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Pre-Sample Weigh In
UCD TI #251J, Version 3.1
September 30, 2026
Page 1 of 11

UCD IMPROVE Technical Information #251J

Pre-Sample Weigh In

*Interagency Monitoring of Protected Visual Environments
Air Quality Research Center
University of California, Davis*

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Version 3.1*

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DOCUMENT HISTORY

Revision	Release Date	Initials	Section/s Modified	Brief Description of Modifications
	02/23/2022	SRS	All	Previously anthologized version separated into individual TIs.
	04/8/2022	GRM	All	Updated wording to accommodate new procedures.
3.1	9/30/2026	RMA	All	Reorganized procedural steps and section content for improved readability. Updated wording and content for consistency across SHL TIs. Added and revised figures to reflect lab app updates and procedural changes.

Section 508 Compliant ☐ Yes ☒ NoPre-Sample Weigh In
UCD TI #251J, Version 3.1
September 30, 2026
Page 3 of 11

TABLE OF CONTENTS

1. Purpose and Applicability	4
2. Summary of the Method	4
3. Definitions.....	4
4. Cautions	4
5. Equipment and Supplies	5
6. Procedural Steps.....	5
6.1 Assigning Pre-weigh Filter Weights.....	5
6.2 Troubleshooting Cognex Scanner.....	9

LIST OF FIGURES

Figure 1. Cognex Scanner With Carrier.	6
Figure 2. Successful Trigger.....	6
Figure 3. Pre-weight Accepted.	7
Figure 4. Redo Filter Assignment.....	8
Figure 5. Highlighted Logsheet.	8
Figure 6. Connected Scanner.	9
Figure 7. Carrier Seated Correctly on Scanner Base.	10
Figure 8. Manually Adding Filter Codes.	11

1. PURPOSE AND APPLICABILITY

The purpose of this technical information document (TI) is to describe the procedures used to assign a physical Teflon filter to a given IMPROVE site, date, and module. These procedures are used for every routine site in the IMPROVE network.

2. SUMMARY OF THE METHOD

Teflon filters that have already been pre-weighed are scanned and assigned to a given site, date, and module. Log sheets are generated, one for each week.

3. DEFINITIONS

- **1A Module:** IMPROVE sampling module for 25 mm Teflon filters that have a deposit composed of PM_{2.5}. Sometimes shortened to 1A or A modules.
- **4D Module:** IMPROVE sampling module for 25 mm Teflon filters that have a deposit composed of PM₁₀. Can be shortened to 4D or D module.
- **Cartridge:** A set of four cassettes with a clear plastic base. Holds 2-3 Cassettes with filters.
- **Carrier:** A small metal item that holds a filter as it is analyzed in the MTL automatic weighing chambers.
- **Cassette:** A white plastic item that holds one filter in place. Made up of two halves; a cassette bottom and top.
- **Field Blank:** IMPROVE filters, often abbreviated FB. These filters don't have air pumped through them when they are in the sampler; they serve as a control group for lab and field contamination.
- **Filter Serial Code:** An alphanumeric code printed on a Teflon filter; typically referred to as a barcode.
- **IMPROVE Filter Processing Application:** Proprietary laboratory software for processing IMPROVE samples in the Sample Handling Lab; also referred to as the lab app.

4. CAUTIONS

Many site names are similar; ensure the site listed on screen matches the labels physically on the cartridges before you proceed.

Handle only one cassette and one filter at a time; having two or more cassettes open while loading filters increases the risk of filter swaps.

When loading Teflon filters, place a single screen in each cassette. Failure to load a screen or loading two screens instead of one can affect sampling out in the field.

The containers that hold each MTL chamber's carriers are stored above the benchtop. Exercise caution if moving these containers, as they are heavy and the contents shift around. Ensure dividers are in place before moving the container.

5. EQUIPMENT AND SUPPLIES

- Computer with lab application
- Barcode scanner
- Forceps
- Container of clean 25 mm loose screens
- Unexposed Teflon filters
- Carriers
- Printer
- Cardstock for Log sheets
- Extra red caps
- Highlighter

6. PROCEDURAL STEPS

6.1 Assigning Pre-weigh Filter Weights

Unexposed filters ready for pre-weigh assignment can be found in bins labeled with each chamber's name at the designated station. Confirm the bin you select filters from has enough filters before starting the procedure, if less than 20 filters check the other bin. Do not use filters from both bins. If a filter has physical damage, is dropped or contaminated in any way do not use this filter. Place the filter in the designated labeled bin.

1. Remove a stack of approximately 15 filters in MTL carriers from one bin, place them on the benchtop. Keep each filter in the same carrier it was weighed in.
2. Navigate to the lab app Pre-Weighing Station. Select Pre-Sampling, then Pre-sample Weigh-in.
3. Scan or type in the five-character site code for the bin. If an error message appears, refer to section 6.3 to troubleshoot.
4. Place a carrier with a filter on the scanning platform.

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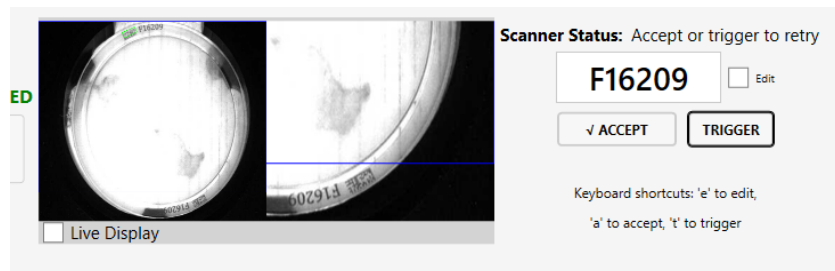
Pre-Sample Weigh In
UCD TI #251J, Version 3.1
September 30, 2026
Page 6 of 11

Figure 1. Cognex Scanner With Carrier.



5. Press “trigger” on the screen or select “t” on the keyboard to trigger the barcode scanner.
6. A successful scan will result in the filter barcode filling in on the screen and an image of the filter appearing. See image below.
 - If a scan is not successful, see section 6.3.

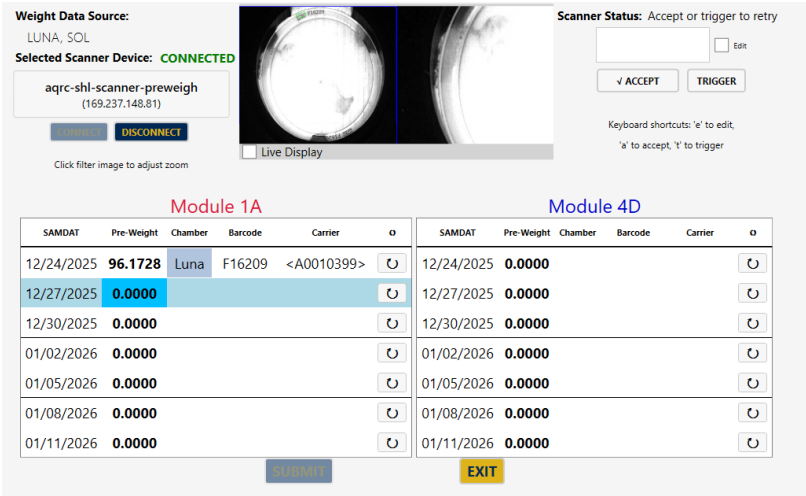
Figure 2. Successful Trigger.



7. After a successful filter barcode scan, press Accept or ‘A’ on the keyboard to continue. The filter pre-weight, weighing chamber, barcode and carrier fields will all update. See Figure 3 below.

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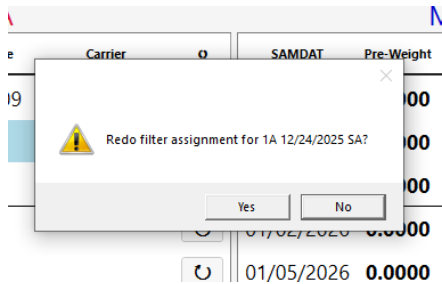
Figure 3. Pre-weight Accepted.



8. Locate the cassette labeled with the date that was just accepted and confirm the module being loaded is correct.
9. Remove the filter from its carrier with forceps and place it into the labeled cassette barcode side down. If two filters are found in a carrier, see 6.3 step 2.
10. The barcode text field should be blank now, confirm the empty barcode text field before triggering the next scan.
- If the Scanner Status says, “Accept or trigger to retry” and there is still text in the barcode text field, the barcode / weight has not been accepted and assigned. Click “Accept” before moving on.
11. If a filter is dropped or damaged after it is assigned to a sampling date, the filter will need to be replaced. To the right of the carrier code is the following symbol, . Click on this to redo the filter. The following pop-up will appear, click yes to replace this filter with a new one.

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Figure 4. Redo Filter Assignment.



- 12. Select a new filter from the stack and repeat the scanning steps to add this filter to the selected sampling date.
- 13. Repeat all steps for all A module filters, followed by all D module filters. If the site contains a 5A or 5D module, these will be scanned following the routine 4D module.
 - Pay attention to any notes on the screen for the various modules.
- 14. Once all sampling dates have a filter and weight assigned place all red caps on the bottom of the 1A, 4D and 5th module cassettes.
- 15. Click submit. Log sheets will automatically print from the lab printer.
- 16. Confirm the site name and date on each page of the log sheets match the site that was just loaded. Highlight the site and date box at the top of the sheet, as seen in Figure 5.

Figure 5. Highlighted Logsheet.

UC Code: 2580 INSTALL ON --> **WHPE1 8/25/2026** FC# 0000.36.02

IMPROVE Network Field Log

INITIAL READINGS						FINAL READINGS		
Operator Initials: _____		Sampler's Date: ____/____/____				Init: _____		Sampler's Date: ____/____/____
		Sampler's Time: _____						Sampler's Temp: _____
								Sampler's Time: _____
SamDate	Day	Vac ($\times 10$)	Cass	Pressure	Flow (15-25)	Pressure	Flow (15-25)	ET (1440)
08/27/2026	Thu	Mod 1A	1	---	---	---	---	---
08/30/2026	Sun		2	---	---	---	---	---
08/27/2026	Thu	Mod 2B ($\times 10$)	1	---	(15-25)	---	(15-25)	(1440)
08/30/2026	Sun		2	---	---	---	---	---
08/27/2026	Thu	Mod 3C ($\times 10$)	1	---	(15-25)	---	(15-25)	(1440)
08/30/2026	Sun		2	---	---	---	---	---
08/27/2026	Thu	Mod 4D ($\times 40$)	1	---	(17-1)	---	(17-1)	(1440)
08/30/2026	Sun		2	---	---	---	---	---

Always Orient each Cartridge Plate as per Instructions on each Door

17. Place the log sheets in the side of the bin.

18. Place the completed bin on the rack at the “QC Check” station.

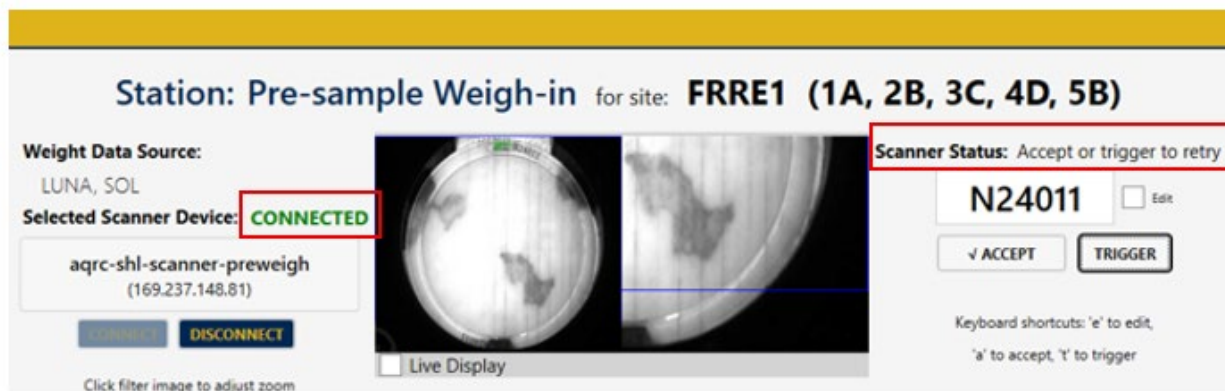
19. The empty carriers can be set aside in a labeled bin on the benchtop to use for future weighing procedures.

6.2 Troubleshooting Cognex Scanner

Cognex scanners are used for scanning the filter barcode on Teflon filter support rings. The scanner must be properly connected at a specific station for the lab app to recognize it.

If the scanner is properly connected, the left side of the screen will show “Selected Scanner Device: Connected” and the scanner name. On the right-side the screen will show the Scanner Status, when ready it displays “Accept or trigger to retry”. (Figure 6)

Figure 6. Connected Scanner.



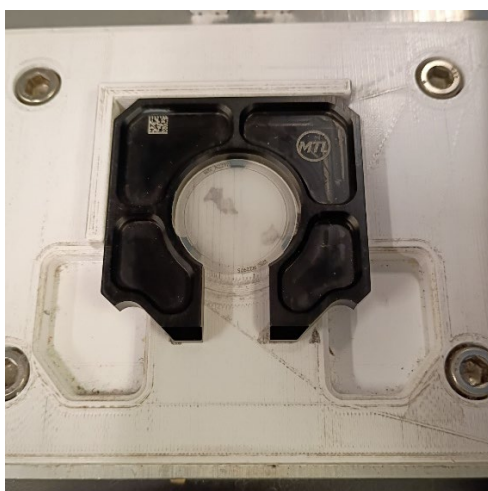
If this is not the case:

1. Ensure the scanners power cable and ethernet cable are plugged in. Try unplugging and reconnecting before proceeding.
2. Close and then reopen the lab app and see if the camera has reconnected.
3. If it does not show that is connected, check the name of the scanner is correct for the assigned station. For pre-weigh, the name will display as “aqrc-shl-scanner-preweigh”.
 - a. If the name is not correct, click on the box with the name, this will bring up a pop-up with a list of device names. Select the appropriate scanner name from the list to highlight it and then click ok. If the

correct device name is not displayed or on the pop-up list, please refer to senior lab staff for assistance.

4. To check the barcode reader's alignment or to view a filter through the barcode scanner, place a filter (still in its Carrier) under the barcode scanner and check the Live Display box on upper center of the screen.
 - a. The Carrier must be oriented with the Carrier barcode in the upper left corner, the MTL logo on the upper right corner, and the alphanumeric barcode legible from the front. (Figure 7)

Figure 7. Carrier Seated Correctly on Scanner Base.



- b. The scanner will stop trying to read a barcode after a few seconds even if a filter is placed within view.
- c. Uncheck the Live Display box before proceeding, the last captured image will remain in that view until the Live Display box is activated again or the lab app successfully scans a filter in the following steps. While the Live Display box is checked, the scanner cannot be used to scan in filters to the lab app.

6.3 Troubleshooting Individual Filters

1. The filter may need to be repositioned within the carrier to get a successful image. If the scanning system is unable to read the filter barcode, the error message "Undefined" will show up. (Figure 8). First, try repositioning the filter. If this is not successful use the edit button in the lab app to type the filter barcode. (Circled in red in Figure 8.)
2. If a carrier contains more than one filter, do not use these filters. Separate the filters

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into individual carriers and place in the designated bin labeled “No Mass Record” for gravimetric analysis.

Figure 8. Manually Adding Filter Codes.

