

UCD IMPROVE Technical Information #251J

Pre-Sample Weigh In

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

*July 15, 2022
Version 3.0*

Prepared By:	<small>DocuSigned by:</small> <i>Anthony Kawamoto</i> <small>3A49A57FF666452...</small>	Date: <u>10/4/2022</u>
Reviewed By:	<small>DocuSigned by:</small> <i>Jason Giacomo</i> <small>B62B01F81613421...</small>	Date: <u>10/4/2022</u>
Approved By:	<small>DocuSigned by:</small> <i>Marcus Langston</i> <small>0A10CF79B0452...</small>	Date: <u>10/4/2022</u>

DOCUMENT HISTORY

Date Modified	Initials	Section/s Modified	Brief Description of Modifications
02/23/2022	SRS	All	Previously anthologized version separated into individual TIs.
4/8/2022	GRM	All	Updated wording to accommodate new procedures.

TABLE OF CONTENTS

1. Purpose and Applicability.....	4
2. Summary of the Method	4
3. Cautions	4
4. Equipment and Supplies	4
5. Procedural Steps.....	4
5.1 Manually Weighing.....	4
5.2 Weighing in MTL Autohandler Chambers	7
6. Database Management	9

LIST OF FIGURES

Figure 1. Pre-sample weigh in with 5A Module.....	9
Figure 2. Pre-sample weigh in with 3C only.	10

1. PURPOSE AND APPLICABILITY

The purpose of this TI is to describe the procedures used to weigh and install clean 1A and 4D PTFE filters to be sent back out into the field. These procedures are used for every site in the IMPROVE network, though many of them generally apply to special studies as well.

2. SUMMARY OF THE METHOD

Clean PTFE filters are weighed on a microbalance. The weights are recorded using the lab application. PTFE filters are loaded into labeled cassettes. Log sheets are generated, one for each week. Bins are then ready for the Quality Check station.

3. CAUTIONS

Many site names are similar. It is important to ensure that the site being loaded in the Pre-sample Weigh-in program matches the site name on the bin.

Make sure to 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 PTFE filters, it is important to place a single screen in each cassette. Failure to load a screen at all or loading two screens instead of one can severely affect sampling out in the field. It is important to load the PTFE filter with the alphanumeric code facing down on the bottom portion of the cassette. Make sure to use the correct login information at the Pre-sample Weigh-in computer.

4. EQUIPMENT AND SUPPLIES

- Mettler Toledo XP6 Microbalance
- Computer with lab application
- Barcode scanner
- Antistatic unit
- Forceps with ceramic tips
- Container of clean 25 mm loose screens
- Polonium strips (small and large)
- Clean PTFE filters
- Printer
- Log sheet paper
- Extra red caps

5. PROCEDURAL STEPS

5.1 Manually Weighing

1. Refer to section 5.1 of TI 251H: Post-Sample Weigh In for general precautions. These instructions only cover the new and or different parts of the Pre-Weigh station and will not delve into every step. There is one micro balance at the Mettler 1 station. There should be one set of forceps to be used for the PTFE filters. Make sure to use the correct login information at the station. The username and password are posted in the safety glasses cabinet.
2. Remove the PTFE filters from the box and line up as many as possible but safely (do not let the filters fall onto the counter) on the polonium strips. Use the forceps, making sure to grab the filters by the plastic edge. Throw away the clear plastic circles that are on the top and bottom of each stack of filters if applicable. If there are not PTFE filters readily available, notify a lab assistant to check-out more.
3. Open the Lab Application. Navigate to Pre-Sampling, and then Pre-sample Weigh-in, entering three-letter initials. Scan the bin barcode (type in the 5-character site code if the bin is unlabeled).
4. The cartridges should have already been stickered by the time the bin gets to this station. Remove the 1A and 4D cartridges from week 1. Verify that the Cartridge and Bag stickers match the dates listed by the Lab Application. If they do not, contact an authorized lead lab assistant. A line divides each week. SAMDAT (Sampling Dates) appear in the correct order of oldest at the top, to more-recent at the bottom, and module should match, for each filter type
5. Make sure that the balance reads 0.000 mg. If it does not, alert the lead lab tech. Check the level bubble at the top of the balance. If the bubble is outside of the circle, ask a lead lab tech to level it before continuing.
6. Make sure that there is $\frac{1}{2}$ a polonium strip inside the balance. Make sure the polonium strip is not too close to the weighing pan; if the strip is too close a filter may rest on it and report faulty measurements. Make sure that there is a whole polonium strip attached to the glass top of the weighing chamber.
7. Wait for the lab application to accept the zero weight. Take the forceps and pick up a PTFE filter from the polonium strips. Look at the filter. Make sure that there are no holes. If a speck can be seen on the filter, try to flick it off by tapping the edge of the forceps. If the speck will not come off, place it in the box on the weight table that is labeled, "Specks." If a hole is found, place it in the box labeled, "Holes." If the filter is dropped or injured in any way due to handling, place it in the "Dropped" box.
8. Ensure that the filter is oriented correctly. The alphanumeric code on the outer rim of the filter is facing up. Pass the filter through the antistatic unit on the right side of the balance. Open the balance by pressing the right arrow button. With the wrist remaining within the ionizing strip's effective zone, gently place the filter on the pan shiny side down and press the same button to shut the door.
9. The top row in the A module column with the first sample date row will appear

highlighted. Therefore, the filter that is being weighed belongs to position 1 of the A module. There will be an area for text to the right of the weights box that will read “Waiting for stable weight.” While waiting for the balance to stabilize, open the first position of the physical 1A cartridge. Do so by putting the cassette in the arbor press and pulling down on the lever. Take the cup from the bottom of the press and set it next to the polonium strips. When the filter weight is stable, the program will pick up the weight and display it in the green box.

10. After the filter’s weight stabilizes and a weight is displayed, the text area will offer several options: **[A]** to accept and continue; **[R]** to discard and retry. Check to make sure that the weight the balance display reports matches the number on the computer monitor. If the two numbers differ, then press **[R]** to discard and retry. If the weights match, press **[A]**. The text area will be confirmed that the weight is saved. Remove the filter. Open the balance door and gently grab the filter (again by its outer edge) with the forceps. Set the filter down into the cassette bottom. Make sure that the filter is alphanumeric code faced down in the cassette bottom. The proper orientation is extremely important. Then, retrieve a clean loose screen from the container on the weight table and place it on top of the filter. Make sure the side with the engraved “UP” is facing up in the cassette cup. Make sure to load only one, as they can sometimes stick together.
11. The program will wait for a stable zero weight from the balance. Alert the lead lab tech if it fails to do so by itself. After, the program displays “Waiting for stable weight” in text area, place another filter on the balance. Now the space for the second position A filter will be highlighted. Pick up another filter and place it on the balance. Be sure to close the balance door. The computer will automatically start waiting for the balance to stabilize. Filters are weighed by week, with 1A filters weighed first in order of earliest to more recent sampling dates, the 4D filters in that same order. Proceed with the rest of the filters in the box.
12. Make sure while weighing that all weights in a week are ± 0.100 mg apart from each other. The program will perform this check and prompt for a replacement weight when necessary. If filters are too close in weight, select **NO** on the pop-up screen and select another filter to weigh.
13. When all three weeks are complete, the lab application will offer the chance to change a weight. Whenever replacing a weight at the end of a box, contact an authorized lead lab assistant. Next, submit records and retrieve the log sheets for the box from the printer. The site name is printed in the center at the top of each log sheet. Confirm that the log sheets match the site that was just loaded. Fold the log sheets in half lengthwise, then widthwise and place them in the correct weeks. Place all red caps on the bottom of the 1A and 4D cartridges. Place the completed bin in the cabinet at the “QC Check” station.
14. Special Case #1: 5X module-boxes. Some bins will have an additional cartridge in each week bag. If the 5th module is an A or a D, it will show up on the weigh

in page with the 1A and 4D samples (Figure 1).

15. Special Case #2: C-only site. C-only site (DETR1) will not need to have any filters weighed at the load station. Simply submit records to print the log sheets (Figure 2).

5.2 Weighing in MTL Autohandler Chambers

Refer to section 5.2 of TI 251H: Post-Sample Weigh In for general precautions and for the weighing of the clean filters. These instructions only cover the new and or different parts of the Pre-Weigh station and will not delve into every step. Prior experience with the manual Pre-Weighing station is required, and the same procedural considerations must be observed.

1. Prepare a set of filters (~15) that have already been Pre-Weighed through either MTL chamber. Keep the filters in the same carrier that it was weighed in. Confirm that there are plenty of filters that have been Pre-Weighed in the MTL Chamber available before proceeding. If at any time two filters were accidentally loaded to one carrier, the registered Pre-Weigh would be very high 160 + mg. Split them into separate carriers and reuse both filters for the next round of Pre-Weigh loading (within 30 days).
2. Navigate to the lab app Pre-Weighing Station.
3. Scan in or type in the five-character code for the bin. It will take a few seconds to advance to the next screen. If an error message comes up before the next screen pops up, it might be because the lab app cannot recognize the external barcode scanner. Confirm that the external barcode scanner is securely connected (power and Ethernet).
4. In the upper right corner, there is a barcode status section. There are multiple scanners on the network so confirm that the scanner corresponding to the login is selected. If not, click anywhere inside the rectangular box that shows the device name to bring up another popup. If the desired scanner shows up on that list, highlight it, press **OK**, and confirm that the same device name shows up on the previous window. The COM9 device is the barcode scanner in the AH1 MTL chamber.
5. 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. 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. If the barcode scanner beeps soon after checking the Live Display box, it signals that the scanner was able to read a valid barcode. The scanner will stop trying to read a barcode after a few seconds even if a filter is placed within view. 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. Note that while that Live

Display box is checked, the scanner cannot be used to scan in filters to the lab app.

6. The section on the upper right will show the Scanner Status. Once the station is prepared, press the Trigger button or 'T' to trigger. If the barcode successfully scans the barcode, the barcode scanner beeps, the Live Display refreshes with a screenshot of the correct filter, and a green rectangle appears somewhere near the barcode that was scanned. The text field shows the correct 6-digit alphanumeric filter barcode.
7. If the barcode scanner does not beep a few seconds after Triggering, a popup box appears. The Live Display should still update with a screenshot, but the barcode text field shows #UNDEF.
 - a. Press Ok to get past the popup window. Check that filter's alphanumeric code is legible (not upside down when viewed on the screenshot). If it was Pre-Weighed by the MTL chamber while the barcode was upside down, it may be best to set that filter and Carrier aside; the filter orientation can be corrected and reloaded the next time the MTL chamber Pre-Weights filters
 - b. Rotate the filter 30° - 45° at a time and press the Trigger button each time. Try to keep both barcodes within view and away from the Carrier's three support tabs.
 - c. If the barcode does not scan and the alphanumeric code is not legible for a clean / unsampled filter, we will not use that one. It is very important that the barcodes are correctly assigned.
8. After a successful filter barcode scan, press Accept or 'A' to continue. If the MTL database does not have records for the filter barcode, a popup box will appear. Refer to the No Weigh Data Found troubleshooting section at the end of section 5.4 of TI 251H: Post-Sample Weigh.
9. The lab app will perform the same weigh validation as before it may be necessary to select a different filter if the criteria is not met.
10. If a filter is dropped or torn before it is assigned to a site, set it in the dropped / holes box.
11. If the database has records for the filter barcode and it passes all validation, confirm that the filter barcode (refer to the refreshed Live Trigger screenshot) accepted for the Sampling Date and Module match. All associated Pre-Weigh information will be filled in on the table to the right.
12. Remove the filter from its Carrier and load it into the Cassette as usual (barcode side faced down).
13. It is paramount that all the associated Pre-Weigh information appears before handling the filter. Not doing so can easily lead to errors.
14. After accepting a barcode and weight, the Scanner Status shows "Ready to trigger" and the barcode text field is blank. Once the filter is correctly loaded into the cassette, continue to assign barcodes / weights in the same order as

manually weighing filters. Always confirm the Scanner Status and empty barcode text field before triggering another 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. If a filter is dropped or damaged after it is accepted / assigned to a sampling date, the filter weigh replacement procedure is similar to manual weighing. The filter can be replaced after all weights for that site have been assigned.

15. Submit records and retrieve the log sheets for the box from the printer. The site name is printed in the center at the top of each log sheet. Confirm that the log sheets match the site that was just loaded. Place all red caps on the bottom of the 1A and 4D cartridges. Place the completed bin in the cabinet at the “QC Check” station.
16. The empty carrier can be set aside in a pile for use for future weighing procedures.
17. Repeat all steps for all A module filters, and followed by all D module filters. If the bin contains a 5A or 5D module, loading of clean filters will follow the D module.

6. DATABASE MANAGEMENT

The lab application is used to load filters that will be sent out into the field. The program checks the Logs and Weights databases to determine the sample date of the last filter weighed for each site. The lab app then determines the next seven sample dates required at each site.

Figure 1. Pre-sample weigh in with 5A Module.

Station: Pre-sample Weigh-in for site: **PMRF1 (1A, 2B, 3C, 4D, 5A)**

Weight Data Source: LUNA, SQL
 Selected Scanner Device: **CONNECTED**
 aqrc-shl-scanner-Joana (169.237.148.81)
 CONNECT DISCONNECT

Scanner Status: Ready to trigger
 Edit
 ✓ ACCEPT TRIGGER

Click filter image to adjust zoom Live Display
 Keyboard shortcuts: 'e' to edit, 'a' to accept, 't' to trigger

Module 1A						Module 4D						Module 5A					
SAMDAT	QTR	POS	Pre-Weight	Chamber	Barcode	SAMDAT	QTR	POS	Pre-Weight	Chamber	Barcode	SAMDAT	QTR	POS	Pre-Weight	Chamber	Barcode
04/28/2021	B21	10	0.000			04/28/2021	B21	10	0.000			04/28/2021	B21	10	0.000		
05/01/2021	B21	11	0.000			05/01/2021	B21	11	0.000			05/01/2021	B21	11	0.000		
05/04/2021	B21	12	0.000			05/04/2021	B21	12	0.000			05/04/2021	B21	12	0.000		
05/07/2021	B21	13	0.000			05/07/2021	B21	13	0.000			05/07/2021	B21	13	0.000		
05/10/2021	B21	14	0.000			05/10/2021	B21	14	0.000			05/10/2021	B21	14	0.000		
05/13/2021	B21	15	0.000			05/13/2021	B21	15	0.000			05/13/2021	B21	15	0.000		
05/16/2021	B21	16	0.000			05/16/2021	B21	16	0.000			05/16/2021	B21	16	0.000		

REPLICATES: 0

Figure 2. Pre-sample weigh in with 3C only.

Main Menu Version 1.2 Test 3b Current User Initials: ALC

Station: Pre-sample Weigh In for site: DETR1 (3C)

No weights required. Hit submit to continue. (Sample dates are listed below).

1/25/2017
1/28/2017
1/31/2017
2/3/2017
2/6/2017
2/9/2017
2/12/2017

SUBMIT EXIT