

Questions and Answers about Wood Adhesives and Formaldehyde Emissions

Formaldehyde is a widespread, naturally occurring and commercially produced chemical substance. Humans and other organic life forms produce and use formaldehyde in normal biochemical reactions. In industry, this chemical is widely used as a building block chemical due to its reactivity and versatility.

Increased public awareness about formaldehyde's potential health effects has led to concerns about the adhesives used in wood-based products for home construction. In addition, the California Air Resources Board (CARB), the United States Environmental Protection Agency (EPA), and the Canadian Government have issued regulations for formaldehyde emissions from certain composite wood products. This technical resource sheet provides answers to questions that occasionally arise about formaldehyde emissions from Weyerhaeuser engineered wood products (EWP). Additional information on potential emissions can also be found in the Safety Data Sheets (SDSs) for Weyerhaeuser engineered wood products.

Weyerhaeuser OSB, structural plywood, structural composite lumber, and wood I-joists are excluded from the CARB, EPA, and Canadian regulations for formaldehyde emissions from composite wood products.

Q: Do the California Air Resources Board (CARB), Airborne Toxic Control Measure, Environmental Protection Agency (EPA) regulation Formaldehyde Standards for Composite Wood Products (40 CFR Part 770) (a.k.a. TSCA Title VI), and the Canadian Formaldehyde Emissions from Composite Wood Products Regulations (SOR/2021-148) apply to Weyerhaeuser's engineered wood products?

A: The CARB, EPA, and Canadian regulations for composite wood products apply specifically to hardwood plywood, medium density fiberboard (MDF), and particle board. Structural engineered wood products (EWP), including oriented strand board (OSB), structural plywood, structural composite lumber, and wood I-joists are specifically excluded from the regulations when certified in accordance with applicable structural standards, because they are "made with resins with limited formaldehyde emissions potential"⁽¹⁾. Therefore, the structural engineered wood products discussed in this Q&A document, including Weyerhaeuser oriented strand board (OSB), structural plywood, Trus Joist® TJI® joists, Microllam® LVL, TimberStrand® LSL, and Parallam® PSL, are excluded from the CARB, EPA, and Canadian regulations. However, Weyerhaeuser also

produces MDF and some non-structural plywood products that are subject to these regulations.

Q: Why are formaldehyde emissions of concern?

A: Airborne formaldehyde can have eye and upper respiratory irritant properties when present in sufficient concentrations. Several health agencies also classify formaldehyde as a carcinogen or as a probable carcinogen. Although most of us have robust defense mechanisms to transform and eliminate formaldehyde from our systems, its inherent toxicity indicates a need to identify and reduce potential exposures.

Q: Why is formaldehyde released from adhesive bonded wood products?

A: In the adhesive manufacturing process, formaldehyde is commonly reacted with other chemicals to form a liquid resin, which is either used alone or in combination with other substances as the adhesive in engineered wood products. In wood product manufacturing facilities, the adhesive is applied to small pieces of wood, which are then consolidated under heat and pressure to form strong, bonded products. Some adhesives contain

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low levels of unreacted formaldehyde at the time they are applied to the wood, and additional formaldehyde can be generated in subsequent heating processes. Some of this formaldehyde can become trapped within the finished wood products. Depending on environmental conditions, such as increased heat or humidity, this formaldehyde may be released and become airborne. In addition, interior-use resins traditionally used in the manufacture of particle board, MDF, and hardwood plywood may release formaldehyde when exposed to water. Exterior-use resins used in the manufacture of structural engineered wood products typically don't break down (hydrolysis) and release formaldehyde when exposed to moisture.

Q: What is the level of formaldehyde emissions from the Weyerhaeuser wood products mentioned above?

A: For Weyerhaeuser MDF and non-structural plywood products regulated by CARB, EPA, and the Canadian government, products are regularly tested and certified for compliance to those regulations based on acceptably low formaldehyde emissions.

For structural engineered wood products that are not regulated by CARB, EPA, or the Canadian government, independent third-party testing⁽²⁾ has shown that products bonded with either phenol-formaldehyde-based adhesives, phenol-resorcinol-formaldehyde-based adhesives, polymeric MDI (isocyanate) adhesives, or a combination of these, do not emit

substantial amounts of formaldehyde. When tested in accordance with the ASTM large chamber test⁽³⁾, using representative loading ratios, formaldehyde emissions from these products were typically under 0.08 parts per million (ppm) inside the test chamber.

Q: How much adhesive is used in Weyerhaeuser wood products?

A: Adhesives used in the wood products manufactured by Weyerhaeuser typically make up less than 6% of the final product weight.

Q: What types of resins are used in Weyerhaeuser wood products?

A: Weyerhaeuser structural engineered wood products are manufactured with exterior-use adhesives with low formaldehyde emissions potential, including phenol-formaldehyde (PF), phenol-resorcinol-formaldehyde (PRF), and polymeric methylene diisocyanate (pMDI).

Weyerhaeuser MDF is manufactured using interior-use adhesives that meet the stringent CARB, EPA, and Canadian emissions requirements. Product formaldehyde emissions are regularly tested to confirm compliance.

Q: Do Weyerhaeuser structural EWP meet emissions requirements associated with "green building," such as those set by LEED?

A: Yes. Voluntary standards, like the U.S. Green Building Council's LEED, define and categorize composite products

differently than the CARB, EPA, and Canadian regulations—LEED includes structural engineered wood products in its definitions. The adhesives used in Weyerhaeuser structural EWP, which does not include certain MDF products, have "no added urea-formaldehyde resin" as defined by LEED v4 and qualify as low-emitting materials under LEED v4.1.

Q: Where can I find additional information about the health and safety of Weyerhaeuser's products?

A: See product specific Safety Data Sheets (SDS) at weyerhaeuser.com/woodproducts/building-green-with-wood/product-stewardship-safety-data-sheets/

References

1. Formaldehyde Emissions Standards for Composite Wood Products. Federal Register/Vol. 81, No. 238, p.89682. December 12, 2016.
2. Technical Note J330E: Formaldehyde and Engineered Wood Products. January 2022. APA — The Engineered Wood Association, <apawood.org>
3. Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber. ASTM E1333.



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