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FORMALDEHYDE

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What is Formaldehyde?

Formaldehyde is a chemical that is released into the air as a pungent vapor; many of us remember this smell from the high school biology lab. Formaldehyde is a strong irritant that affects the eyes, nose, throat and skin. It may also cause headaches and fatigue.

Formaldehyde has a number of useful properties. It is a good preservative and makes an excellent adhesive, therefore used in the building and furnishings industries. It is also found in small amounts in some textiles as an anti-wrinkle (permanent-press) agents.

Health Effects of Formaldehyde

Low doses of formaldehyde cause watery eyes or burning sensations in the eyes, nose, and throat. Larger doses can cause nausea, breathing difficulties, headaches, and fatigue. High doses can cause asthma attacks. Some people are highly sensitive to formaldehyde and react to concentrations that would not bother other people. Formaldehyde has been shown to cause cancer in laboratory animals, but to date there is limited evidence that it causes cancer in humans. Nevertheless, it is classified as a "probable human carcinogen" by the EPA and the National Institute for Occupational Safety and Health (NIOSH).

Sources of Formaldehyde

In the past, particle board and medium density fiberboard were major sources of formaldehyde in the environment. However, some particle board is now being manufactured with reduced or no formaldehyde. The culprit is the adhesive urea formaldehyde which can break down and release the gas. A related adhesive, called phenol formaldehyde (used in softwood plywood and oriented-strand board) releases little, if any, formaldehyde. Therefore, products with phenol formaldehyde are widely recommended as substitutes for board products using urea formaldehyde. Oriented-strand board is now widely used for flooring, sheathing and roof decking.

In the mid-1980s, some homes had severe problems due to improperly mixed urea formaldehyde foam insulation (UFFI). This product was taken off the market and is virtually unavailable today. Foams installed back then are unlikely to cause problems today because they continue to off-gas. Other types of foam insulation are <u>not</u> associated with such problems. In fact, there are some very good foams being used that have little or no off-gasing.

Some commercially-applied furniture and floor finishes (acid-cured finishes) can also release formaldehyde. Hardwood plywood, paneling, and interior plywood are sources of formaldehyde as well. Permanent-press fabrics, some other textiles, and cosmetics are sources of trace amounts of formaldehyde. In addition, formaldehyde can be produced by combustion processes where there is a gas flame and cigarette smoke.

Formaldehyde emissions can continue for a long time after the original product is manufactured. The emissions and concentration levels can be increased by elevated temperature and humidity.

Detection of Formaldehyde

Those who are familiar with the characteristic smell of formaldehyde may be able to identify it by its odor. (The formaldehyde symptoms we have mentioned are not much help in identifying this substance since these symptoms are also produced by a wide array of other irritants.)

Environmental testing firms (listed in the yellow pages of the phone directory) should be able to provide testing for residential formaldehyde levels. Since such tests are costly, it is wise to establish a health problem that may be related to formaldehyde or that you are worried about the presence of formaldehyde in your home. The U.S. does not have any standards for formaldehyde in residential indoor air. Generally over time, the level of formaldehyde dissipates. A ventilation organization has proposed a voluntary standard of 0.10 part per which may still cause problems for sensitive individuals. Some agencies recommend lower levels.

Reducing Formaldehyde Problems

Existing homes.
The first step in reducing formaldehyde problems in existing homes is to identify possible sources. As mentioned earlier, likely sources include particle board, fiberboard, acid-cured finished, paneling and hardwood plywood, and cabinets and furnishing made from these materials. Such furnishings are often covered with plastic laminate, veneer, or a “woodgrain” covering.

Formaldehyde gas cannot penetrate into the room. It is blocked by coatings. Although special formaldehyde sealants are available, varnishes such as polyurethane are also effective in this regard (two coat are preferred). Coating should be applied to all exposed edges and surfaces (for example, the underside of countertops, and cabinet interior and drawers) to reduce off-gasing of formaldehyde.

Since high humidity and elevated temperatures increase formaldehyde release, these conditions should be controlled when possible. Also, air conditioning, dehumidifiers, and other moisture control measures should be explored. Additionally, ventilation can help lower indoor formaldehyde levels when outdoor weather conditions permit.

New construction.
In new construction, specify the use of low-emitting or formaldehyde-free materials, sometimes referred to as material with low VOC’s– low volatile organic chemicals. Some building products are now being manufactured to have “lower” formaldehyde emission. (These products are identified by a stamp indicating compliance with HUD standards for formaldehyde emissions or labeled low VOC’s.) While this is an improvement, there is still no guarantee that indoor formaldehyde levels will be acceptable. Although there have been press reports about research showing certain plants (such as

spider plants) can absorb formaldehyde and other indoor pollutants, other studies show such effects are limited and it would be impractical (or impossible) to have enough plants to counteract continuous formaldehyde emissions (Resource: "An Update on Formaldehyde," CPSC).

Source: Healthy Indoor Air for America's Homes (3rd ed.), Formaldehyde in the Home Instructional Module. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU.

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