

California Environmental Protection Agency



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

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

9/13/2013

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 Air Resources Board. Specific brand names and instrument descriptions listed in the Standard Operating Procedures are equipment used by the ARB. Any functionally equivalent instrumentation can be used.

1. SCOPE

This Standard Operating Procedure (SOP) is to be used to prepare a finished good for laboratory testing to determine if the finished good complies with the ATCM to Reduce Formaldehyde Emissions from Composite Wood Products. This SOP describes a procedure for preparing or deconstructing finished goods made with composite wood panels and preparing specimens prior to laboratory testing according to the requirements of ARB's Monitoring and Laboratory Division SOP "Sampling and Analysis of Formaldehyde Emissions from Composite Wood Products."

2. SUMMARY OF METHOD

Finished goods contains pieces of composite wood panels and include such items as cabinets, furniture, flooring, doors, picture frames, and toys. Panels in finished goods often are veneered, laminated, coated, or otherwise manipulated such that the formaldehyde emission characteristics of the original panels may have been changed on one or both sides of the component part. Deconstruction is the process of separating or cutting the finished good into component parts so that pieces of the underlying panel may be accessed in order to remove the coating or laminate to achieve a test specimen that can be sent to a lab for formaldehyde emissions testing. This process includes removing coatings from hardwood plywood and removing laminates (synthetic or wood veneer) from laminated products to access the underlying composite wood products. For finished goods that consist of a laminated product in which one side is not laminated or coated, the product may be cut and tested as a panel with a surface coating on one side (see SOP for composite wood panels).

The key activity in the deconstruction process is the removal of the surface layer of a specimen using a thickness planer or sander to expose the underlying composite wood panel. This SOP defines how a panel surface is to be removed in order to provide reliable data.

The regulation requires a minimum of one specimen to test the formaldehyde emissions of a composite wood product in a finished good. Specimen size is determined by the laboratory to meet the air flow and surface area requirements as defined in the ASTM D6007. Specimen size can vary among laboratories due to differences in equipment, air flow rates, etc. Cut and labeled specimens are stored in resealable bags made of 6-mil plastic or equivalent.

Deconstruction can occur on either one or both sides of the test specimen. If only one side is deconstructed, then two pieces are then placed back to back (deconstructed sides exposed) with the edges taped to make one test specimen. A specimen with both sides deconstructed is also tested with the edges taped and both sides exposed.

3. INTERFERENCES/LIMITATIONS

Emissions decay, or the loss of formaldehyde from exposure to the atmosphere, will cause lower formaldehyde emission results than an otherwise fresh sample. Heat can also increase emissions decay. When handling or storing samples, avoid heat and exposure when practical.

4. EQUIPMENT AND CONDITIONS

A. MATERIALS

Plastic sheeting (as sold for painting or landscaping), thickness = 6 mils
Masking tape
Pencils, #2
Formaldehyde free permanent markers
Sample Bags, Resealable made of 6-mil plastic

B. EQUIPMENT

Panel Saw
Table Saw
Band Saw
Jig Saw
Circular Saw
Drum Sander, Performax 10-20+, with 120 grit sandpaper
Thickness Planer, Dewalt DW735, 13-inch
Sandpaper, 120 grit
Micrometer, +/- .001 inches

5. ACQUISITION OF SAMPLES

Finished goods or component parts can be acquired in a number of ways including purchase or donation from a retailer, distributor, importer, or manufacturer or from a fabricator of finished goods.

Panels and finished goods can be cut to ease handling and transportation. Before cutting, mark each item with a pencil or formaldehyde free permanent marker in such a way that the original orientation of the cut boards can be restored prior to cutting sample specimens.

Each finished good is assigned an identification number and labeled using a pencil or formaldehyde free permanent marker. The identification number consists of the date in the form yymmdd, two letters (normally inspector initials), and two digits to differentiate samples collected on a given day. An example could be 110704FJ02. This data is included in a chain of custody document that accompanies the sample on its way to the laboratory and is updated as necessary.

Finished goods are to be transferred to CARB facilities in their original packaging, if any, and when practical. Panels that are coated or modified are to be handled in the same way as raw panels.

ASTM Method D-6007 allows for alternative ways of collecting samples. "When testing wood products that are not newly manufactured such as after original application, installation or use, the method of packaging and shipping the products shall be fully described. Information on the age and history of the product shall be detailed in the test report."

6. STORAGE

Panels, finished goods, component parts and specimens must be stored in a locked area with restricted access in a manner that prevents cross contamination and preserves sample integrity.

7. PREPARATION OF SAMPLES

- A. Sample Layout: Due to the variety of shapes and sizes of finished goods, it is not possible to define a sample layout. Only one specimen is required to test one panel type in the finished good. Additional specimens may also be tested. If the quantity of a composite wood panel type in a finished good is large, space specimens to provide a representative sampling. If the quantity of a composite wood panel type in a finished good is small, pieces may be assembled into a test specimen representative of the panel type. When possible, specimens should be prepared to represent each panel type found in the finished good.
- B. Micrometer: Use a micrometer to measure the initial thickness of the specimen to within 0.002 inches.
- C. Thickness Planer and Drum Sander Operation: Testing by ARB has shown that use of either a thickness planer or a drum sander to remove surface layers will produce specimens with comparable formaldehyde emissions characteristics.

Selection of a planer or a sander can be made based on operator preference or other constraints such as sample size or thickness.

- a. Thickness planer operation:
 - i. Maintain the planer in good operating condition including sharp blades, proper blade alignment, and removal of excess dust buildup.
 - ii. Pass the board thru the planer, trimming small amounts (less than .02" per pass is recommended) until the desired coating or laminate and glue line has been removed (typically 0.005" to 0.03"). At the final thickness, pass the board thru one time in each direction to achieve a more uniform thickness.
 - iii. When a board is fed through a planer, the ends are often thinned to an incorrect thickness. This is known as snipe. Samples to be planed must be long enough to account for snipe. Cut off and discard any snipe to produce a test specimen with uniform thickness. Snipe is typically 3 inches long on each end of a board fed through the CARB thickness planer.

- b. Drum sander operation:
 - i. Maintain the sander in good operating condition including fresh sandpaper free of clogs or heavy wear, proper drum alignment, proper feed belt adjustment, and removal of excess dust buildup.
 - ii. Pass the board thru the sander, trimming small amounts (about .003" to .01" per pass is recommended) until the desired coating or laminate and glue line has been removed (typically 0.005" to 0.03"). At the final thickness, pass the board thru one time in each direction to achieve a more uniform thickness.
 - iii. Snipe is uncommon when using the CARB drum sander. Check specimen thickness near the leading and trailing edges for snipe and cut off and discard any snipe to produce a test specimen with uniform thickness.

D. Testing the Core of MDF Core and Particle Board Core Products: These composite core products must have a compliant core that meets the regulation's formaldehyde emission limits.

- a. Select one side of the board and remove surface coatings of paint, stain, varnish, or laminate one thin layer at a time by planing or sanding (as described in section 3 above) until the surface coatings have been removed and a clean smooth surface of MDF or PB remains.
- b. Measure and record the thickness of the remaining board.
- c. If there is a sufficient quantity of the test board, the operator can cut two pieces to the required size and label both unaltered sides with the sample

- number plus a specimen identifier such as A1, B1, C3, etc. Both pieces of the pair are given the same specimen identifier.
- d. Alternatively, repeat steps a and b on the opposite side of the board to test both sides of the specimen. Cut to size and label with the sample number plus a specimen identifier such as A1, B1, C3, etc.
 - e. Place the specimen in a resealable bag made of 6-mil plastic or equivalent. The specimen label should be facing outward so that the label is legible thru the plastic bag. Alternatively, label the bag.
 - f. Record specimen identification numbers, descriptions, and preparation details along with the date in the wood shop log book. Include a description of the original finished good.
 - g. Update the chain of custody document.
- E. Testing the Outer Veneer of Veneer Core and Composite Core Products: These are prepared for testing by removing any paint, stain, coating, or covering while leaving the veneer in place.
- a. Select one side of the board and remove surface coatings of paint, stain, or varnish one thin layer at a time by planing or sanding until the surface coatings have been removed and a clean smooth surface of wood veneer remains. Use care not to sand or plane all the way thru the outer veneer into the glue line. Specimens with the glue line exposed cannot give reliable compliance test results.
 - b. Measure and record the thickness of the remaining board.
 - c. If there is a sufficient quantity of the test board, the operator can cut two pieces to the required size and label both unaltered sides with the sample number plus a specimen identifier such as A1, B1, C3, etc. Both pieces of the pair are given the same specimen identifier.
 - d. Alternatively, repeat steps a and b on the opposite side of the board to test both sides of the specimen. Cut to size and label with the sample number plus a specimen identifier such as A1, B1, C3, etc.
 - e. Place the specimen in a resealable bag made of 6-mil plastic or equivalent. The specimen label should be facing outward so that the label is legible thru the plastic bag. Alternatively, label the bag.
 - f. Record specimen identification numbers, descriptions, and preparation details along with the date in the wood shop log book. Include a description of the original finished good.
 - g. Update the chain of custody document.
- F. Small Samples: Small items may require procedure modifications to prepare enough material for testing.
- a. If the surface coatings must be removed from both sides of a specimen, remove one side first and then measure the thickness. Remove the

coating from the other side and measure the thickness again. The key step here is to determine the thickness removed from each side.

- b. Sometimes the sample is narrower than the specimen dimensions require (a picture frame for example). First, prepare the surfaces as described in steps D or E. Then cut into strips that can be laid side by side and assembled into a specimen with the test surfaces exposed as required for step G.

G. Specimen Size: Test specimen dimensions are determined by the laboratory to meet the air flow and surface area requirements as defined in the ASTM D6007. Specimen size can vary among laboratories due to differences in equipment, air flow rates, etc.

- a. For the CARB MLD laboratory, the following sample surface areas are specified:
 - i. MDF, 49 square inches
 - ii. Particle board, 78.75 square inches
 - iii. Hardwood plywood, 78.75 square inches
 - iv. Hardwood plywood wall paneling, 174 square inches

These surface areas can be achieved by testing one specimen with both sides exposed and the edges taped. Alternatively, two specimen pieces can be cut and arranged face-to-face or back-to-back with edges taped to achieve the same surface area. ASTM D6007 allows this for nonstandard testing of products with a single surface exposed. This is often done if one side of the panel has a surface coating.

- b. To achieve these required surface areas, CARB specimens are normally cut to the following dimensions:
 - i. MDF, 7 inches by 3.5 inches
 - ii. Particle board, 7 inches by 5 5/8 inches
 - iii. Hardwood plywood, 7 inches by 5 5/8 inches
 - iv. Hardwood plywood wall paneling, 7 inches by 12 3/8 inches

The dimensions of the finished good sometimes necessitates that the specimen dimensions vary somewhat from the norm. This is acceptable as long as the specimen surface area complies with the requirements of paragraph G.a.

H. Specimen Handling:

- a. Cut and labeled specimens are placed in resealable bags made of 6-mil plastic or equivalent. Specimens are labeled with a pencil, black or silver formaldehyde free permanent marker.
- b. Record specimen identification numbers, descriptions, and preparation details along with the date in the wood shop log book.
- c. Update the chain of custody document.