

# UL ENVIRONMENT

TECHNICAL BRIEF

# CARB FORMALDEHYDE RISKS

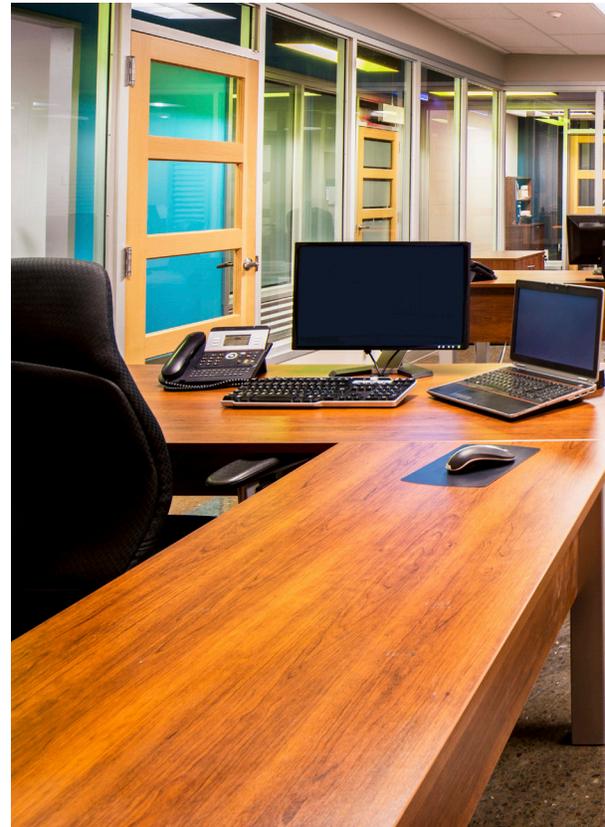


# Evaluating CARB Formaldehyde Risks in Your Supply Chain

## Introduction: What is CARB?

The California Air Resources Board, also known as CARB, is the "clean air agency" within the California Environmental Protection Agency. CARB is responsible for maintaining air quality and protecting the public from exposure to toxic air contaminants. Formaldehyde was designated as a toxic air contaminant (TAC) in California in 1992 with evidence that exposure does present a public health hazard. Formaldehyde is an important precursor to many other materials and chemical compounds and mainly used in the production of industrial resins and coatings. Health effects from formaldehyde exposure can include nose and throat irritation, a burning sensation of the eyes, difficulty in breathing, and it can also trigger asthma symptoms. Sensitive individuals may experience fatigue, headache, and nausea. Formaldehyde is also a known human carcinogen.

CARB evaluated formaldehyde and found that one of the major sources of exposure is from inhalation of formaldehyde emitted from composite wood products. Composite wood products are manufactured by binding the particles, fibers, or veneers of wood, together with adhesives, which are often based on formaldehyde chemistry. Billions of square feet of composite wood products including hardwood plywood (HWPW), particleboard (PB), and medium density fiberboard (MDF) are sold in California annually, primarily as finished products such as flooring, furniture, and cabinetry.



## What is ACTM and how does it affect my business?

On April 26, 2007, CARB approved an Airborne Toxic Control Measure (ATCM) to reduce formaldehyde emissions from composite wood products and any finished products that contain them. ATCM 93120 applies to panel manufacturers, distributors, importers, fabricators, and retailers of HWPW, PB, MDF, and finished goods containing those products, that would be sold or supplied to California.

The ATCM established formaldehyde emission limits for new composite wood panels based on the ASTM E 1333 test method (or an equivalent method). The current emission limits for each type of composite wood are summarized in Table 1.

**Table 1. Phase 2 Allowable Formaldehyde Concentration**

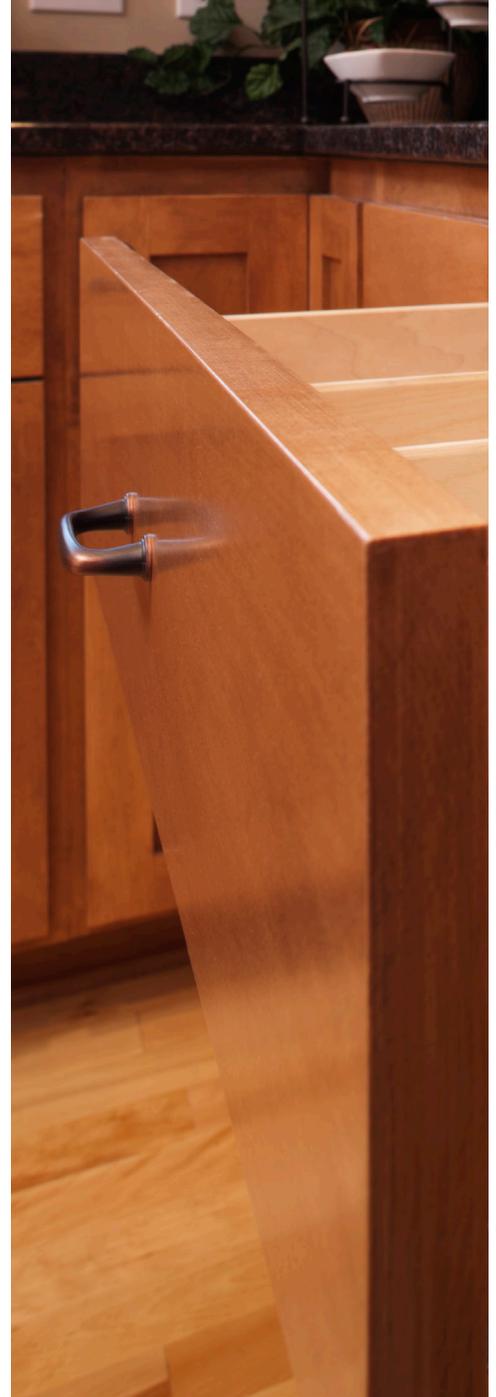
Product	Phase 2 Levels (ppm)
Hardwood Plywood – Veneer Core	0.05
Hardwood Plywood – Composite Core*	0.05
Particleboard	0.09
MDF	0.11
Thin MDF**	0.13

\* Hardwood plywood panel using particleboard or MDF in the core.

\*\* Maximum thickness of 8 mm.

The regulation includes a detailed third-party certification scheme for manufacturers of composite wood products to determine if products meet the formaldehyde limits. The certified panels must be labelled and manufacturers must provide documentation that states that their products comply with the CARB ATCM 93120 regulation.

Companies that import, distribute, or sell composite wood products or finished products are required to have records to demonstrate that only certified panels are used in their products. This includes keeping track of what items were purchased from which manufacturer or fabricator. This process can be quite complex, especially for finished products such as furniture which may be made with several types of composite wood.





A summary of the regulatory requirements for each classification are summarized in Table 2.

Table 2. CARB ATCM 93120 Regulatory Requirements

Classification	Manufacturer	Fabricator	Distributor	Importer	Retailer
Definition	Produces MDF, PB, or HWPW	Uses composite wood to make finished products (including laminated products)	Purchases composite wood or finished products for resale (not manufacturer or retailer)	Liable for payment of any duties (or authorized agent)	Sells composite wood or finished products directly to consumers
Requirements	<ul style="list-style-type: none"> <li>• Third Party Certification</li> <li>• Emission Standards</li> <li>• Quality Assurance</li> <li>• Facility Inspections</li> <li>• Product Labeling</li> <li>• Statements of Compliance</li> <li>• Recordkeeping</li> </ul>	<ul style="list-style-type: none"> <li>• “Reasonable prudent precautions”</li> <li>• Product Labeling</li> <li>• Statements of Compliance</li> <li>• Recordkeeping</li> </ul>	<ul style="list-style-type: none"> <li>• “Reasonable prudent precautions”</li> <li>• Statements of Compliance</li> <li>• Recordkeeping</li> </ul>	<ul style="list-style-type: none"> <li>• “Reasonable prudent precautions”</li> <li>• Statements of Compliance</li> <li>• Recordkeeping</li> </ul>	<ul style="list-style-type: none"> <li>• “Reasonable prudent precautions”</li> <li>• Recordkeeping</li> </ul>

With regard to potential enforcement, CARB conducts inspections at any point in the supply chain from manufacturers to retailers. These inspections include reviews of compliance with labeling requirements, record-keeping documentation, and even collection of samples for emissions testing. Enforcement actions for violators can include administrative, civil, and potentially criminal penalties.

### UL Solutions for CARB Compliance

Fabricators, distributors, importers, and retailers can avoid potential enforcement action and negative publicity by understanding their responsibilities and developing proactive compliance strategies. The regulation does not provide detailed compliance recommendations and only indicates that companies must take “reasonable prudent precautions.” UL has global experts in this regulation and testing, and has helped many high-profile retailers and finished product manufacturers establish their own inspection and testing programs to monitor their supply chain.

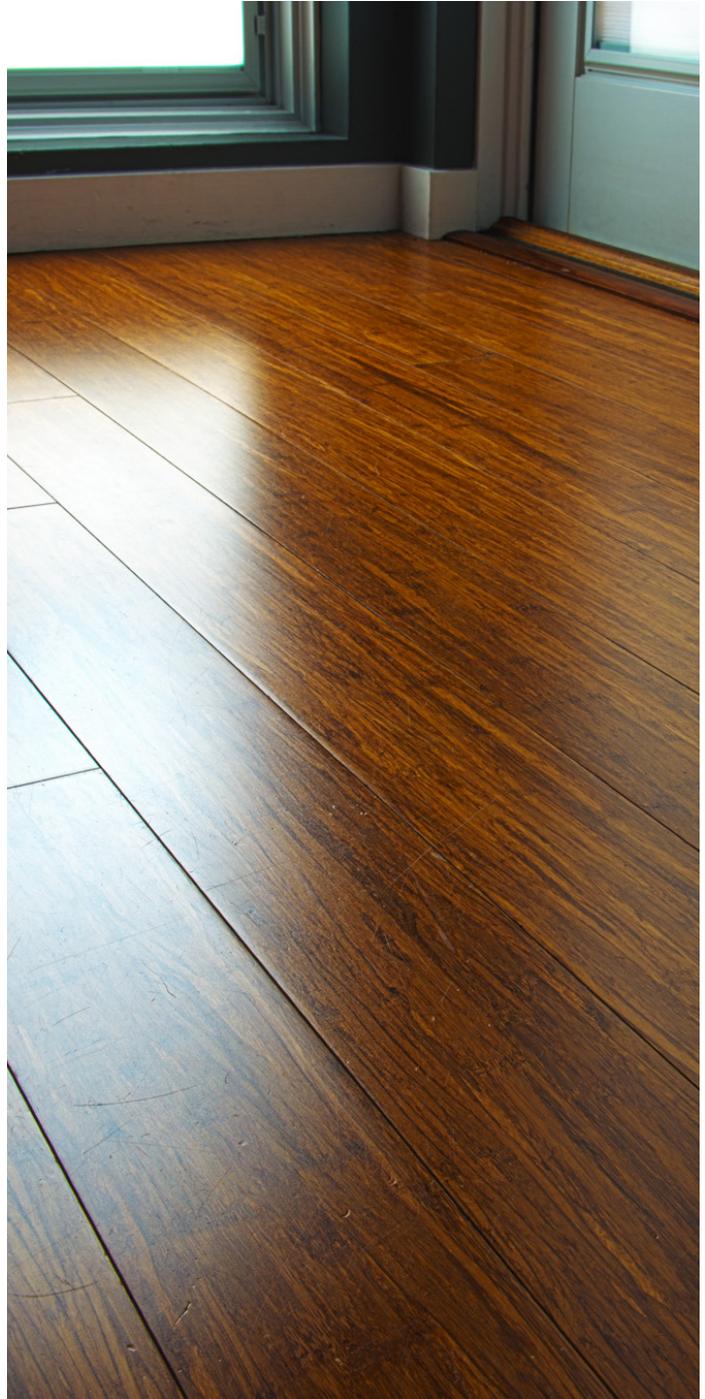
The UL approach includes identifying areas of high, medium, and low risk in your supply chain. Based on the risk ratings, UL experts can conduct desk audits and facility inspections throughout your supply chain to verify that your product labelling, recordkeeping, and statements of compliance are sufficient for the regulatory requirements. UL’s process is designed to reveal the complete supply chain back to the fabricator of the finished products and the manufacturer of the composite wood products. For high and medium risk supply chains, UL recommends going beyond the record-keeping requirements by using periodic testing of composite wood products to measure actual formaldehyde emissions.

## Overview of Test Methodology

The key test method used to investigate products in the supply chain is ASTM D6007-02. This small chamber method allows for testing of small samples, which makes it more practical and cost-effective. The details of sample procurement and preparation must be taken into account. Whenever possible, panels should be selected from the raw materials at the fabricator's facility prior to coating or laminating. When testing products pulled from stock, another option is to find an area of the finished product with unfinished HWPW, PB, or MDF still exposed. The exposed pieces can be cut from the finished product for testing to the CARB requirements. The unfinished panel samples will most closely simulate the CARB requirements for panel testing.

Acquiring unfinished panels can be problematic for many importers or distributors that purchase finished products. Once the surfaces of a panel have been laminated or coated, it is more difficult to determine if it was compliant with the CARB emissions limits. Surfacing materials can encapsulate formaldehyde emissions from the composite wood substrate and some materials may also add formaldehyde emissions.

As part of their enforcement efforts, CARB developed the "Standard Operating Procedure for Finished Good Test Specimen Preparation Prior to Analysis of Formaldehyde Emissions from Composite Wood Products". This document details a procedure for planing or sanding to remove the finished surface materials from composite wood samples prior to chamber testing. The procedure, often referred to as "deconstruction," can lead to variability and uncertainty in the test results. As such, deconstructed sample test results should not be directly compared to the CARB limits and the data should be put in perspective to determine if further factory inspections or unfinished board testing is warranted.





## How CARB Relates to Formaldehyde Emissions of Finished Products

The CARB formaldehyde emission levels and test methods were designed to reduce formaldehyde levels from composite wood products and finished products; however, the test data can't be used to estimate indoor exposure levels. Consumers are increasingly concerned about emissions of formaldehyde and other chemicals from products that may negatively impact indoor air quality in their homes, offices, schools, and hospitals. Ultimately, consumers want to know that the products they purchase are not going to expose them to harmful levels of toxic chemicals.

UL has developed test protocols to measure emissions of formaldehyde and other volatile organic compounds (VOCs) from finished products. Products that meet stringent, health-based emission criteria can achieve UL's GREENGUARD Certification. Manufacturers that achieve GREENGUARD Certification for their products demonstrate a commitment to public health by going beyond regulatory requirements and producing products that do not contribute to poor indoor air quality.

### Sources

<http://www.arb.ca.gov/toxics/compwood/compwood.htm>

<http://www3.epa.gov/airtoxics/hlthef/formalde.html>

[http://www.arb.ca.gov/enf/compwood\\_sop\\_fg\\_decon\\_091313.pdf](http://www.arb.ca.gov/enf/compwood_sop_fg_decon_091313.pdf)

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### *UL Services for CARB Compliance*

- Chamber testing to ASTM E 1333 and ASTM D 6007 to assess formaldehyde levels in products*
- Supplier declaration and risk assessment and ratings to identify potential gaps*
- Development of product protocols and requirements to limit formaldehyde in products*
- Development of custom advanced supplier monitoring and tracking systems*
- Desktop review and chain-of-custody audits*
- Factory and warehouse inspections*
- Advanced chemical emissions testing and certification to ensure compliance*