

UCD IMPROVE Technical Information #251I

Cartridge Preparation Station

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

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DOCUMENT HISTORY

| Date Modified | Initials | Section/s Modified | Brief Description of Modifications |
|----------------------|-----------------|---------------------------|--|
| 02/17/2022 | SRS | All | Previously anthologized version separated into individual TIs. |
| 4/8/2022 | GRM | All | Updated wording to accommodate new procedures |
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1. PURPOSE AND APPLICABILITY

This TI details the procedures used for the Cartridge Preparation station in the sample handling laboratory and establishes uniform guidelines for how to perform these tasks. These instructions are applicable for any IMPROVE network site box.

2. SUMMARY OF THE METHOD

The Cartridge Preparation station is the first in the process of loading filters to be sent back out into the field. Cartridges are checked for proper orientation. All cartridges are labeled with fresh stickers for the new cycle. 2B and 3C filters are loaded, a flashcard is assigned, and field blanks are designated if necessary.

3. DEFINITIONS

- Dummy: a placeholder used for cassette positions that are not sampling positions and do not contain filters

4. CAUTIONS

When loading quartz filters, it is important to load a single screen and filter 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.

Some sites have very similar names. It is important to use the correct stickers when labeling cartridges and week bags so that no confusion occurs at later stations or in the field.

5. EQUIPMENT AND SUPPLIES

- Labeled Compact Flashcard or SD Card
- Bins with empty cartridges
- Computer with lab application
- Barcode scanner
- Week stickers (with site name and installation date)
- Cassette stickers (with site name and sample date)
- Sharpies/highlighters (red, yellow, green, blue, black)
- Necktie stickers (A, B, C, D, X)
- Dot stickers (red, yellow, green, blue, orange)
- Blank cassette stickers
- Black pen
- Clean 6 mil re-closable bags
- Pre-labeled 6 mil re-closable Week bags

- Container of clean quartz screens
- Designated quartz forceps
- Stainless steel forceps for nylons
- Stainless steel forceps for quartz
- Clean quartz filters
- Clean nylon filters

6. QUALITY CHECK PROCEDURE

6.1 General Information

Bins ready to go through the Cartridge Preparation station are free of any sampled filters and placed near the Cartridge Preparation station.

Bins go through the Cartridge Preparation station according to priority. Priority is determined by the IMPROVE Calendar Cycle. Bins with pink or white labels will have three or more boxes in circulation and are higher priority depending on the IMPROVE calendar.

6.2 Quality Check of the Cartridges

The first step at the cartridge prep station is to remove the stickers from the week bags and then dispose of them. Remove all cartridges from the three-week bags and line them up by week. Perform a quick integrity inspection of all cartridges to make sure no portions of the cartridge are damaged and they have been cleaned thoroughly. Wipe down any cartridges that need to be and replace any parts. Parts that may need replacing include: dot-colored stickers, rubber o-rings, c-clips, cassette bottoms or tops.

Be able to recognize which cartridges (1A-5X) should be in which bag. Make any necessary corrections. Lists of how cartridges should be configured for each cycle type are below:

6.2.1 2-3-2 Yellow-bin Boxes

- Week 1: All 4 C-clip positions, with neckties on positions 1 and 2.
- Week 2: C-clip positions in positions 1 and 2, with an O-ring cassette in position 3. The 3 positions should have neckties. Position 4 should have a C-clip position with no necktie.
- Week 3: C-clip positions with neckties for positions 1 and 2. There should be an open hole in position 3 (no cassette). Position 4 should be a C-clip position without a necktie.

6.2.2 3-2-2 Blue-bin Boxes

- Week 1: C-clip positions for positions 1 and 2, with an O-ring cassette in

position 3. These three positions should have neckties. Position 4 should have a C-clip and no necktie.

- Week 2: C-clip positions with neckties for positions 1 and 2. There should be an open hole in position 3 (no cassette). Position 4 should be a C-clip position without a necktie.
- Week 3: All 4 C-clip positions, with neckties on positions 1 and 2.

6.3 Week Bag Check

- 1) Check that week bags are presentable. They should be clean and without holes.
- 2) If unsure about a week bag, it is safer to replace it.
- 3) Pre-labeled week bags are located on a shelf at the Cartridge Preparation station. If there are none, make more using fresh 6 mil resealable bags and a black Sharpie.

6.4 Necktie Check

- 1) Check that there are clean neckties on all sampling positions (not on field blanks). Replacements for all A, B, C, D, and X neckties can be found on a shelf at the cartridge prep station.
- 2) If any necktie is fading or falling off, replace it. Clean the cassette neck with ethanol and a lab wipe before applying the sticker.

6.5 Access the Lab Application

- 1) Open the lab application. Navigate to Pre-Sampling, and then Cartridge Preparation, entering three-letter initials if necessary.
- 2) Scan the bin barcode (begin typing in the 5-character site code if the bin is unlabeled; select the site from the list).
- 3) Select up to four Field Blanks (FB) if the quota is not met. Otherwise select **None**.
- 4) In a tray at the Cartridge Preparation station, find the flashcard associated with the site. If the 8-digit serial number is listed on the left column, select it. Otherwise confirm with a lead lab tech before entering a new card number.

6.6 Stickers on Bags and Cartridges

- 1) Bag and cassette stickers for all sites can be found in the filing cabinet. If any stickers are missing, ask a lab tech to print new ones.
- 2) Verify that the Cartridge and Bag stickers match the dates listed by the lab application. If they do not, contact an authorized lab tech. 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 type should match, for each filter type. If there is a FB it will be noted in a separate table next to the flashcard info.

- 3) Place the appropriate bag label on each week's bag. They are site and week specific.
- 4) Sticker all cartridges. Sticker Wk1 → Wk3, POS 1 → POS2, etc. for the appropriate filter type. Only sticker cartridges one week at a time to avoid mix-ups and confusion.
- 5) Determine whether or not field blanks need to be loaded.
 - a. If no field blanks need to be loaded, continue to 6.
 - b. Make the appropriate FB labels. Blank FB stickers are located at the Cartridge Preparation station. Label the sticker with the information reflected by the lab application (with the appropriate site, ordinal position, FB filter type, and sample date (the same sample date as the filter in position 1 of the appropriate week)).
 - c. All field blanks are always in position 3. Field blanks are located in week 1 for yellow-bin (2-3-2') boxes and should have the same sampling date as the first position for that week. Blue-bin (3-2'-2) field blanks are located in week 3 and should match the sampling date of position 1 for that week.
- 6) After bag and cassette stickers are used, leave them in the appropriate desk tray on the shelf at Cartridge Preparation station. These will need to be returned to the filing cabinet at a later time.

6.7 Dummy Check

- 1) All positions without a necktie should have a correctly colored dummy set and screen. The dummy for the 1A cartridge is a thin, clear plastic disc and a circular red piece of construction paper. The clear plastic disc is placed in the cassette bottom, followed by the circular piece of construction paper. The dummy for the 3C, 4D, and 5X cartridge follows the same procedure except that the construction paper circle is green, blue, or orange instead of red. The 2B or 5B dummy consists of two white circular papers with blue type spelling "PALL" written on one side. The papers are placed type-side down into the cassette bottom.
- 2) If field blanks were designated and a field blank sticker was placed on the cartridge, remove the dummy set from that position. Clean the cassette bottom to prepare it for loading.
- 3) If a field blank was loaded previously but is not being loaded in the current box, fill that position with the appropriate dummy set. If it is a 1A, 3C, or 4D cassette, also make sure to put a correctly-oriented loose screen on top of the dummy set.

7. PROCEDURE FOR LOADING NYLON AND QUARTZ FILTERS

The second part of the Cartridge Preparation station is loading 2B and 3C filters.

- 1) Find the two sets of forceps needed for B/C filter loading. Each is used exclusively for one filter type and marked with a corresponding necktie

around the end of the handle. If the forceps are not marked alert the lead lab tech.

- 2) There should be a box of nylon filters and a box of quartz filters at the station. If there are not any, notify a lead lab tech so that they can check out a new box. These filters are both stored in the IMPROVE SHLfridge; the nylon filters are in a fridge and the quartz filters are in a freezer.
- 3) Remove all red caps from the Week 1 bag. Stack the 1A on top of the 4D cartridges, keeping them together by week. These will not be loaded until the next station. Line up the 2B and 3C cartridges according to week.
- 4) Loading 2B filters: Separate the top and bottom pieces of the cassettes for all the sampling positions. Use a pair of 2B forceps to remove the 2B filters from their container. The filters are white and there are pieces of paper with the PALL logo on them to separate the filters. Throw away the papers. The 2B filters do not have any orientation. Simply place one in each cassette bottom. After loading a filter, close the cassette by putting the cassette bottom and top into the arbor press and then pushing down on the lever to close them together. When all filters have been loaded, put red caps on all cassette bottoms.
- 5) Loading 3C filters: Separate the top and bottom pieces of the cassettes for all sampling positions. Use a pair of 3C forceps to remove the quartz filters from their container. These filters do not have any paper to separate them. Be sure to take only one at a time. The 3C filters have a proper orientation: the roughest side must be facing up in the cassette bottom. Once a filter has been loaded into a cassette bottom, use forceps to pick up a loose 3C screen from the container at the station and place it on top of the filter. Make sure the screen is oriented so that the side with the engraved "UP" is facing up out of the cassette. After loading a filter, close the cassette by putting the cassette bottom and top into the arbor press and then pushing up on the lever to close them together. When all filters have been loaded, put red caps on all cassette bottoms.
- 6) When all 2B and 3C filters have been loaded and capped, return them to their appropriate week bags, along with the 1A and 4D cartridges. Place 2B and 3C cartridges at the bottom of each bag and 1A and 4D cartridges at the top. Place all remaining red caps in the Week 1 bag and move the bin to the "Pre-sample Weigh-in" cabinet.
- 7) Specialty Cases:
 - a. 5X module sites: Some sites have a 5th module. This means that a site will have three bags with five cartridges in each. The 5th module can be any filter type. If it is a 1A or a 4D, no further work needs to be done. If it is a 2B or a 3C module, make sure to load the cassettes with the appropriate filter type. Note: 1A, 2B, 3C, or 4D cartridges in 5th module site bins are all labeled with an orange dot sticker and X neckties. To identify the appropriate filter type, refer to the lab application and confirm with the 5X module cassette and bag labels (Figure 1 and Figure 2).

8. SUBMIT RECORDS

Re-check all neckties, stickers, dummies, bags, and cassette organization, then submit the records through the lab app.

Figure 1. Cartridge prep with 5C Module.

Station: Cartridge Preparation for site: **EVER1 (1A, 2B, 3C, 4D, 5C)**

| Module 2B | | | Module 3C | | | Module 5C | | |
|------------|-----|-----|------------|-----|-----|------------|-----|-----|
| SAMDAT | QTR | POS | SAMDAT | QTR | POS | SAMDAT | QTR | POS |
| 03/23/2017 | A17 | 28 | 03/23/2017 | A17 | 28 | 03/23/2017 | A17 | 28 |
| 03/26/2017 | A17 | 29 | 03/26/2017 | A17 | 29 | 03/26/2017 | A17 | 29 |
| 03/29/2017 | A17 | 30 | 03/29/2017 | A17 | 30 | 03/29/2017 | A17 | 30 |
| 04/01/2017 | B17 | 1 | 04/01/2017 | B17 | 1 | 04/01/2017 | B17 | 1 |
| 04/04/2017 | B17 | 2 | 04/04/2017 | B17 | 2 | 04/04/2017 | B17 | 2 |
| 04/07/2017 | B17 | 3 | 04/07/2017 | B17 | 3 | 04/07/2017 | B17 | 3 |
| 04/10/2017 | B17 | 4 | 04/10/2017 | B17 | 4 | 04/10/2017 | B17 | 4 |

Module 1A Field Blank

| | |
|-----------------|---------------------------|
| FB 03/23 A17 28 | FLASHCARD # 3235.03.01 |
|-----------------|---------------------------|

SUBMIT **EXIT**

Figure 2. Cartridge prep with 5A Module.

Station: Cartridge Preparation for site: **BYIS1 (1A, 2B, 3C, 4D, 5A)**

| Module 2B | | | Module 3C | | |
|------------|-----|-----|------------|-----|-----|
| SAMDAT | QTR | POS | SAMDAT | QTR | POS |
| 04/19/2017 | B17 | 7 | 04/19/2017 | B17 | 7 |
| 04/22/2017 | B17 | 8 | 04/22/2017 | B17 | 8 |
| 04/25/2017 | B17 | 9 | 04/25/2017 | B17 | 9 |
| 04/28/2017 | B17 | 10 | 04/28/2017 | B17 | 10 |
| 05/01/2017 | B17 | 11 | 05/01/2017 | B17 | 11 |
| 05/04/2017 | B17 | 12 | 05/04/2017 | B17 | 12 |
| 05/07/2017 | B17 | 13 | 05/07/2017 | B17 | 13 |

Module 2B Field Blank

| | |
|-----------------|---------------------------|
| FB 05/04 B17 12 | FLASHCARD # 4024.01.01 |
|-----------------|---------------------------|

SUBMIT **EXIT**