Standard Operating Procedure for
Finished Good Test Sample Preparation
Prior to Analysis of Formaldehyde Emissions from Composite Wood Products

Consumer Products Enforcement Section
Vehicle, Parts, and Consumer Products Enforcement Branch
Enforcement Division

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DISCLAIMER: Mention of any trade name or commercial product in this Standard Operating Procedure does not constitute endorsement or recommendation of this product by the California Air Resources Board (CARB). Specific brand names and instrument descriptions listed in the Standard Operating Procedures are equipment used by CARB. Any functionally equivalent instrumentation can be used.

1. SCOPE

This Standard Operating Procedure (SOP) describes a procedure for cutting samples from finished goods and exposing the underlying composite wood material in preparation for laboratory testing in order to determine if the composite wood material complies with the Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products (ATCM). Samples are prepared from finished goods that contain composite wood according to the size requirements of California Air Resources Board's (CARB) Monitoring and Laboratory Division's (MLD) Standard Operating Procedure Sampling and Analysis of Formaldehyde Emissions from Composite Wood Products.

Regulated composite wood materials include hardwood plywood (HWPW), particle board (PB), medium density fiberboard (MDF), and thin medium density fiberboard (tMDF). Composite wood materials used in the fabrication of finished goods must comply with the applicable emission standards.

Preparation of composite wood panels for emissions testing is described in a separate SOP: Standard Operating Procedure for Composite Wood Panel Test Specimen Preparation Prior to Analysis of Formaldehyde Emissions from Composite Wood Products.

2. SUMMARY OF METHOD

Finished goods containing composite wood include items such as cabinets, furniture, flooring, doors, home decor, and toys. Composite wood in finished goods may contain a surface covering of veneer, laminate, paint, stain, or varnish on one or both sides. Deconstruction is the process of cutting a finished good and removing the surface covering in order to expose the underlying composite wood material. The goal is to acquire a composite wood sample free of surface coverings with a specified surface area to conduct formaldehyde emissions testing. A sample may be one unit or be made of multiple units (specimens) pieced together to meet the surface area requirements for testing in a small sampling chamber. The regulation requires a minimum of one sample to test the formaldehyde emissions of a composite wood material, however additional samples may be tested.

3. MATERIALS AND EQUIPMENT

A. Materials:

Pencil or Formaldehyde Free Pen
Labels for samples
Resealable bags made of 6 mil plastic
Composite Wood Data Log

B. Equipment:

Panel Saw
Table Saw
Drum Sander
Sandpaper (various grit)
Planer
Micrometer

4. ACQUISITION OF SAMPLES

Finished goods are acquired in a number of ways including purchase or donation from a retailer, distributor, importer, or from a fabricator of finished goods.

Finished goods are transferred to CARB facilities in their original packaging, if any, and when practical. Panels and finished goods may be cut to ease handling and transportation.

5. STORAGE

Exposure to heat and humidity accelerate the release of formaldehyde from composite wood materials. Panels, finished goods, and samples are stored in a secure indoor location in a manner that prevents cross contamination and reduces formaldehyde emission loss. Cut and labeled samples are stored sealed in resealable bags made of 6 mil plastic, or an equivalent material, until they are tested.

6. PREPARATION OF SAMPLES

A. Sample Layout:

The size and shape of the finished good determines how the sample will be cut. Small or irregularly shaped products may require procedure modifications to prepare enough surface area for testing.

1. Typically, the quantity and shape of the finished good is adequate to cut two specimens. In this case, the surface covering is removed from one side of each specimen, and both are placed back-to-back with the exposed surfaces facing outward to create one sample with the required surface area for testing.
2. If the product is not large enough to obtain two specimens, surface coverings must be removed from both sides of one specimen to create a

sample with the specified surface area.

3. If the dimensions of a composite wood material in a finished good are smaller than the required surface area for testing (a picture frame for example), multiple specimens may be assembled into a sample to create the specified surface area for testing. The surface coverings may be removed from either one or both sides of the specimens.

B. Sample Size:

Sample surface area calculation is specified in the American Standard Test Method (ASTM) D6007-02. Due to variations in laboratory equipment, required sample surface area will vary and so will the resulting sample size.

1. For the laboratory equipment used by CARB, the following sample surface areas are required:
    a. MDF: 49 square inches
    b. PB: 78.75 square inches
    c. HWPW: 78.75 square inches
    d. HWPW Wall Paneling: 174 square inches
    e. Particleboard Door Core: 24.50 square inches

    The specified surface area to be analyzed is free of surface coverings. The edges of the samples are taped prior to testing; therefore, they are not included in the total surface area requirements.

2. To achieve these required surface areas, CARB samples have the following dimensions:
    a. MDF: 7" x 3.500"
    b. PB: 7" x 5.625"
    c. HWPW: 7" x 5.625"
    d. HWPW Wall Paneling: 7" x 12.429"
    e. Particleboard Door Core: 7" x 1.750"

    Any sample with a variation on these dimensions must meet the specified surface area (Section 1 a-e). The surface areas can be +/- 2% from the desired surface area for the flow to area ratio specified in the small chamber method.

C. Removal of Surface Area Coverings to Expose Composite Wood Material for Testing:

Composite wood products are prepared for formaldehyde emission testing by removing any surface area coverings to expose the composite wood material.

1. Use a micrometer to measure the initial thickness of the specimen to within 0.002". Record the initial thickness of the specimen. All measurements are recorded in the Composite Wood Data Log.

2. Cut specimens to the required sample size by using a panel saw and/or table saw.
3. Remove any surface coverings from one side of the specimen until the covering is completely removed. If a surface covering, such as a laminate or veneer, is glued to the composite wood material, remove the surface covering to just below the glue line. Removal of the surface covering should be uniform across the entire specimen surface. For this step, CARB operators may use a drum sander or a planer. Pass the specimen through the sander or planer to trim small amounts (0.003" to 0.01" per pass is recommended) until the surface covering and visible glue line has been removed.
4. If the surface covering of the specimen does not contain a glue line, such as paint, stain, or varnish, proceed to Step 7.
5. Use a micrometer to measure the thickness of the specimen just below the glue line to within 0.002". Record the thickness of the specimen.
6. An additional 0.02" ± 0.01" of material is then removed. This is done to ensure the removal of any glue that has seeped into the underlying composite wood material. Use either the drum sander or the planer for this step, ensuring the thickness of the specimen is flat and uniform throughout.
7. Use a micrometer to measure the final thickness of the specimen to within 0.002". Record the final thickness of the specimen.
8. If the surface covering must be removed from both sides of the sample, it is important to determine the thickness removed from each side. To do this, first record the initial thickness of the sample. Remove one side of the surface covering first and measure the thicknesses just below the glue line and the final thickness as described above. Repeat this process on the opposite side of the sample. Record all measurements.
9. When testing the outer veneer of veneer core and composite core of products containing HWPW: Use care not to sand or plane all the way through the outer veneer into the glue line. Samples with the glue line exposed cannot give reliable test results.

D. Sample Labeling and Handling:

1. Each sample is assigned a unique identification number generated by a computer database prior to deconstruction. This sample identification number is labeled on the sample and specimens using a pencil or formaldehyde free pen.
2. In addition to the sample identification number, each specimen making up a sample is also labeled with a separate identifying number such as A1, A2, etc.
3. Each sample is sealed in a resealable 6 mil plastic bag to keep it isolated from ambient air and other samples.
4. The bag containing the sample is labeled with a computer generated

label with the following information: the sample identification number, composite wood material type (PB, MDF, tMDF or HWPW), description of the finished good, date of inspection, and name(s) of inspector(s). This information is also included on the Chain of Custody form

5. Sample identification numbers, composite wood material type, measurements, and preparation details along with the date of deconstruction are recorded in the Composite Wood Data Log.
6. The Chain of Custody form remains with the sample and accompanies the sample to the MLD laboratory for analysis.
7. Enforcement Division staff retains a copy of the Chain of Custody form for their records.

7. REVISION HISTORY

Standard Operating Procedure for Finished Good Test Specimen Preparation Prior to Analysis of Formaldehyde Emissions from Composite Wood Products (9/13/2013)