I. Purpose

The purpose of this procedure is to construct and precondition Tedlar Sample bags for hydrocarbon speciation of exhaust and evaporative emissions. This procedure has been developed to minimize any contaminants emitted by the sample bag. The frequency of this procedure varies with the request of the Test Engineer.

II. Regulatory Requirements

III. Related Documents

A. Cell 1 Test Log is found on the ARB El Monte server R:drive at R:\SOPs\Forms\Cell 1 Test Log Form. This form is used to document all procedural problems and corrective actions taken.

IV. Additional Requirements

A. Corrective Action Protocol

If any acceptance criteria or verification check in this procedure is not met, if any step in this procedure can not be completed or validated as specified, or if any equipment or system does not perform as expected during the procedure, then corrective action must be taken and documented using the following protocol.

1. For minor deviations from the procedure that are not part of the acceptance criteria, and will not effect the remainder of the procedure or results, take the following actions.

    a. Verify the deviation is minor with the test equipment engineer or lead person.

    b. Take corrective action and continue with the procedure.

2. Document the problem and corrective action on the Cell 1 Test Log. For major deviations from the procedure that are not part of the acceptance criteria but may effect the remainder of the procedure, or results, take the following actions.

    a. Suspend the procedure.

    b. Notify the test equipment engineer or lead person.

    c. Take corrective action as directed by the test equipment engineer or lead person.

    d. Document the problem and the corrective action on the Cell 1 Test Log.

e. Repeat the affected portion of the procedure or the entire procedure as directed by the test equipment engineer or lead person.

f. If the procedure cannot be completed in the allotted time, go to step 3.

3. If the procedure could not be completed in the allotted time, take the following actions.

a. Notify the test equipment engineer or lead person that the test cell is unavailable for official testing until this procedure has been completed and meets all acceptance criteria.

b. Document on the Cell 1 Test Log that the procedure was not completed.

c. Reschedule test time with the lead person to complete this procedure.

d. Repeat the entire procedure.

B. Reference Equipment and Materials Certification

Verify that all reference measurement equipment and materials used in this procedure have a current calibration or analysis certificate. Electronic copies of certificates are found in the Engineering Studies Branch (ESB) Cylinder and Equipment Database on the ARB El Monte R:/drive at R:\spec\Special-Testing.mdb. Hardcopies of the certificates are found in the Engineering Studies Branch Certificate Notebook.

1. For cylinders, query the database by cylinder number and check the “shelf life,” which is the expiration date.

2. For equipment, query the database by equipment owner (Cell 1, MSCD or Cell 7) and check the “Cal Due Date,” which is the expiration date.

3. If the certificate for the cylinder or equipment is passed the expiration date, take the following actions:

a. Notify the lead person that the certificate has expired.

b. Take corrective action as directed by the lead person.

c. Ask the lead person from another testing section to borrow their equipment or cylinders. Check that all borrowed equipment or cylinders have a current certificate. For all alternate equipment or cylinders used to perform this procedure, note the model number, serial number, and certificate expiration date on the Cell 1 Test Log.

4. If any equipment or cylinder does not have a current certificate, do not perform the procedure until the needed equipment or cylinder with a current certificate becomes available.

V. Equipment and Materials

The abbreviated equipment names shown in parentheses are common names. These names are used in this procedure instead of the full name.

A. Vertrod Thermal Impulse Heat-Sealing machine, Model 14A/CAB.

B. Grieve Oven, Model 323. Top Exhaust connects to outside exhaust dump.

C. ⅜ ″ Hole punch, carbon steel construction. Manufacture ADCO.

D. Self-closing male Swagelock™ Quick Disconnect Fitting.

E. Tedlar, DuPont, grade TTR 20SG4 or TST 20SG4, 2 mil thick.

F. Liquid Nitrogen Dewar.

G. Aadco 737 Pure Air Generator, Model # 737-15A, (Zero-Air Supply). This is ARB's house zero air gas supply which is used as the zero gas for the hydrocarbon and methane analyzers and for the zero air bag check test. This generator produces pure air that meets specifications in quality control procedure QC005 HSL Zero Air Verification.

H. Zero Air Gas Cylinder - Zero air cylinders are used only when the zero air generator is not working. The product grade is VOC free grade 5.0, and meets the following specifications: THC <0.01 ppm, CO <0.05 ppm, CO_2 <0.3 ppm, H_20 <2.0 ppm, Oxygen 20.9% ± 1%. The product is made for natural air and not a synthetic blend. This gas is used to zero the hydrocarbon and methane analyzers and for the Bag Check Test for QC010.

I. Zero Nitrogen Cylinder - These cylinders are used to zero the CO, CO_2, and NOx analyzers. The product grade is VOC free grade 5.0 which has the following specifications: 99.999% Nitrogen, O_2 <2.0 ppm, H_2O <2 ppm, CO_2 <0.3 ppm, CO <0.1 ppm, THC <0.05 ppm, and SO_2 <0.01 ppm.

J. Span Gas Cylinders - These cylinders are single blend gases used to span the analytical instruments. The product grade is Gas Manufacturer Certified Primary Standard. These cylinders are prepared gravimetrically on electronic high precision balance and named to gravimetrically generated concentration. The laboratory analytical accuracy is ± 0.1 ppm for concentrations under 10 ppm and ± 1% above 10 ppm. The typical span gases include propane, methane, carbon monoxide, carbon dioxide, and oxides of nitrogen. The concentration of the span gas must be between 85 to 100 of the particular range of the instrument. The diluent for the propane and methane span gases shall be zero air VOC free grade 5 and the diluent for the other span gases shall be zero nitrogen VOC free grade 5.

K. Shop Air. This is used for various testing functions including filling vehicle tires, operating the dynamometer brakes and the dynamometer roll-centering cradle.

VI. Safety Requirements

A. General Safety Requirements

Staff performing this procedure shall comply with all ARB safety requirements as listed in ARB's Web Site-http://inside.arb.ca.gov/as/safety/HSL.htm especially for compressed cylinder handling and safe laboratory operating practices. Hardcopies of the safety requirements can be obtained by contacting the ARB's Management Services Branch Chief and Equal Employment Opportunity Officer listed on the ARB's Web Site- www.arb.ca.gov/html/org/orgasd.htm.

B. Equipment, Materials, and Laboratory Safety Requirements

1. For all equipment used in this procedure, staff performing this procedure shall comply with all safety precautions found in the manufacturer's equipment manuals that relate to this procedure. Equipment manuals are located in the test cell instrument room or in the equipment manual bookcase in Room 180 in the Haagen-Smit Laboratory.

2. For all materials used in this procedure such as gases and chemicals, staff performing this procedure shall be familiar with the safety precautions list in the material safety data sheets (MSDS), which are filed in the MSDS notebook located in Room 135 in the Haagen-Smit Laboratory.

3. Staff shall comply with all safety requirements and precautions applicable to the test cell and laboratory. If staff have any safety questions or concerns, notify the Section Supervisor or the appropriate laboratory safety personnel.

VII. Designated Staff Allowed to Perform this Procedure and Staff Training

A. Staff Qualifications

Staff performing this procedure must be classified as one of the following: Automotive Emission Test Specialist (AETS) II or III, AET Supervisor, Air Pollution Specialist, or Air Resources Engineer.

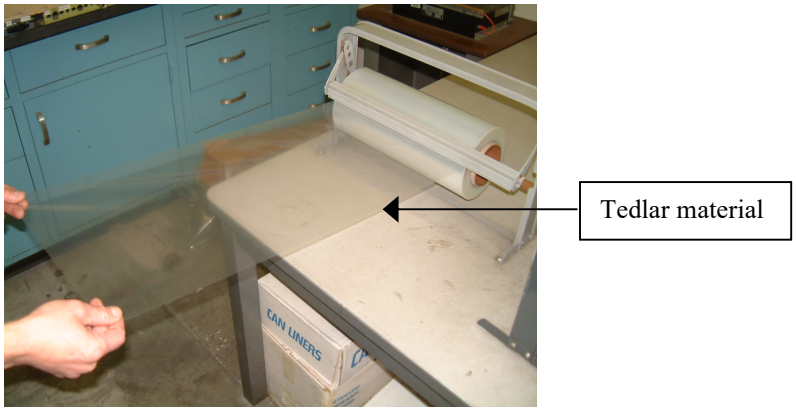
B. Staff Training

Staff performing this procedure must have previously demonstrated their proficiency to perform this procedure, and be approved by the Section Supervisor. The lead person, staff specialist or engineer shall provide staff training on this procedure. Training sessions(s) shall be documented in the training files.

VIII. Procedure

A. Bag Material Conditioning

1. Each sheet will be used to make a bag. Cut a sheet of Tedlar material to 13”x16.”



2. Sample bags shall be constructed and preconditioned 24 hours prior to use.

3. Suspend the Tedlar sheet on the middle rack in the oven so that both halves of the sheet are draped over the rack.

4. Turn **ON** the oven to 250° F.

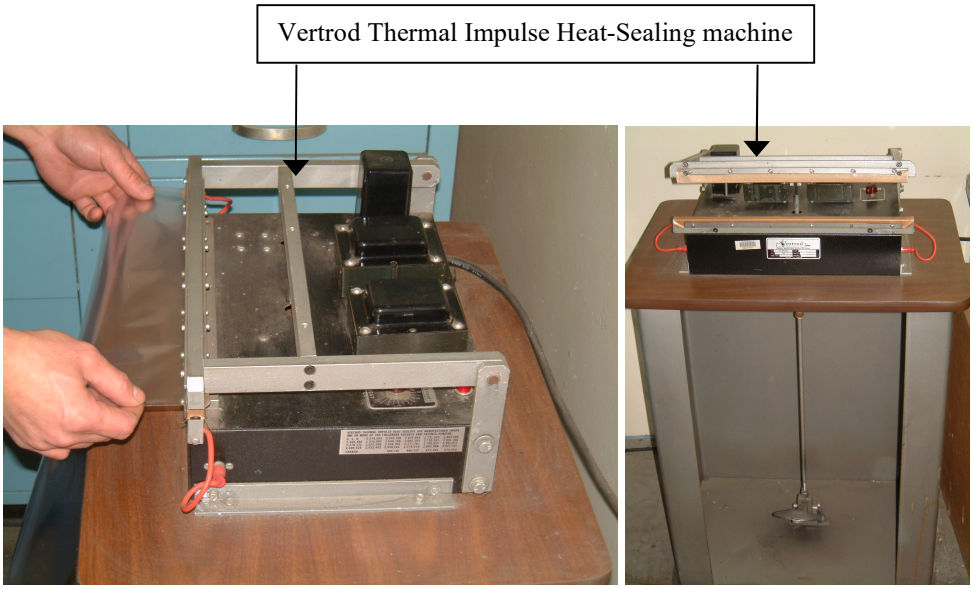
5. Bake the Tedlar sheet in the oven at 250° F for 16 hours.

6. Allow the Tedlar sheet to cool to ambient temperature for at least 8 hours.

B. Bag Construction

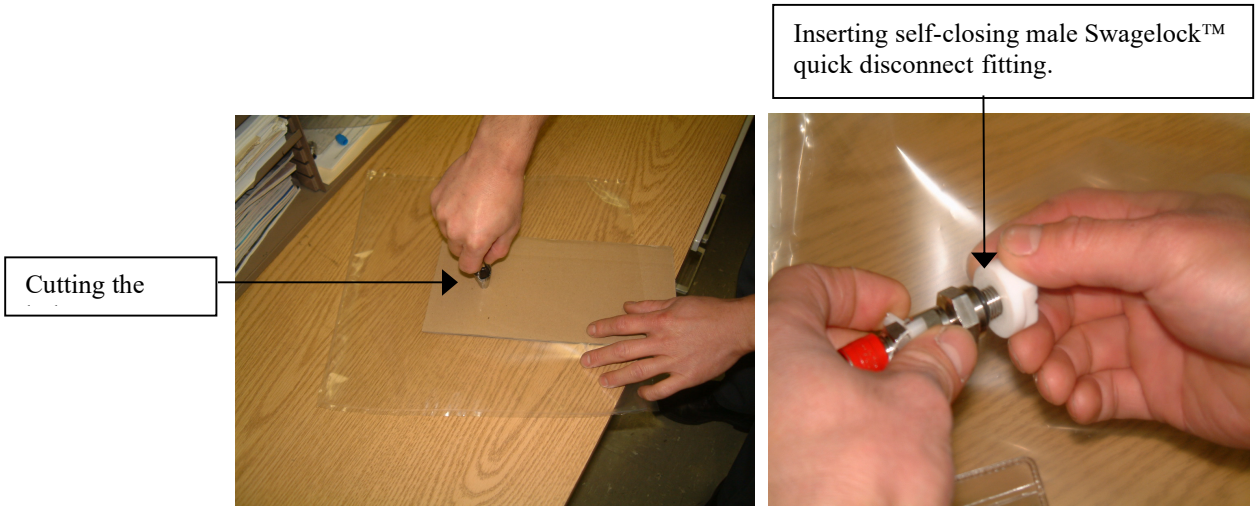
1. Remove the Tedlar sheet from the oven.

2. Seal three of the four sides of the bag using the Vertrod Thermal Impulse Heat-Sealing machine.

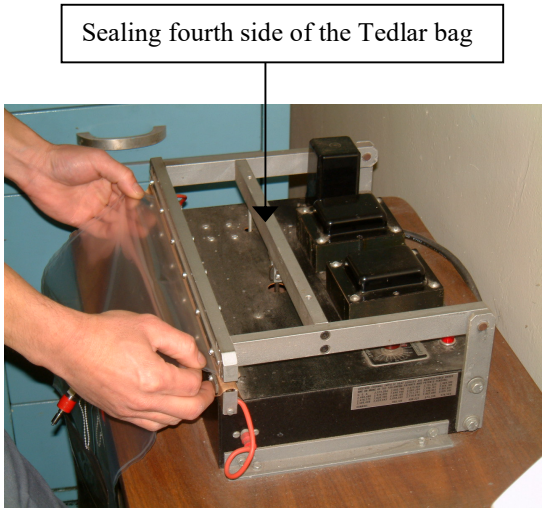


3. Insert a piece of cardboard inside the bag and cut a ⅜″ hole in the center of one side of the bag and remove the cardboard.

4. Insert a self-closing male Swagelock™ quick disconnect fitting in the hole.

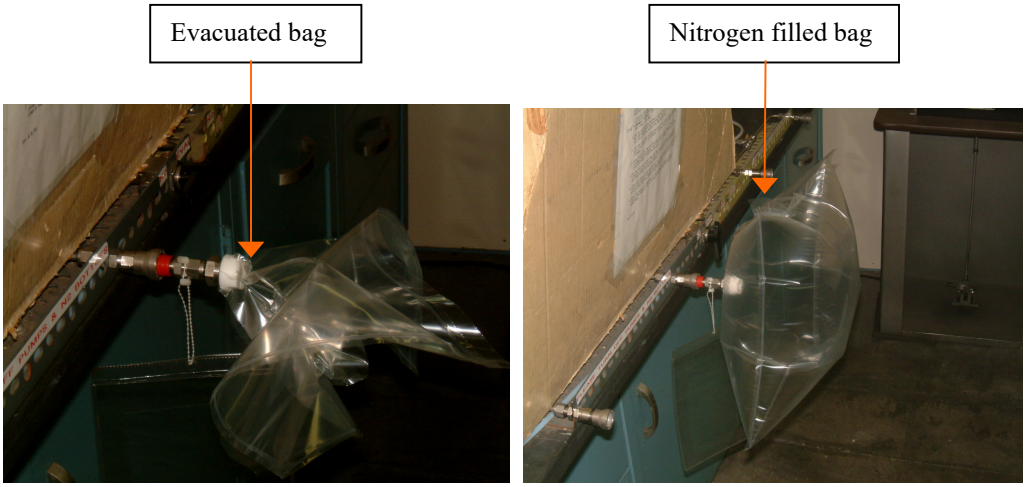


5. Seal the fourth side of the Tedlar bag using the Vertrod Thermal Impulse Heat-sealing machine.



C. Bag Preconditioning

1. Evacuate and fill the bag with nitrogen two times. Cell 1 has an apparatus that expedites this process.



2. Soak the bags filled with nitrogen a minimum of 8 hours (usually overnight). Cell 1 has a large cardboard box for soaking bags.

3. Prior to using the bag, evacuate the bag, fill with nitrogen, and evacuate bag again. The bag is now ready for emission sample collection.

IX. Documentation

None apply to this procedure.

X. Record of Revisions

Version #	Effective Date	Revision Description	Approved By