

Formaldehyde-Based Resins and Composite Wood Products

Proven Product Performance

Formaldehyde is one of the most well-studied and well-understood compounds in commerce. It occurs naturally, in living cells and is respired by all living things. Formaldehyde is also manmade, for use in a variety of industrial applications. When used properly, formaldehyde-based chemistry provides important, [value-added benefits](#) to a wide range of [wood-based products for American homes and businesses](#).

The wood-based panel industry relies on the dependable performance of formaldehyde-based resins for wood products. Few, if any, compounds can replace formaldehyde chemistry in creating high-quality resins without compromising quality and performance, or making the final products more expensive. While formaldehyde is an essential building block in a diverse range of wood products, its end use is primarily in a converted form. That means that virtually all of the formaldehyde is consumed in making the final product.

Strong Science

Studies show that highly efficient biological protective mechanisms in a person's upper respiratory tract ensure that normal, everyday exposures to inhaled formaldehyde do not reach the lungs or other distant sites in the body. Inhaled formaldehyde is absorbed primarily at the site of first contact because of its affinity for moisture. The relatively small amounts of formaldehyde that might remain in the nose and upper respiratory tract are expired by the body with every breath or quickly metabolized within minutes. Formaldehyde does not accumulate in the body due to these efficient biological processes.

Both the Agency for Toxic Substances and Disease Registry (ATSDR) and the World Health Organization (WHO) have concluded that there is no scientific evidence that children are more or less susceptible to formaldehyde exposures than adults.

Industry Stewardship and Government Regulation

Emissions reduction has been the cornerstone of the formaldehyde resin industry for more than 25 years. The industry's stewardship efforts have resulted in the development of products that meet performance requirements set by customers and regulatory bodies to minimize emissions from composite wood products. Industry efforts have led to the development of resin technologies, including ultra-low emitting formaldehyde resins that are capable of reducing potential emissions to remarkably low levels – some emissions are at or very near the level of wood itself. Resin technologies meet or exceed technical performance requirements for a wide-range of composite wood products, while also ensuring compliance with the California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) standards. For more information, please visit [CARB's Frequently Asked Questions](#).

Answering Questions

What are composite wood panels?

Composite wood panels are hardwood plywood, particleboard and medium density fiberboard (MDF). They are typically made from wood fibers or veneers that are glued together using an adhesive. These products are used in common household items like laminated countertops, floors, cabinets, moulding, doors and furniture. Formaldehyde-based glues and resins are the enabling technology that helps to provide versatility and [innovative solutions for these wood products](#). For more information about composite wood flooring, please visit [CARB's Facts about Flooring Made with Composite Wood Products](#).

What is the California Air Resources Board (CARB)?

CARB is a department of California's Environmental Protection Agency (EPA), which developed – as well as implements and enforces – the Airborne Toxic Control Measure (ATCM), the world's most stringent product testing and certification standard for formaldehyde emissions from composite wood products.

As of now, the regulation only applies to composite wood products being sold in California; however, nearly 100 percent of the North American composite panel manufacturers make CARB compliant products sold in the U.S. and U.S. EPA is currently finalizing a national regulation based on California's rules.

Included in the CARB rule is a stringent third party certification ("TPC") element, to ensure that inspection service providers are qualified to perform extensive emissions testing on wood panels and finished goods. CARB must ensure – through rigorous qualification processes – that the TPC system is being effectively carried out.

What is CARB Phase 2?

[According to California EPA's Air Resources Board](#), "From a public health standpoint, the [California Composite Wood Products Regulation's] emission standards are set at low levels intended to protect public health. The first emission standards (Phase 1) went into effect in 2009. The more stringent Phase 2 standards are now in effect for all composite wood panels and finished goods sold in California."

CARB Phase 2 has unequivocally shown that existing and developing technologies for both resins and panel manufacturing are capable of delivering composite panel products that emit at, or very near, the emissions levels for natural wood. By taking a performance-based approach tied to emissions limits, the CARB Phase 2 program encouraged advancement in all technologies and provides the widest array of options for panel manufacturers and the downstream chain of commerce. Manufacturers of composite wood products continue to rely on urea formaldehyde (UF)-based resin technologies in products that comply with or perform better than the CARB Phase 2 emissions standards, which is a testimony to the effectiveness and capability of UF-based resins.

What is the U.S. Formaldehyde Standards for Composite Wood Products Act?

With the industry's cooperation, the Formaldehyde Standards for Composite Wood Products Act was signed into law in 2010, establishing a framework for the regulation of emissions from composite wood products at the national level, based on the California ATCM. The industry continues to urge EPA to quickly finalize its draft national standard in a way that is consistent with the Formaldehyde Standards for Composite Wood Products Act and CARB's ATCM regulations. Implementing CARB's regulations on a national level will create consistent – and stringent – emissions standards for all composite wood products manufactured in North America or shipped into and sold in the U.S.

Can people experience health issues from building materials produced with formaldehyde?

Formaldehyde levels in typical indoor environments are well below concentrations that could trigger sensory irritation in most people. These symptoms are transient and do not cause lasting health effects. Based on a robust scientific review, the WHO has set protective indoor air guidelines for formaldehyde at 80 ppb (0.125 mg/m³) to prevent sensory irritation in the general population. Typical household formaldehyde concentration levels are between 16 and 32 parts per billion.

Does formaldehyde exposure cause cancer?

Numerous scientific studies show that levels of formaldehyde normally found in homes and offices do not pose a risk. The weight of the scientific evidence surrounding the potential association between occupational exposure to formaldehyde and human cancer risk is conflicting, even when significant and prolonged exposures to inhaled formaldehyde are involved.

Is there a link between formaldehyde and asthma?

In children or adults, asthma is a chronic disease of the lower respiratory tract and lungs. In order for a household exposure to cause or exacerbate asthma, high enough levels of inhaled formaldehyde must reach the lower respiratory tract and lungs. Highly-efficient protective mechanisms in the upper respiratory tract prevent normal, everyday exposures to inhaled formaldehyde from reaching the lungs. And, since indoor air concentrations of formaldehyde are far below the levels that cause sensory irritation, it is not plausible that everyday exposures to formaldehyde would be associated with asthmatic symptoms.