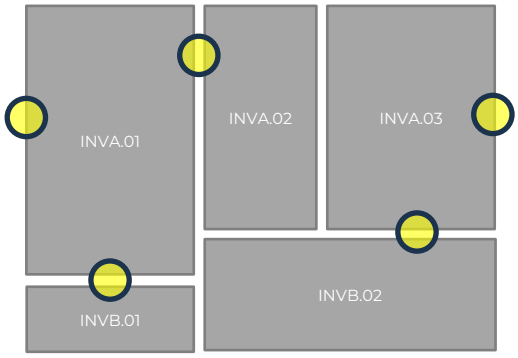
  A charging cord is supplied in your Solar Unsoiled bag. The charging port is located under the rubber cover on the top of the microscope (see right).

  Note: The microscope turns on automatically when you plug it in to charge. Leave it on while charging and turn it off after you unplug the unit.

- If you are performing a Soiling Snapshot, make sure you know the specific locations to image on site.

  This will be provided to you before going on site via a list or a map (see example to the right).

  You will be taking a 'collection' (set of 30 images) for each location on site.



Getting Started

1. Open the side screen and press the power (⏻) button to turn the microscope on.

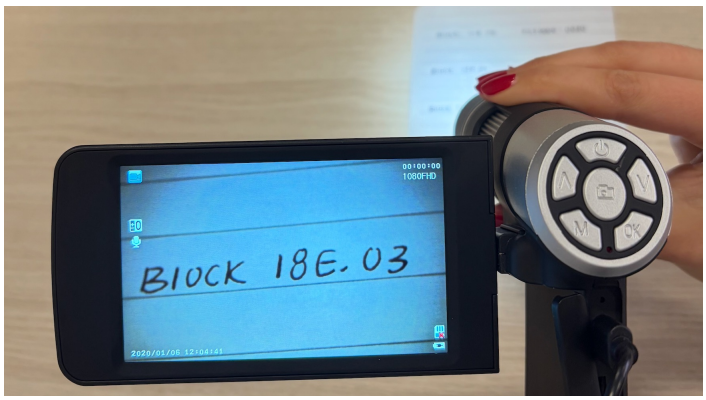
2. Press the mode (**M**) button on the top of the microscope to change from the default video mode to picture mode. You should see a camera (📷) icon in the upper lefthand corner of your screen. We need pictures, not videos.

3. Turn the light on the microscope up – do this by turning the black wheel on the underside of the microscope forwards.

4. Take a picture to document the new site or location that you are beginning to image.

   Why: As you take more images, all past and current images will be stored on the same SD card. Taking a buffer image helps make sure there is a clear distinction between images from different sites/locations.

   How: Write the site or location you are at in your notebook, zoom your microscope all the way out, and snap a picture of what you wrote. Alternatively, snap a picture of the inverter block sign on the site.



Positioning the Microscope

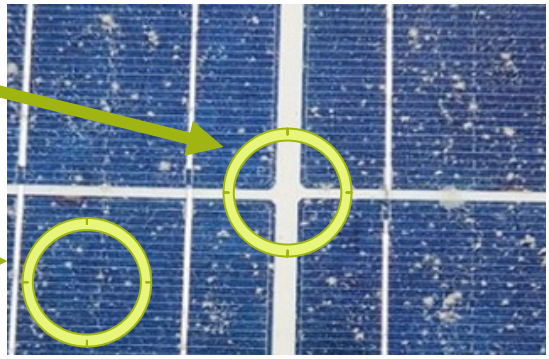
5. Take images evenly spaced out across the middle parts of the panels, not the edges.

   Why: The images you take need to be unbiased and representative of overall panel soiling. We do not want to focus solely on the highest or lowest regions of soiling.

6. On **crystalline panels**, you will be taking imagery in two places: in between and over the dark cells.

   Position the microscope lens here to image over the white part in between the dark cells

   Position the microscope lens here to image over the dark cells

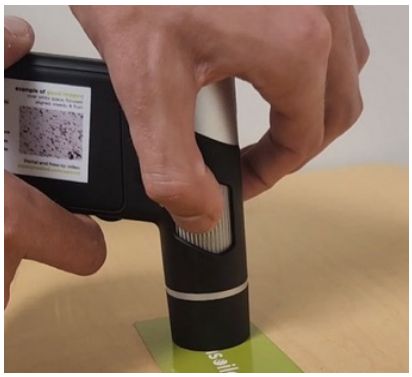


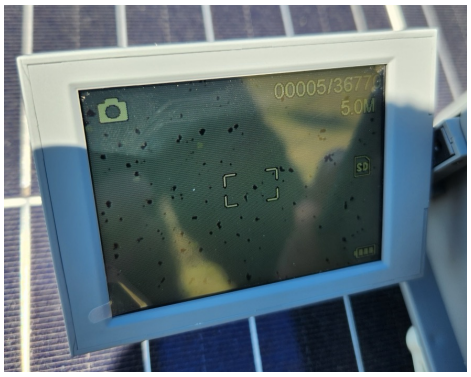
On **thin film panels**, position the microscope lens over the dark cells and do not worry if wires are in the image.

Taking Microscope Imagery

7. Securely press the microscope onto the surface of the glass.

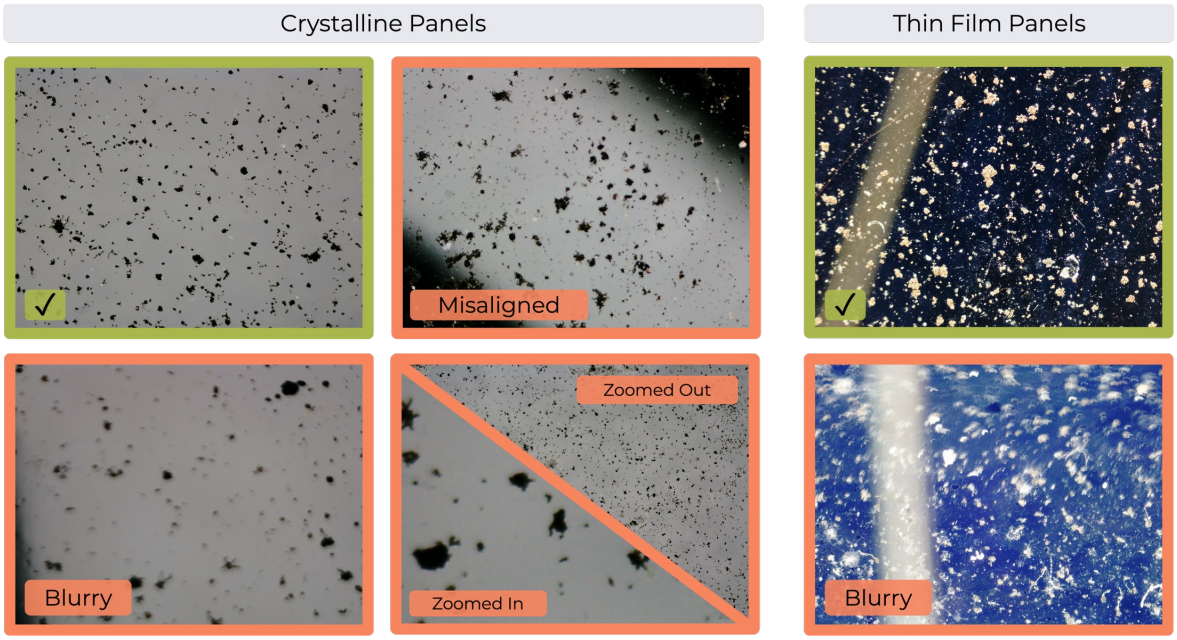
8. Focus the image by very slowly turning the gray wheel on the front of the microscope. The particles on the panel (which you should see in the screen) should have sharp edges.





9. Once the image is in focus, hold the microscope steady and firmly against the panel. Press the camera (📷) button at the top of the microscope to take an image.

   Examples of good/poor quality images:



Imaging Requirements

10. On each panel you visit, take images based the following table:

Crystalline Panels	Thin Film Panels
5 images over the white part, 1 image over the dark cell	6 images over the dark cells

11. Continue imaging until you have met the requirements listed in the table below:

	Routine Microscope Imagery	Soiling Snapshots
Images per panel	6 images per panel	6 images per panel
Panels per collection	5 panels randomly sampled across the site	5 panels at each specified imaging location
Collections per visit	1 collection for the entire site	1 collection for each specified imaging location
Total # of images	**30 images**	**~150-450 images**

12. Note: if a site is being cleaned, please complete all imaging requirements in Step 11 for dirty (pre-wash) panels and for clean (post-wash) panels separately.

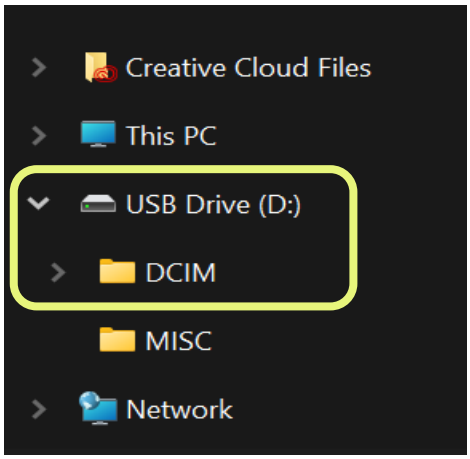
Uploading Images

13. Images are stored on a MicroSD card under the rubber cover next to the charging port. Pressing down slightly on the SD card will make it pop up so you can grab it.

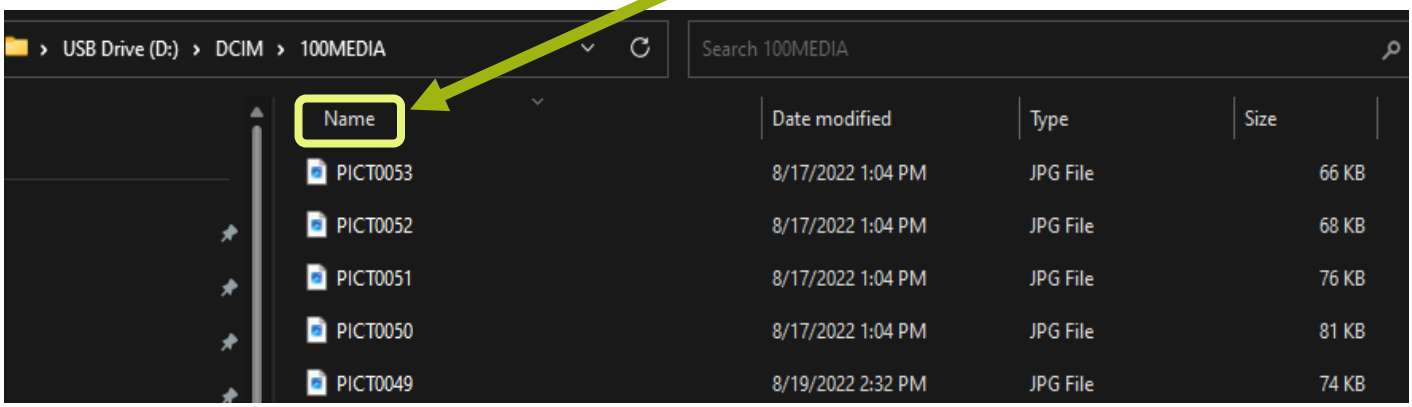
14. Insert the SD card into the included USB adapter and plug this into your laptop.

15. Open a File Explorer tab. Your images will be in the USB or External Drive Folder under the 'DCIM' folder.

    Open this folder to view all images on the MicroSD card.



16. Images are named numerically, with numbers increasing sequentially over time (oldest images have the lowest numbers; newest have the highest). Click the 'Name' column to sort from most recent to oldest images.



Uploading Images

17. Open a browser tab and go to www.solarunsoiled.com/upload

18. Select all images belonging to a single collection.

What is a collection?

- For Routine Microscope Imagery, one collection = images from one entire site.
- For Soiling Snapshots, one collection = images from one specified location on site.
- If you are taking images from a site cleaning, please upload pre-wash and post-wash images as two separate collections.

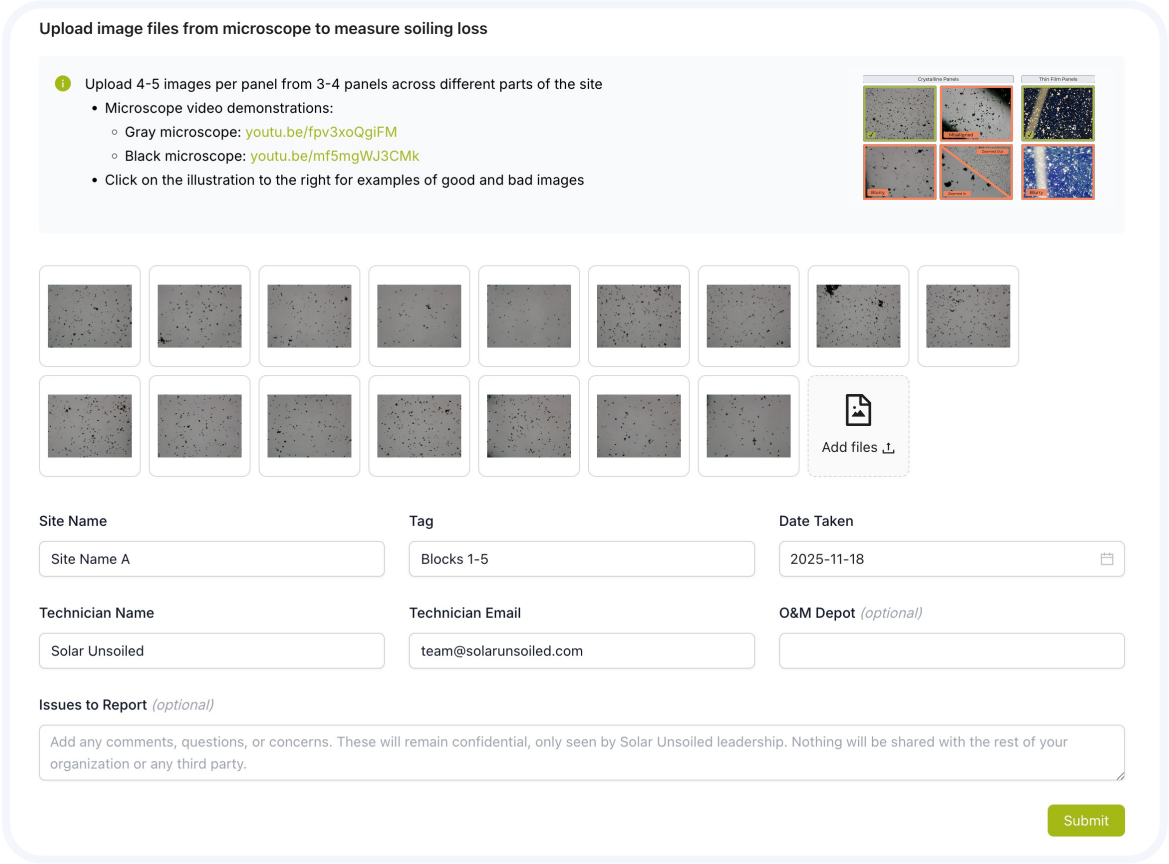
Helpful tips:

- Use your notebook and your buffer images to reference which images belong to which collection.
- Click on the first image corresponding to a collection, hold down *Shift*, and then select the last image corresponding to a collection to easily select them all.
- Remember – the image names with the highest number are from the site/location you went to most recently.

19. Drag these selected images from the File Explorer to the 'Add Files' icon in the Solar Unsoiled upload portal (see right).

Uploading Images

20. You will now see your images loaded into the portal. Fill out the upload portal form with the following information:
    - Site Name
    - Tag – any relevant information including:
        - The location on the site the images were taken
        - Special imaging notes (ex: images are from the back of the module, from bifacial panels, pre-wash, post-wash etc.)
    - Date taken – this is the date the images were taken, not today's date if you are uploading them later
    - Your name/email – how we can contact you!



21. Hit '**Submit**' and repeat steps 18-20 for all collections to upload.

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Thank you for your support!

Call/text/email team@solarunsoiled.com or (443) 610-1405 with any questions or concerns.

If your microscope is broken or lost, no worries – send us an email and we will get you a replacement.

A brief version of these instructions are printed on the sticker on your microscope.

Video instructions can be found at solarunsoiled.com/upload.