

TerranearPMC Safety Share

Week of March 16, 2015 – Formaldehyde

Recently I found myself watching the popular television newsmagazine, “60 Minutes” which had an expose’ on a wholesale lumber company (we’ll let this company stay anonymous) and its products containing unhealthy levels of formaldehyde. Of course the company representatives vehemently denied such accusations while angry customers charged the company with dishonest claims and fraudulent practices. These people have accused the company of causing various degrees of health issues due to selling wood floors and walls made with high levels of formaldehyde.

Over the years formaldehyde has received a fair amount of publicity due its toxic effects from what is typically referred to as “off-gassing” from furniture and other household items such as floor and wall materials. “Off-gassing” is a process where chemicals that are imbedded into a solid gradually volatilize through the cracks in furniture or overcome a fabric’s adhesive properties to become airborne and consequently result in an inhalation health hazard.

Formaldehyde is a common additive in pressed-wood products, including particleboard, plywood, and fiberboard. It is also a component in many types of glue and adhesives, as well as permanent-press fabrics and paper product coatings and certain insulation materials. In addition, formaldehyde is commonly used as an industrial fungicide, germicide, and disinfectant, and as a preservative in mortuaries and medical laboratories. Formaldehyde also occurs naturally in the environment. It is produced in small amounts by most living organisms as part of normal metabolic processes.

Formaldehyde belongs to a specific class of chemicals known as aldehydes, which contain a double bonded oxygen atom at the end of the molecular chain (formaldehyde is the simplest aldehyde). It is a colorless material that, at room temperature, pure formaldehyde is a gas. However, in this state there is a tendency for it to polymerize, meaning the individual molecules will link together forming a very large molecule, and thereby changing its physical state from gas to a solid (white powder called para – formaldehyde). Generally formaldehyde is used in an aqueous solution containing 37% formaldehyde in water (with about 10% -15% methanol), known as formalin. In its pure form, it has a flash point of 147 °F and has a characteristic pungent odor.

Since the 1980s, the National Cancer Institute (NCI), a branch of the National Institutes of Health (NIH), has conducted studies to determine whether there is an association between formaldehyde exposure and an increase in the risk of cancer. The results of this research have provided the Environmental Protection Administration (EPA) and the Occupational Safety and Health Administration (OSHA) with information to evaluate the potential health effects of workplace exposure to formaldehyde.

Occupational exposure limits for formaldehyde, such as the OSHA permissible exposure limit (PEL) and the ACGIH threshold limit value (TLV) are quite stringent. ACGIH has published a Ceiling Limit of 0.3 ppm, meaning workers should not be exposed to formaldehyde as an



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airborne/inhalation hazard at this concentration for even an instant, while OSHA has established a specific regulation for formaldehyde (29 CFR 1910.1048) that specifies an 8-hour time-weighted average PEL of 0.75 ppm, an action level (AL) of 0.5 ppm, and a short-term exposure limit (15- minute period) of 2 ppm.

Some people are very sensitive to formaldehyde, whereas others have no reaction to the same level of exposure. When formaldehyde is present in the air at levels exceeding 0.1 ppm, some individuals may experience such adverse effects as watery eyes as well as burning sensations in the eyes, nose, and throat. Coughing; wheezing; nausea; and skin irritation are also common health effects.

Formaldehyde undergoes a rapid metabolic process once entered into the body, causing immediate chemical changes upon absorption. Therefore, some scientists think that formaldehyde is unlikely to have such varied effects other than the upper respiratory tract irritation. However, some laboratory studies suggest that formaldehyde may affect the lymphatic and hematopoietic (blood) systems. Based on a wide range of studies, NCI investigators have concluded that exposure to formaldehyde *may* cause leukemia, particularly myeloid leukemia (cancer of the blood-forming tissues of the blood marrow).

The long-term effects of formaldehyde exposure have been evaluated in various types of epidemiologic studies (studies that attempt to uncover the patterns and causes of disease in groups of people) including cohort and case-control studies. The results show a wide variation with some studies indicating a relationship between human exposures and cancer while others are inconclusive.

One occupation that has a history of formaldehyde exposure is mortuary work or embalming. The National Institute for Occupational Safety and Health (NIOSH) studied formaldehyde exposure in embalming students from a college of mortuary science. One particular study focused on students who were taking an embalming course. The results concluded that no health effects have been connected with the test results. While the International Agency for Research on Cancer (IARC) has classified formaldehyde as a carcinogen, embalmers throughout the country, insist this is the best material for their profession. To help control occupational exposures, ventilation systems have been upgraded (a complete air change every four minutes) while wearing safety glasses/goggles, rubber gloves and chemical-resistant aprons.

To control non-occupational formaldehyde exposures, the EPA recommends the use of “exterior-grade” pressed-wood products. These products emit less formaldehyde because they contain phenol resins, not urea resins. Pressed-wood products include plywood, paneling, particleboard, and fiberboard and are not the same as pressure-treated wood products, which contain chemical preservatives and are intended for outdoor use. Before purchasing pressed-wood products, such as building materials, cabinetry, and furniture, buyers should ask about the formaldehyde content of these products. Formaldehyde levels in homes can also be reduced by ensuring adequate ventilation, moderate temperatures, and reduced humidity levels through the use of air conditioners and dehumidifiers.

Logic is the beginning of wisdom, not the end – Mr. Spock

