

UCD IMPROVE Technical Information #251S

Box Cycles and Cartridge Orientation

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DOCUMENT HISTORY

Date Modified	Initials	Section/s Modified	Brief Description of Modifications
03/04/2022	SRS	All	Previous anthologized version separated into individual TIs.
4/15/2022	GRM	All	Updated wording to accommodate new procedure.

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1. PURPOSE AND APPLICABILITY

The purpose of this TI is to describe the different box cycles used for IMPROVE sites, proper cartridge orientation and configuration, and to explain the quarter naming system used to organize filters for analysis.

2. SUMMARY OF THE METHOD

IMPROVE sites run on one of two box cycles, which are referred to as 2-3-2' (Yellow Bin) and 3-2'-2 (Blue Bin). Cycles are differentiated by cartridge configuration, bin color, and box labels. Each cycle is three weeks long, with loaded cartridges for each week. Cartridges are configured according to the week and cycle to which they belong. After the filters have been sampled and returned to the sample handling laboratory, they are organized for analysis and separated into four different quarters based on the months in which they were sampled.

3. PROCEDURAL STEPS

3.1 Types of Bins

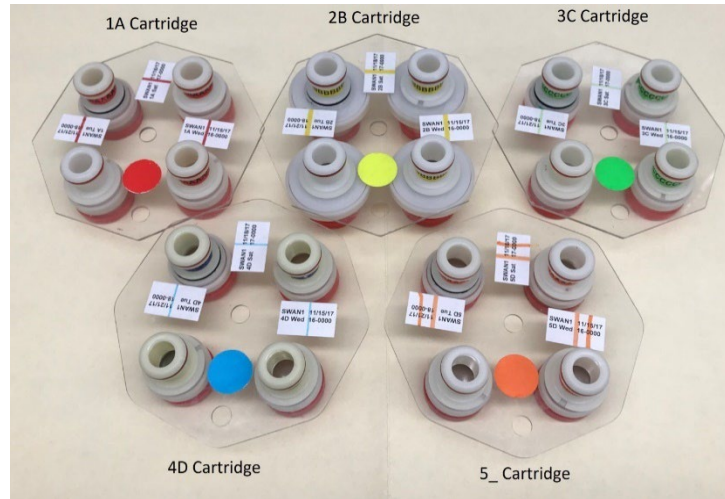
There should be two different color bins found at the “Box Sending/Receiving” station, YELLOW and BLUE. YELLOW bins typically have yellow stickers, while BLUE bins have their site names on green stickers. Sites with more than 2 boxes in circulation either bin color have a PINK or WHITE dot on their label. Bins of either color with WHITE dots are shipped through the United States Postal Service (USPS) instead of the United Parcel Service (UPS) (all bins designated with yellow, green, and pink site stickers are sent by UPS).

3.2 Bin Contents

3.2.1 Primary Filters

Each yellow and blue bin should contain three plastic bags labeled Week 1, Week 2, and Week 3. Each plastic bag should contain four or five cartridges. There are five types of cartridges: 1A (red), 2B (yellow), 3C (green), 4D (blue), and 5X (orange) (Figure 1). For 5X module sites each bag should have one of each type of cartridge, regular sites will only have 1A, 2B, 3C and 4D cartridges. Cartridges contain three to four cassettes. The cassettes in A and D cartridges contain PTFE filters. The cassettes in B cartridges contain nylon filters, and the cassettes in C cartridges contain quartz filters.

Figure 1. Contents of one zip lock bag (one week).



3.3 Proper Cartridge Orientation

The proper orientation of the cartridge is with the labels facing up. There are two holes in each cartridge—one in the middle and one on the outer edge. If looking at the cartridge head-on, orient the cartridge so that the outer hole is facing 6 o'clock. Ensure that the color-coded circular sticker is above the outer hole, as this helps to orient the cartridge.

With the cartridge properly oriented, the sampling of the cassettes runs in a counter-clockwise manner. The bottom right cassette or the first position is always the first sampled followed by the top right (the second position) and then sometimes the top left (the third position) (Figure 2), depending on the week.

Two or three of the cassettes in each cartridge will have labels next to them. The label for each cassette can be found above in the picture. Printed labels contain the site name, the date of the sample, the sample day (Mon-Sun), and the cartridge type. Sometimes handwritten labels will appear in the third position. These are for field blanks, which are filters that are not sampled, but instead are used as controls. Handwritten labels will have the site name, sampling date, and cartridge type. Any unlabeled cassettes are considered “dummies” and do not contain any sample. Dummy cassettes contain a colored piece of paper and a clear circular sheet instead of a filter except for the B cassettes. For the 1A dummies, a red piece of paper and a clear sheet are used. The same protocol follows for 3C and 4D dummies, except that 3C dummies use a green piece of paper and 4D dummies use blue. The 2B dummies use two white circular sheets with the word “PALL” in blue writing. A dummy cassette can be identified by removing the red cap on the bottom of the cassette (Figure 3).

All cassettes containing filters (except for the field blanks) should have a neck-tie around the center. Neck-ties are thin stickers that contain both the color and name of the type of cassette they are for. For example, neck-ties for 1A filters are red and have “AAAAAAA” typed on them; neck-ties for “B” filters are yellow and have “BBBBBBB”

typed on them, etc. All of the neck-ties should be facing upright except for the 4D. This sticker should be put on so that the typed Ds are upside down.

Figure 2. Proper cartridge orientation.

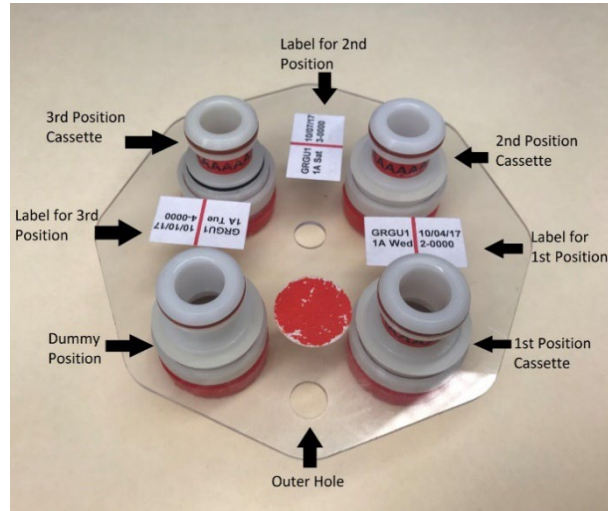
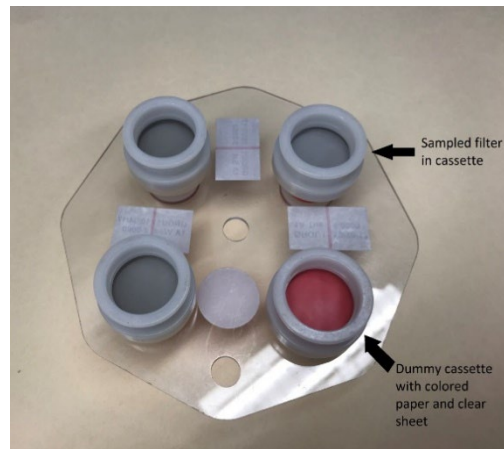
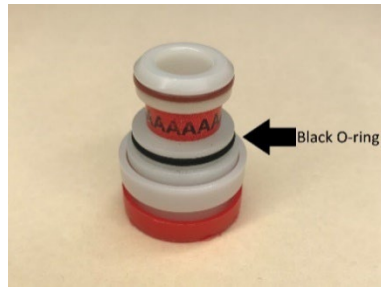


Figure 3. Identification of dummy cassettes.



Some cartridges contain a cassette with a black rubber band, also called an ‘O-ring,’ around its center and label (Figure 4). The black rubber band allows this cassette to be manually moved between cartridges when necessary. The location of this movable position is dependent upon the box cycle.

Figure 4. Movable cassette (O-ring).



3.4 Box Cycles

There are two different types of box cycles, which are referred to as the 3-2'-2 and the 2-3-2'. Cycles can be identified based on the stickers found on both the bins and the boxes they are shipped in. 3-2'-2 have a green sticker with the site code printed on it on both the blue boxes and the blue bins. 2-3-2' have a yellow sticker with the site code printed on the yellow bin and the blue box.

3.4.1 3-2'-2 (Blue Bin)

3-2'-2 bins have three filters in the first week, two filters in the second week, and two filters in the third week. In the first week, the first two cassette positions contain a filter. The third position, which is the top left position, is a movable cassette (the one with the O-ring) containing a filter. A dummy is in the fourth position.

In the second week, there are filters in the first two positions. The third position is left empty. When the box is out in the field, operators remove the movable position found in the first week and insert it into this open space in the second week's cartridge. The empty space found in this cartridge is denoted by the apostrophe after the "2" in "3-2'-2." The fourth position is a dummy.

In the third week, there are two cassettes with filters and two dummies. This is the only week in which field blanks can be found for a 3-2'-2. They will be in the third position (top-left) instead of a dummy.

3.4.2 2-3-2' (Yellow Bin)

2-3-2' bins have two filters in the first week, three filters in the second week, and two filters in the third week. In the first week, there are two cassettes with filters and two dummies. This is the only week in which field blanks can be found for a 2-3-2' bin. They will be in the third position (top-left) instead of a dummy.

In the second week, the first two cassette positions contain a filter. The third position (top-left) is a movable cassette, which also contains a filter. Operators in the field will remove the movable position and place it into the third week during their sample change. The fourth position is a dummy.

In the third week, the first two positions contain cassettes with filters, and the 3rd position is left empty. The movable cassette will be inserted into this space when it is out in the field. The empty space found in this cartridge is denoted by the apostrophe after the "2" in "2-3-2'." The fourth position is a dummy.

3.5 The Quarter Naming System

When filters are organized for analysis, they are separated into four different quarters based on the months in which they were sampled. Every quarter is given a three-digit code for identification purposes. The quarter is identified by the month and the year. January through March are identified as A months, April through June are B months, July through September are C months, and October through December are D months.

Therefore, there are four quarters in a year each labeled A, B, C or D. The last two digits of the year in which the quarter began are found after the quarter letter. For example, October of 2012 through December of 2012 would be D12, while January through March of 2013 would be A13.