



Solar **Unsoiled**[®]

Microscope How-To Guide

Updated Dec 2025

Questions or concerns? Email, call, or text:

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A Note on the Purpose of this Tool

This microscope is used to quickly assess soiling losses while on-site for other O&M.

The images you take will be used to calibrate our predictive soiling model and make cleaning decisions.

The following points are very important:

1. Soiling images must be **representative of overall site soiling**. We do not want to seek out the highest or lowest level of soiling; the images we take need to be **unbiased**.
2. The correct images associated with the correct site must be **uploaded and labeled**.

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)



How To: In the Field

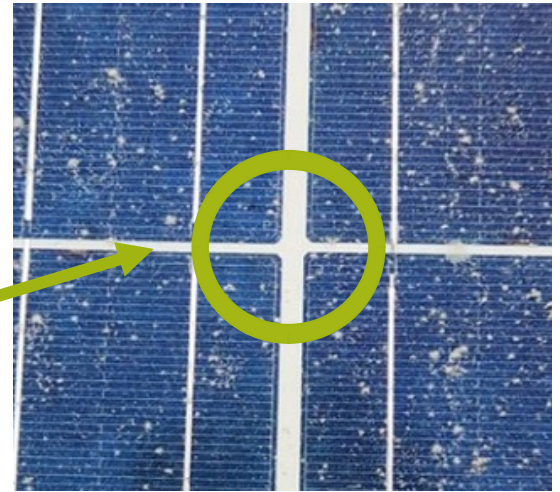
1. Open the side screen and press the power () button to turn the microscope on.
2. Press the mode (**M**) button on the top to go from the default video mode to the picture mode (*reminder: we want pictures, not videos*).
3. A camera () icon should appear on your screen.
4. Turn the light on the microscope up – do this by turning the black wheel on the underside of the microscope forwards.
5. Take a picture of something that lets you know you are beginning to image a new site.
 - **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!
 - **Helpful Tip:** When our team gets to a new site, we like to take a picture of our hand before and after taking images of the panels. This helps us know where that site's collection starts and ends.

How To: In the Field

6. Position the microscope so the lens (and the view in the screen) is over the **white part of the panel, in between the blue cells.**

Image here on crystalline panels!

Note for thin film sites: just image over the dark part and don't worry if wires are in the image.



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

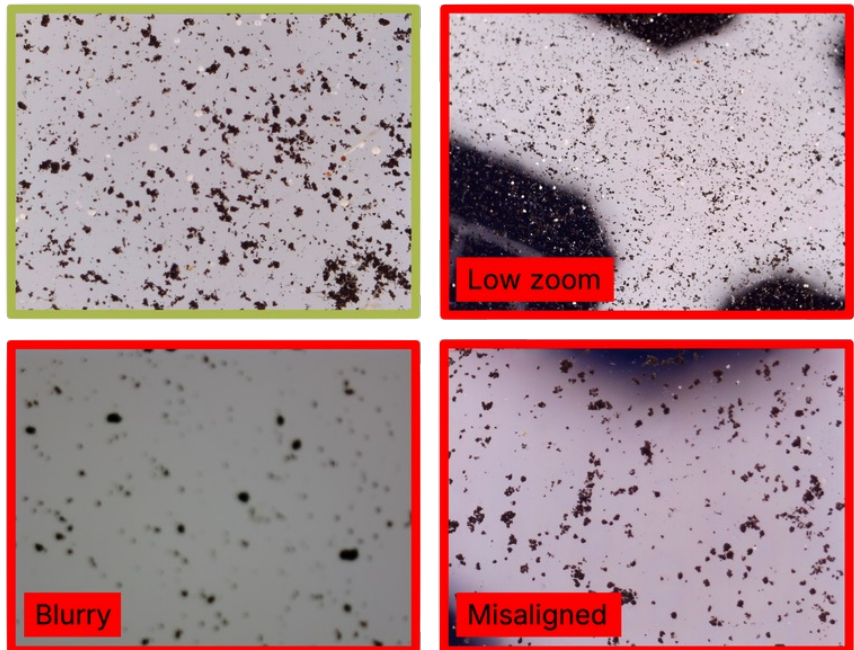
8. Focus the image by very slowly turning the gray wheel on the front of the microscope. The particles on the panel (which you should see in the screen) should have sharp edges. **In-focus images are necessary for accurate soiling measurements.**



How To: In the Field

9. Once the image is in focus, hold the microscope steady and firmly against the panel and press the camera (📷) button at the top of the microscope to take an image.
10. Take **6 images from 5 different panels** across the site. You should take a total of **30 images per site**.
 - Images should be taken from the **middle parts of the panels** (not the edges).
 - Please take 5 images between the solar cells and 1 image over the dark cell.

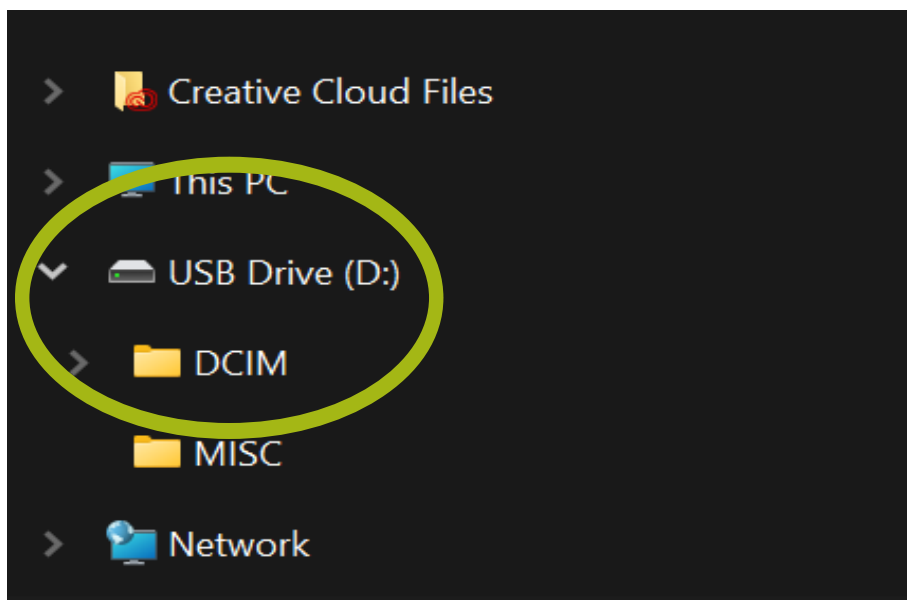
Examples of good and poor-quality images:



11. Use your notebook to keep track of **how many** images you took at **what site** and on **what date**.

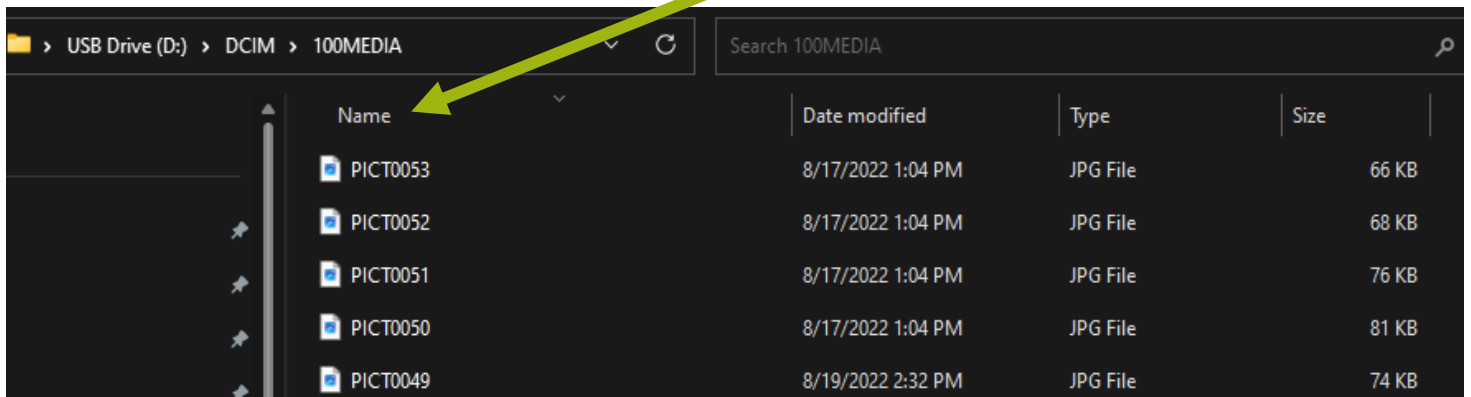
How To: Uploading Images

1. Images are stored to 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.
2. Insert the SD card into the included USB adapter and plug this into your laptop.
3. 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.

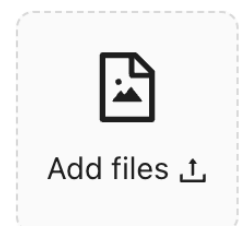


How To: Uploading Images

- 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.



- Open a browser tab and go to www.solarunsoiled.com/upload
- Select the images for a single site – click on the first image corresponding to that site, hold down Shift, then select the last image corresponding to the same site to select them all.
 - Use your notebook and your buffer images to reference which images came from which sites.
 - Remember – the image names with the highest number are from the site you went to most recently.
- Drag these selected images from the File Explorer to the 'Add Files' icon in the Solar Unsoiled upload portal (see right).



How To: Uploading Images


8. 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** such as the work order attached to the imaging, the location on the site the images were taken, if the images are from the back of the module (bifacial panels), etc.)
- Date taken (note: this needs to be **the date the images were taken**, not today's date if you are uploading them after the fact)
- Your name/email (how we can contact you!)
- Optional fields: O&M Depot (if applicable) and any issues to report

Upload image files from microscope to measure soiling loss

i Upload 4-5 images per panel from 3-4 panels across different parts of the site

- Microscope video demonstrations:
 - Gray microscope: youtu.be/fpv3xoQgjFM
 - Black microscope: youtu.be/mf5mgWJ3CMk
- Click on the illustration to the right for examples of good and bad images




 Add files ↓

Site Name

Tag

Date Taken

Technician Name

Technician Email

O&M Depot *(optional)*

Issues to Report *(optional)*

Add any comments, questions, or concerns. These will remain confidential, only seen by Solar Unsoiled leadership. Nothing will be shared with the rest of your organization or any third party.

9. Hit **'Submit'** and repeat steps 6-9 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.