



FORMALDEHYDE IN COMPOSITE WOOD PRODUCTS:

Meeting the New U.S. EPA Regulations





OVERVIEW



The U.S. Environmental Protection Agency (EPA) has issued new regulations to protect consumers from the potential health risks associated with exposure to formaldehyde emissions in composite wood products. The regulations, which take effect in 2017, will significantly restrict formaldehyde emissions consistent with the limits currently in effect in California under the California Air Resource Board's Airborne Toxic Control Measure (generally referred to as CARB ATCM, or CARB). In addition to imposing testing requirements on manufacturers to ensure compliance with these emissions limits, the regulations also establish labeling and disclosure notification requirements that are applicable to fabricators, distributors, importers and retailers.

This UL white paper provides an overview of the EPA's new regulations for formaldehyde emissions from composite wood products, including detailed requirements to be addressed by individual supply chain participants. Beginning with a brief summary of the uses and potential dangers associated with formaldehyde in composite wood products, the paper then reviews prior efforts to regulate formaldehyde emissions before discussing the specifics of the EPA's new regulations. The white paper also details the anticipated mechanisms for enforcing the EPA's regulations, and concludes by providing some strategies for achieving compliance.

Formaldehyde in Composite Wood Products

Formaldehyde is a volatile organic compound (VOC) that is present in substantial concentrations both indoors and outdoors. The most prevalent sources of indoor formaldehyde are construction materials and furniture products made of composite wood bonded with adhesives containing formaldehyde. Such products include plywood, particleboard and medium density fiberboard (MDF) used in furniture, cabinetry, shelving, flooring, paneling, subflooring and sheathing.

Formaldehyde is classified as a Group 1 known human carcinogen by the International Agency for Research on Cancer (IARC).¹ The EPA's Integrated Risk Information System (IRIS) estimates a cancer risk in humans of one in 10,000 at relatively low concentration levels.² Exposure to formaldehyde is also associated with decreased lung function and respiratory, eye, nose and throat irritation. According to the EPA, adverse health effects from formaldehyde exposure may have a disproportionate impact on children and other vulnerable populations.

Recent high-profile incidents clearly illustrate the potential risk of exposure to formaldehyde in composite wood products. Most notable was the discovery in 2015 of high levels of formaldehyde in laminated floor boards produced in China between 2012 and 2014, and sold in the U.S. by a national retailer. Testing of sample boards conducted under the supervision of the U.S. Consumer Product Safety Commission (CPSC) and subsequent analysis of test results by the Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) determined the potential for heightened risk of health-related effects, and predicted a small but real increase in the projected number of cancer deaths associated with long-term exposure to the affected floor boards.³



Previous Regulatory Efforts Related to Formaldehyde

Several federal and state regulations intended to reduce exposure to formaldehyde and other potentially hazardous chemicals are currently in effect. For example, the U.S. Department of Housing and Urban Development (HUD) places limits on formaldehyde emissions from non-structural plywood and particleboard used in manufactured housing applications. All such products must be certified by a “nationally-recognized testing laboratory” to verify compliance with HUD’s formaldehyde emissions limits.⁴

However, regulations in force in the state of California have been the most extensive and far reaching of any in the U.S. to date. Perhaps the mostly widely known California regulations are those enacted under the state’s Safe Drinking Water and Toxic Enforcement Act of 1986. These regulations (often referred to as Proposition 65 regulations) are intended to protect consumers from being exposed to any one of more than 900 chemical substances, including formaldehyde, that have been linked to cancer, birth defects and other reproductive harms. Proposition 65 regulations prohibit any entity conducting business in California from knowingly exposing individuals to any listed chemical without first providing a clear and reasonable warning.





A second California regulation that is directly applicable to composite wood products containing formaldehyde is the state's California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120. Implemented in 2007, the CARB regulation established formaldehyde emissions limits for various types of new composite wood panels and finished products that contain composite wood materials that are sold in California. It requires manufacturers to have composite wood products certified by CARB-approved third-party certifiers (TPCs) for compliance with the relevant emissions limits. Composite wood panels that have been certified must be clearly labeled and manufacturers must provide documentation that attests to compliance with the formaldehyde emissions limits specified under the ATCM.

California has the largest state economy in the U.S. and the sixth largest economy in the world, ahead of countries including France and India.⁵ As a result, the CARB regulations have essentially served as a de facto U.S. national regulation related to the emissions of formaldehyde from composite wood products. However, the absence of actual regulations at the federal level has led to confusion in the marketplace among manufacturers, distributors, retailers and consumers.





The EPA’s Rule on Formaldehyde Emissions from Composite Wood Products

The EPA has been actively studying the issue of formaldehyde emissions from composite wood products since 2008 when it was petitioned by 25 organizations and approximately 5,000 individuals to adopt the CARB regulations nationally. The U.S. Congress passed the Formaldehyde Standards for Composite Wood Products Act in early 2010 and it was signed into law in July of that year. The Act resulted in part from public and industry interest in establishing nationwide restrictions on the use of formaldehyde in wood composite products that would reduce risk to consumers while also unifying compliance requirements for manufacturers. It amends Title VI of the U.S. Toxic Substances Control Act (TSCA) to establish formaldehyde emissions standards that are consistent with the CARB requirements.

Following congressional passage of the Formaldehyde Standards Act, the agency initiated a formal rule-making process that included lengthy deliberations, extensive consultations with representatives from the wood products industry, and multiple public comment periods. Ultimately, the EPA issued a pre-publication of its final rule on formaldehyde emissions from composite wood products in July 2016, and published its final rule in the *Federal Register* on December 12, 2016. In brief, the EPA’s rule addresses the following key issues:

Scope of products covered—The EPA’s rule applies to panels and component parts made of hardwood plywood, MDF, thin MDF and particleboard, as well as finished goods made from these materials, such as furniture, cabinetry, flooring and other building materials. The rule also applies to prefabricated and manufactured homes, i.e., mobile homes, travel trailers, campers and recreational vehicles (RVs), which often include interior build-outs constructed of composite wood products.

Emissions limits—Formaldehyde emissions limits under the EPA rule are identical to the CARB Phase 2 requirements. The specific emission limits depend on the type of composite wood panel, as follows:

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 8mm
***Chamber concentration according to ASTM E 1333 test method

Third-party certification—The rule establishes a third-party certification program that includes testing, inspection, and quality control requirements to certify that composite wood products are compliant with the EPA’s formaldehyde emissions limits. Certification must be conducted by TPCs that have been authorized by an EPA-approved accreditation body to conduct emissions testing and certification under the regulations.



Products certified by a CARB-approved TPC will be considered certified under the EPA rule during a two-year transition period provided they are compliant with all other aspects of TSCA Title VI. TPCs recognized by CARB will also be recognized by EPA through reciprocity during the two-year transition period after which they must participate in the EPA TPC approval process.

Manufacturers of composite wood products that are certified under the EPA rule must conduct regular quality control testing to ensure ongoing compliance with emissions limits. In addition, a TPC must conduct quarterly inspections which include a review of quality control test data and selecting samples for independent formaldehyde emissions testing to maintain certification.

Labeling requirements for composite wood panels—All composite wood panels must be labeled with the panel producer's name, the production lot number, the name or number of the TPC that certified the panel, and a statement signifying that the products are TSCA Title VI certified. Labels can take the form of a stamp, tag or sticker.

Record retention—Manufacturers must maintain the following records for a period of three years:

- Representative copies of all labels used
- Records of all quarterly emissions testing
- Records of all ongoing quality control testing
- Production records, including records of changes in production materials or methods
- Records verifying eligibility for reduced testing (if applicable)
- Purchaser information for each composite wood product (if applicable)
- Transporter information for each composite wood product (if applicable)
- Information on the disposition of non-compliant product lots

Laminated Products—The EPA rule adds a provision for laminated products made by gluing veneers to either side of an already compliant composite wood product. Initially, such laminated products will be treated as finished products and subject only to labeling and recordkeeping requirements (similar to requirements in the current version of the CARB rule). However, after seven years, laminated products will be treated as hardwood plywood unless they are made using phenol formaldehyde or no-added formaldehyde adhesives. Laminated products that are not made with the exempt adhesives will be subject to third party certification requirements for hardwood plywood.

Implementation timetable—The EPA's formaldehyde rule takes effect on December 12, 2017 (one year after its publication in the *Federal Register*). It will apply to all products manufactured as of that date. The rule also includes provisions to prevent the stockpiling of non-compliant composite wood products to evade applicable emissions requirements.





Considerations for Fabricators, Distributors, Retailers and Importers

The EPA estimates that its formaldehyde rule will impact nearly one million business entities worldwide, including composite wood panel manufacturers, laminators, fabricators, importers, distributors and over 750,000 retailers. The breadth of this impact is driven by specific requirements in the rule that apply not just to manufacturers of composite wood panels, but also to most entities in the supply chain.

In general, fabricators, distributors and retailers are required to take “reasonable precautions” to make sure that composite wood products and finished goods that include composite wood products are compliant with the formaldehyde emissions limits under the EPA rule. According to the EPA, these reasonable precautions include obtaining from suppliers and other third parties invoices, bills of lading or other comparable documents bearing a statement affirming that a given product meets the formaldehyde emissions requirements of TSCA Title VI or, alternatively, that the product was produced before one year after the publication of the EPA’s final rule. Such records must be maintained for a period of three years.





Importers will be expected to meet the same compliance requirements for obtaining and retaining suitable documentation as those applicable to fabricators, distributors and retailers. However, because the reach of EPA regulations does not extend to producers or suppliers of composite wood products located outside of the U.S., importers may have the added burden of educating their suppliers regarding the EPA's rule for composite wood products, and ensuring that composite wood products obtained from outside the U.S. are compliant with the rule's formaldehyde emissions requirements.

In addition, importers will be required to make available to the EPA documents that identify the wood panel producer, the date of production, the date of purchase and the name of the panel supplier (if different from the panel producer). Importers will have 30 days from the date of receipt of such a request to provide the EPA with any requested supplier documentation.

Enforcement Mechanisms and Other Factors Expected to Drive Compliance

While the EPA rule on formaldehyde emissions does not include specific enforcement provisions, the agency does have a number of mechanisms at its disposal to enforce the new emissions limits for formaldehyde in composite wood products, including monetary penalties. Apart from EPA enforcement efforts, imported products and materials that include composite wood products can also be detained for inspection by U.S. Customs and Border Patrol agents, and non-compliant products can be refused U.S. entry.





Of course, industry pressure and the risk of adverse publicity are likely to provide even more powerful incentives for compliance with the EPA's formaldehyde emissions limits. Because entities along the entire supply chain are specifically included under the scope of the rule, few retailers are likely to stock or sell composite wood products or finished products that do not have the required labeling, essentially excluding non-compliant products from the market. And most companies can be expected to develop compliance programs that include independent inspections and testing to minimize the risk of non-compliance, and the associated harm to their reputation or brand recognition.

Important Considerations for Retailers and Brand Owners

Beyond meeting the requirements under the EPA's formaldehyde emissions standard for composite wood products, retailers and brand owners can take a number of proactive steps to help ensure that the products they promote or sell meet or exceed their own standards for quality products that are also safe. These steps include:





Use only composite wood materials certified by third-parties—Under the EPA rule, testing and certification must be performed by an EPA-accredited TPC, and self-certification is not permitted. Check to ensure that all purchased composite wood materials include labeling that references the accredited TPC. If in doubt about the authenticity of a panel label, check with the listed TPC.

Conduct risk-based inspection of manufacturers/fabricators—Depending on risk factors such as compliance history, geography, and complexity of the supply chain, go back to the source of your products and materials to conduct inspections of manufacturers and fabricators. Such inspections can identify potential concerns before they become costly problems, and can also signal to suppliers your commitment to offering safe products.

Perform periodic testing of finished products—Conduct random, periodic testing to assess actual formaldehyde levels of finished products. Such testing validates overall compliance and can serve as a secondary check on the quality and integrity of supplier compliance programs.

Implement rigorous document controls to ensure traceability—The documentation requirements under the EPA rule are rigorous and require a comprehensive system to collect and retain documentation as required. An effective document control system can also help expedite a prompt response to a request for documentation as required of importers under the EPA rule.





The Benefits of UL GREENGUARD Certification for Manufacturers

The UL GREENGUARD Certification Program was developed to provide a mechanism to scientifically assess the chemical emission characteristics of products designed for use in indoor spaces. Certification is based on conformity with product-specific, performance-based standards that detail product sample collection procedures, testing methods and frequency of testing, and allowable emission levels based on established toxicity limits.

UL GREENGUARD Certification emissions limits were first used as purchasing specifications for the U.S. EPA and the State of Washington for furniture and commercial building products. UL GREENGUARD Certification criteria have been the basis for the LEED credit for low emitting furniture since 2002. Office furniture products that are UL GREENGUARD Certified are also compliant with the industry association's BIFMA X7.1 standard.

The UL GREENGUARD Gold standard includes health-based criteria for additional chemicals, and also requires lower total VOC emissions levels to ensure that products are acceptable for use even in the most sensitive environments such as schools and healthcare facilities. In addition to limiting emissions of more than 360 VOCs and total chemical emissions, UL GREENGUARD Gold Certified products must also comply with requirements of the State of California's Department of Public Health "*Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1 (2010)*" (also known as California Section 01350).





UL GREENGUARD and UL GREENGUARD Gold Certified products are also subject to rigorous manufacturing review and ongoing testing requirements. The product documentation review and routine verification and retesting can help to quickly identify changes in a product's emission profile due to component modifications or revised manufacturing processes. As such, buyers have increased confidence that UL GREENGUARD Certified products are being consistently produced in accordance with the specified emissions levels.

The UL GREENGUARD and GREENGUARD Gold Certification Marks are widely recognized and trusted by government purchasers, code officials, specifiers, and consumers. The broad acceptance of the UL GREENGUARD Marks provides greater market access for UL GREENGUARD Certified products, thereby providing manufacturers with important competitive advantages. UL GREENGUARD Certification serves as a testament to a manufacturer's commitment to the production of safer products.



Summary and Conclusion

The EPA's formaldehyde emissions standards for composite wood products take effect in December 2017. The rule establishes strict third party certification requirements for composite wood manufacturers, but also imposes recordkeeping and labeling requirements on entities throughout the supply chain, including fabricators, distributors, importers and retailers of finished products that contain composite wood materials. Importers are likely to experience even more significant compliance challenges when dealing with composite wood materials and finished products produced outside of the U.S.

UL is an accredited TPC under both the CARB ATCM and the EPA's rule governing formaldehyde emissions from composite wood products, and has extensive experience in the development of test protocols for quality control testing for panel manufacturers. In addition, UL can assist fabricators, importers, and retailers in the development of finished product inspection and testing protocols and requirements to limit the risk of non-compliant products in their supply chain. Finally, because the labels required under the EPA rule make it easy to identify products that contain formaldehyde, the UL GREENGUARD Certification Program can help consumers select finished products that meet the most stringent health-based emission limits for formaldehyde and other VOCs.

For more information about UL's formaldehyde testing and certification services for composite wood products, and the UL GREENGUARD Certification Program, contact environment@ul.com or visit <http://industries.ul.com/environment/certificationvalidation-marks/greenguard-certification-program>.



Endnotes

¹ "IARC Classifies Formaldehyde as Carcinogenic to Humans," International Agency for Research on Cancer, Press Release No 153, June 15, 2004. Web. 20 November 2016. <http://www.iarc.fr/en/media-centre/pr/2004/pr153.html>.

² "Formaldehyde," Integrated Risk Information System, U.S. Environmental Protection Agency. Web. 20 November 2016. https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=419.

³ "Possible Health Implications from Exposure to Formaldehyde Emitted from Laminate Flooring Samples Tested by the Consumer Product Safety Commission," a joint report of the Centers for Disease Control and Prevention and the Agency for Toxic Substances and Disease Registry, March 22, 2016. Web. 20 November 2016. http://www.cdc.gov/nceh/laminateliflooring/docs/laminate-flooring-report-3-22-2016_508.pdf.

⁴ "24 CFR, Part 3280, Manufactured Home Construction and Safety Standards," U.S. Code of Federal Regulations. Web. 20 November 2016. <http://www.ecfr.gov/cgi-bin/text-idx?SID=a2c5655a37054c584f7dd6a0ed240fb8&node=pt24.5.3280&rgn=div5>.

⁵ "California Passes France As World's 6th Largest Economy," Reuters News Service, as reported at Fortune.com, June 17, 2016. Web. 20 November 2016. <http://fortune.com/2016/06/17/california-france-6th-largest-economy/>.