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High Volume Air Sampler (HVAS) Filter Media Folding and Vacuum Sealing Procedure

February 2023

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U.S. DEPARTMENT OF ENERGY

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1.0 Purpose/Scope

This procedure describes the method for folding of the HVAS filter media, vacuum chamber setup and operation for sealing in preparation for Gamma counting.

2.0 Equipment and Materials

- VP210 Chamber Vacuum Sealer
- UltraSource - 120213-200 Vacuum Chamber Pouches, 3 mil, 8-inch x 12-inch

3.0 Vacuum Chamber Initial Setup

Figure 1. VacMaster VP210 Chamber Vacuum Sealer

3.1 Vacuum Chamber Features (See Figure 1)

1. **Seal Pad**
2. **Lid Gasket**
3. **Power Switch**
4. **Vacuum Chamber**
5. **Filler Plates**: Used to occupy space in the chamber. The plates allow for faster vacuum. When more space is occupied, there is less air to be removed from the chamber.
6. **Seal Bar**
7. **Lid Lock**: This feature is used to keep the lid closed while the machine is in storage. DO NOT USE while the machine is operating.
8. **Control Panel**

Figure 2. Vacuum Chamber Control Panel

3.2 Vacuum Chamber Control Panel (See Figure 2)

1. **Vacuum Gauge**: Indicates the vacuum level inside the chamber.
2. **Function Lights**:
    a. **Vacuum**: Illuminates to adjust vacuum time as well as during the vacuum process. During setup, adjust the vacuum time using the UP/DOWN buttons.
    b. **Gas**: This model does not offer the gas flush option
    c. **Sealing**: Illuminates to adjust vacuum time as well as during the sealing process. During setup, adjust the sealing time using the UP/DOWN buttons.
    d. **Cooling**: Illuminates to adjust vacuum time as well as during the cooling process. During set up, adjust the cooling using the UP/DOWN buttons.
3. **Working Indicator Light**: Illuminates to indicate the machine is currently in use.
4. **LED Screen (Time)**: Displays current function or cycle time, measured in seconds.
5. **STOP Button**: Press to stop the cycle and immediately seal the pouch. This button will only work when the machine has entered the vacuum seal process.
6. **UP/DOWN Buttons**: Press to increase or decrease vacuum time, sealing time, or cooling time.

3.3 Vacuum Chamber Setup

Please read all instructions before operating the Vacuum Chamber

3.3.1 Open the machine lid - Release the lid lock located on the right side of the machine and allow the lid to lift and remain open. Remove all items that were shipped with the chamber.

3.3.2 Locate the seal pad. See Figure 3.

Figure 3. Seal Pad

3.3.3 Locate the seal pad holder located on the inside of the lid. See Figure 4.

Figure 4. Seal Pad Holder

3.3.4 Insert the seal pad into the seal pad holder. See Figure 5.

Figure 5. Assembled Seal Pad in holder.

3.3.5 Locate the complete seal bar. See Figure 6.

Figure 6. Complete Seal Bar

3.3.6 Line up the complete seal bar with the metal pegs inside the vacuum chamber. See Figure 7.

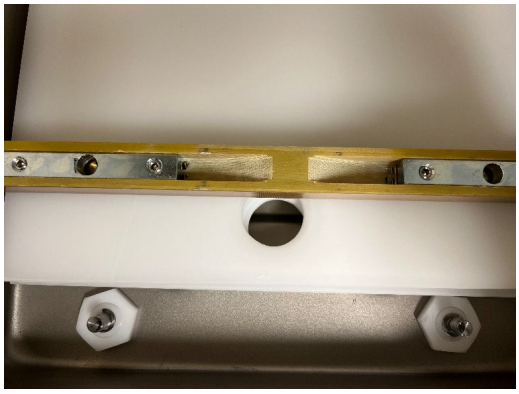

Figure 7. Complete Seal Bar near the pegs inside the chamber

3.3.7 Insert Seal Bar on top of metal pegs inside vacuum chamber. See Figure 8.

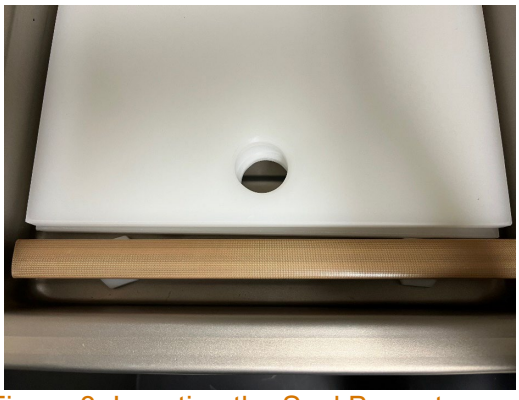

Figure 8. Inserting the Seal Bar onto pegs

3.3.8 Locate both Filler Plates as shown in Figure 9.

Figure 9. Filler Plate

3.3.9 Insert both filler plates into chamber compartment of the vacuum sealer as shown in Figure 10.

Figure 10. Inserted Filler Plates in Chamber

3.3.10 Attach the power cord and plug the machine into the grounded electrical outlet - Properly insert the electrical cord into the power outlet on the back of the machine and then plug the cord into the wall outlet.

IMPORTANT: DO NOT turn the machine on until the lid lock has been released. The lid lock feature is used ONLY to keep the lid closed while the machine is in storage.

3.3.11 Turn the power switch on – Turn the red switch on the left side of the machine, switching from the “0” (Figure 11) to the “1” position (Figure 12). The LED screen on the control panel will illuminate showing a symbol.

Figure 11. Off Position

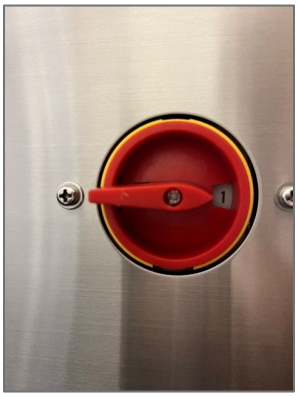

Figure 12. On Position

3.3.12 To adjust the timing controls, press the SET button on the control panel until the required label (Vacuum, Sealing, or Cooling) is illuminated. For each section, the current time setting will show on the LED screen. All time settings are displayed in seconds. Figure 13.

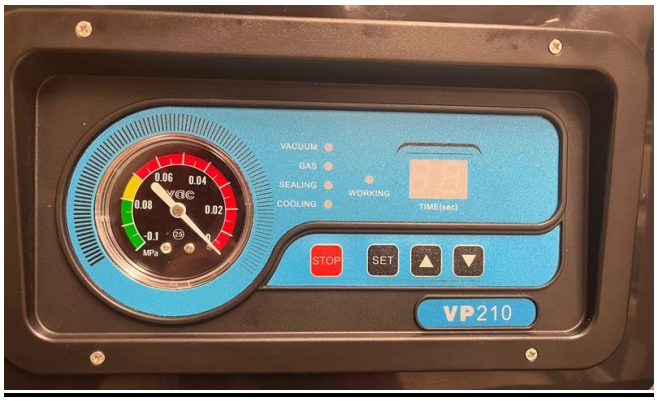

Figure 13. Vacuum Chamber Control Panel

3.3.13 Press the SET button

3.3.14 The LED should be on Vacuum.

3.3.15 Use the UP/DOWN buttons to adjust the time to be 40 seconds for Vacuum.

3.3.16 Press the SET button.

3.3.17 The LED should be on the Sealing.

3.3.18 Use the UP/DOWN buttons to adjust the time to be 1.2 seconds for Sealing.

3.3.19 Press the SET button.

3.3.20 The LED should be on the Cooling.

3.3.21 Use the UP/DOWN buttons to adjust the time to be 2 seconds for Cooling.

3.3.22 Press the SET button to complete the change in settings.

4.0 Folding Instructions

4.1 Acquire HVAS filter contained in Ziplock poly bag with sample information as described in “High Volume Air Sampler (HVAS) Operations Procedure” document.

4.2 Copy Sample information onto new 8-inch x 12-inch sealing bag. See Figure 14.

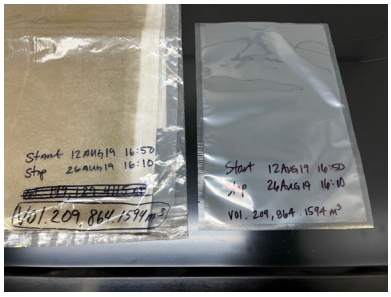

Figure 14. Copy Sample Information

4.3 Keep the filter in its original Ziplock poly bag and lay it on a clean surface. Exposed side up. See Figure 15.

Figure 15. Filter On Clean Surface

4.4 Fold the filter in half as shown in Figure 16. Crease to mark the center of the filter.

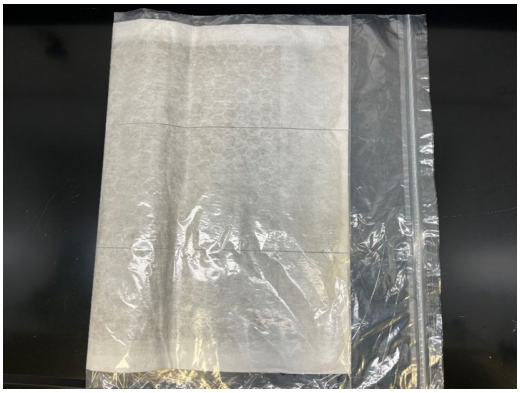

Figure 16. Filter Folded in Half

4.5 Unfold the filter back to the original layout as shown in Figure 15.

4.6 Take the left side and fold it in to the center creased line. See Figure 17.

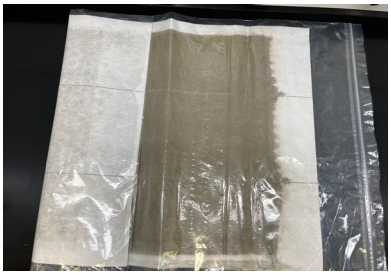

Figure 17. Fold left side to Center

4.7 Take the right side and fold it in to the center creased line. See Figure 18.

Figure 18. Fold Right Side to Center

4.8 Rotate the filter media 90 degrees as shown in Figure 19.

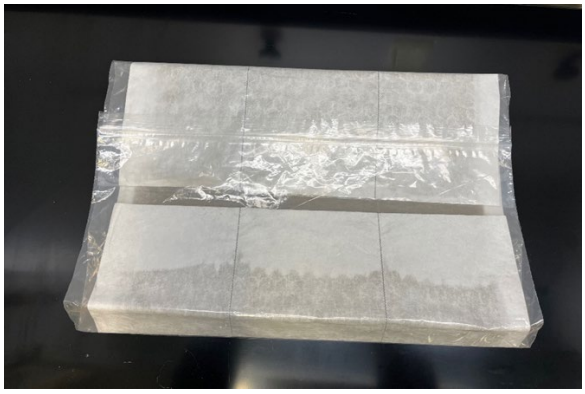

Figure 19. Rotate Filter 90 Degrees

4.9 Fold the filter in half as shown in Figure 20 and crease to mark center of the filter.

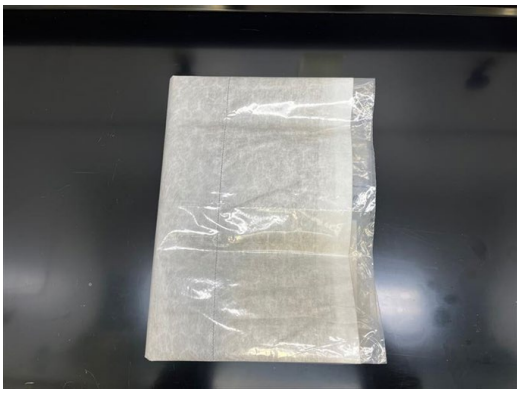

Figure 20. Fold the Filter in Half

4.10 Unfold the filter back to layout shown in Figure 19.

4.11 Take the left side and fold it in to the center creased line. See Figure 21.

Figure 21. Fold Left Side to Center

4.12 Take the right side and fold it in to the center creased line. See Figure 22.

Figure 22. Fold Right Side to Center

4.13 Fold the filter in half as shown in Figure 23.

Figure 23. Fold Filter in Half

4.14 Rotate the filter 90 degrees as shown in Figure 24.

Figure 24. Rotate 90 Degrees

4.15 Fold the filter in half as shown in Figure 25 and crease to mark the center of filter.

Figure 25. Fold Filter in Half

4.16 Unfold the filter back to layout shown in Figure 24.

4.17 Take the left side and fold in to the center creased line. See Figure 26.

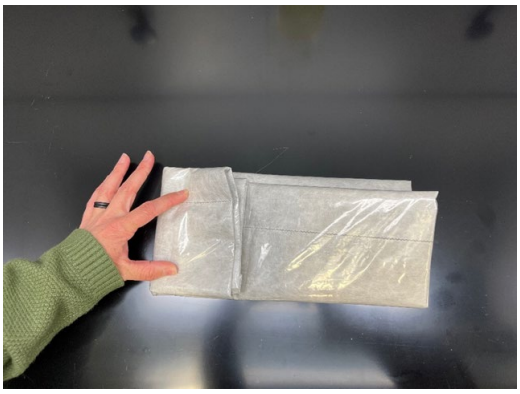

Figure 26. Fold Left Side to Center

4.18 Take the right side and fold in to center creased line. See Figure 27.

Figure 27. Fold Right Side to Center

4.19 Fold the filter in half as shown in Figure 28.

Figure 28. Fold in Half

4.20 When complete with folding, the filter should look like Figure 29 and Figure 30.

Figure 29. Side View of Folded Filter

Figure 30. Top View of Folder Filter

5.0 Vacuum Sealing Packaged Filter

5.1 Acquire folded sample from Section 4 in step 4.20. See Figure 30.

5.2 Place folded sample in vacuum chamber bag with filter information from Section 4 in step 4.2 as seen in Figure 31 and Figure 32.

Figure 31. Top View of Filter Placed in Vacuum Bag

Figure 32. Side View of Filter in Vacuum Bag

5.3 Push filter to the bottom of the vacuum chamber bag to ensure a proper seal may occur as shown in Figure 33 & Figure 34.

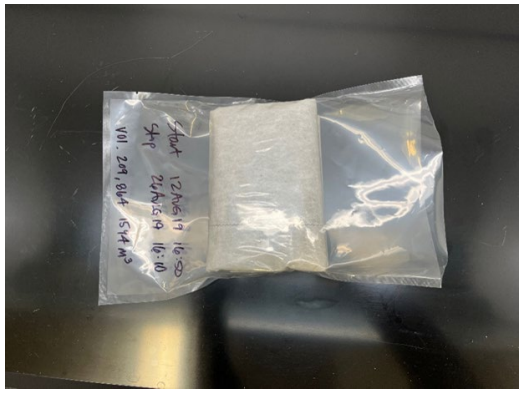

Figure 33. Improper Placement of Filter

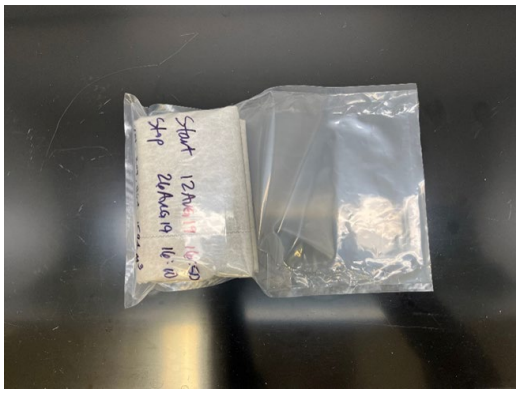

Figure 34. Proper Placement of Filter

5.4 Place the filter and vacuum chamber bag inside the Vacuum Chamber with the open end of the bag facing you as shown in Figure 35.

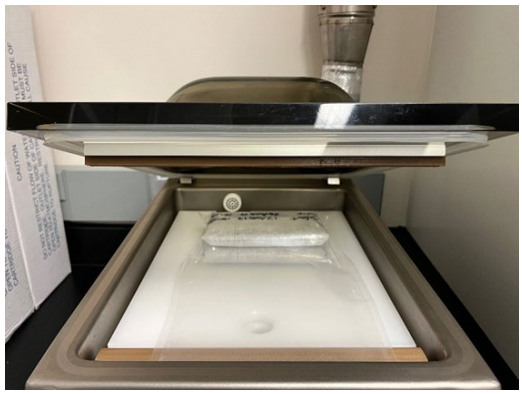

Figure 35. Filter Placed Inside Vacuum Chamber

5.5 Ensure that the vacuum chamber bag hangs over the Seal Bar by approximately ¼ inch.

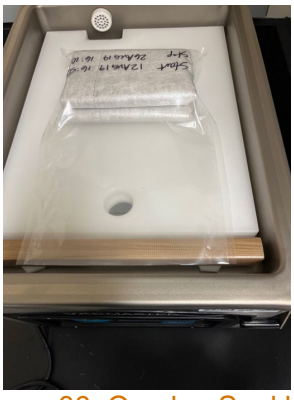

Figure 36. Overlap Seal bar

Important: Vacuum Chamber lid will pop open when it has completed sealing the filter bag. Make sure there is at least 8-inch of clearance above the Vacuum chamber lid to prevent the lid hitting something when it releases the vacuum.

5.6 Close the vacuum chamber lid. See Figure 37.

Figure 37. Vacuum Chamber with Lid Closed

5.7 Apply pressure while holding down the lid for ~4 seconds until enough vacuum pressure has been built up to keep the lid closed.

5.8 The LED screen on the vacuum chamber will count down as it goes through Vacuum, Sealing, and Cooling time.

5.9 Once the vacuum chamber has finished sealing the filter the lid will pop open.

5.10 Remove the vacuum bag from the vacuum chamber.

5.11 After the filter has been sealed it should look as shown in Figure 38.

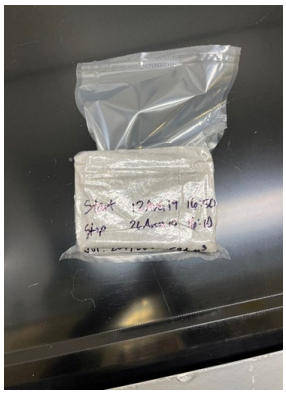

Figure 38. Vacuum Sealed Filter

5.12 Pull the corners of the vacuum bag to help the filter lay flat. See Figure 39.

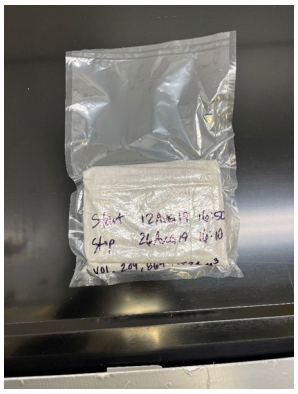

Figure 39. Vacuum Sealed Filter Laying Flat

5.13 The filter is now ready to be counted by detector or stored.

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