

Airborne Toxic Control Measure (ATCM) to Reduce Formaldehyde Emissions from Composite Wood Products

What are composite wood products?

“Composite wood products” is a general term for wood-based panels made from wood pieces, particles, or fibers bonded together with a resin. In daily life, people may see composite wood in many products such as oriented strand board in new home construction, workshop “peg board,” or plywood cabinet doors. However, the ATCM specifically focuses on three composite wood products: hardwood plywood (HWPW), particleboard (PB), and medium density fiberboard (MDF). Most of HWPW, PB, and MDF is used to make furniture, cabinets, shelving, countertops, flooring, and moldings in homes. Formaldehyde is emitted into the air from composite wood products at manufacturing plants, fabrication facilities, home construction sites, remodeling construction, goods transport, lumberyards, and through windows, doors, and ventilation systems in homes and other buildings when unreacted formaldehyde is released from urea-formaldehyde resins.

What are the health effects of exposure to formaldehyde?

Formaldehyde has both cancer and non-cancer health effects. The International Agency for Research on Cancer concluded that there is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans (the region of the throat behind the nose). Formaldehyde also has non-cancer effects such as eye, nose, and respiratory irritation. Formaldehyde has been linked to the exacerbation of asthma in formaldehyde-sensitive individuals, and possibly other asthmatics. In 1992, formaldehyde was formally listed by the Air Resources Board as a Toxic Air Contaminant in California with no safe level of exposure. Health risks from total daily average formaldehyde exposures in California from all sources are estimated to range from 86 to 231 excess cancer cases per million for adults, and from 23 to 63 excess cancer cases per million for children.

Who is subject to the control measure?

The ATCM, which was approved by the Air Resources Board on April 26, 2007, would apply 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.

What are the requirements in the approved control measure?

The ATCM establishes two phases of formaldehyde emission standards, measured by the American Society for Testing and Materials (ASTM) test E 1333-96, for HWPW with a veneer core (HWPW-VC) and with a composite core (HWPW-CC), PB, MDF, and thin MDF. Complying materials must be used in finished goods made with those materials (see table below). All standards are “caps,” meaning that they cannot be exceeded. The standards apply to domestic and imported products.

| Phase 1 Emission Standards (in parts per million (ppm)) | | | | | |
|--|---------|---------|-------|-------|-------|
| Effective Date | HWPW-VC | HWPW-CC | PB | MDF | tMDF |
| January 2009 | 0.08 | ----- | 0.18 | 0.21 | 0.21 |
| July 2009 | ----- | 0.08 | ----- | ----- | ----- |
| Phase 2 Emission Standards | | | | | |
| January 2010 | 0.05 | ----- | ----- | ----- | ----- |
| January 2011 | ----- | ----- | 0.09 | 0.11 | ----- |
| January 2012 | ----- | ----- | ----- | ----- | 0.13 |
| July 2012 | ----- | 0.05 | ----- | ----- | ----- |

To ensure compliance with the ATCM, panel manufacturers must be “third party certified.” This requires independent emission testing of panels and manufacturing processes for manufacturers that sell or supply products to California. Third party certifiers are required to be approved by the Air Resources Board. As an incentive, manufacturers that use “no added formaldehyde” resins would not be subject to the third party certification requirement. Several examples of alternative resins are commercially available today that meet the Phase 2 standards and optimization of urea-formaldehyde resins is underway allowing for more cost-effective resin formulations before 2010.

To provide assurance of complying products to customers, manufacturers of HWPW, PB, and MDF panels would be required to label their products and provide documentation either on invoices or bills-of-lading that state that their products comply with the proposed standards. Similarly, distributors, importers, and fabricators would also be required to provide documentation of complying products to their customers, namely retailers. As fabricators may use HWPW, PB, and MDF to make finished goods such as cabinets and furniture, they would be required to label their finished goods as being made with complying HWPW, PB, and/or MDF.

The ATCM will be enforced by Air Resources Board or local air district personnel. Enforcement activities include facility inspections, auditing of records, and securing samples for compliance testing. Various test methods are included in the ATCM for use in compliance testing.

What are the benefits of the approved control measure?

Formaldehyde emissions from HWPW, PB, and MDF in California are estimated to be about 900 tons per year. Based on the average emissions of existing composite wood products, the ATCM would reduce emissions of formaldehyde by about 20% in Phase 1 or about 180 tons per year. In Phase 2, a 58% reduction in formaldehyde emissions or 500 tons per year would be achieved. Because these emissions would also reduce indoor formaldehyde exposures, substantial benefits would be realized by buyers of new homes as well as those in existing homes due to reduced emissions from remodeling projects and new furniture. These reductions also benefit ambient air quality because direct emissions outdoors will be reduced and most formaldehyde emitted indoors moves outdoors. The Phase 1 standards would reduce the number of formaldehyde-related childhood exposure cancer cases by 3 to 9, and lifetime exposure cancer cases by 12 to 35 per million. In Phase 2, childhood exposure cancer cases would be reduced by 9 to 26, and lifetime exposure cancer cases by 35 to 97 per million.

What are the estimated costs of the approved control measure?

The total combined cost to the HWPW, PB, and MDF industries is estimated to be about \$19 million for Phase 1 in 2009 and about \$127 million for Phase 2 in 2010-2012. We estimate that for a medium priced house of \$574,000, the increase cost of construction will be about \$400. Due to markups at the retail level, the incremental increase in the price of a composite wood panel in Phase 2 could range from about \$3 to \$6 (i.e., HWPW from \$20 to \$24, PB from \$10.50 to \$14, and MDF from \$14 to \$18).

How do the approved standards compare with other standards in the world?

The ATCM would set the most stringent production-based standards in the world. Presently, the U.S. trails efforts in Europe and Japan to reduce formaldehyde emissions from composite wood products. Present European and Japanese standards are “average” standards that allow panels to be produced with formaldehyde contents higher than the value of the standard. The ATCM sets “cap” standards which do not allow for products with emission levels above the cap to be sold in California. In the ATCM, all HWPW, PB, and MDF would be required to meet a single product-specific production-based “cap”

standard, and actual formaldehyde emissions are expected to be about 0.03 to 0.04 ppm lower than the value of the cap.

For more information

Visit our web site at <http://www.arb.ca.gov/toxics/compwood/compwood.htm> for more information or call the Air Resources Board's Public Information Office at (916) 322-2990. For a copy of this document in an alternative format or if you have special accommodation needs, please contact the ADA Coordinator at (916) 323-4916.

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