



Formaldehyde in Air

Camp Justice: The Preliminary Public Health Screening Risk Assessment Report, Camp Justice, describes the result of air sample analyses for formaldehyde in modular buildings (cuzcos). Indoor air was sampled since it has been an issue in modular homes, as it is frequently found in plywood, fiberboard, insulation, resins, glues and other building materials. Formaldehyde exceeded the U.S. Environmental Protection Agency (EPA) Screening Level (SL) for a 25-year commercial worker in 28 of 28 samples; it exceeded the EPA SL for a 6-year active duty military worker in 28 of 28 samples; it exceeded the EPA SL for a 3-year active duty military worker in 19 of 28 samples; and it exceeded the EPA SL for a 9-month active duty military worker/resident in 20 of 28 samples. All formaldehyde concentrations were less than the OSHA PEL of $925 \mu\text{g}/\text{m}^3$ (753 ppb). The average and maximum detected concentrations of formaldehyde in indoor air was $19 \mu\text{g}/\text{m}^3$ (15.4 ppb) and $75 \mu\text{g}/\text{m}^3$ (61 ppb), respectively. Although these formaldehyde concentrations exceed EPA SLs, it is important to note that the concentrations of formaldehyde in homes at Camp Justice are similar to those found in homes in the United States, as shown below.

What is Formaldehyde?

At room temperature, formaldehyde is a colorless, flammable gas that has a distinct pungent smell. Small amounts of formaldehyde are naturally produced by plants, animals, and humans.

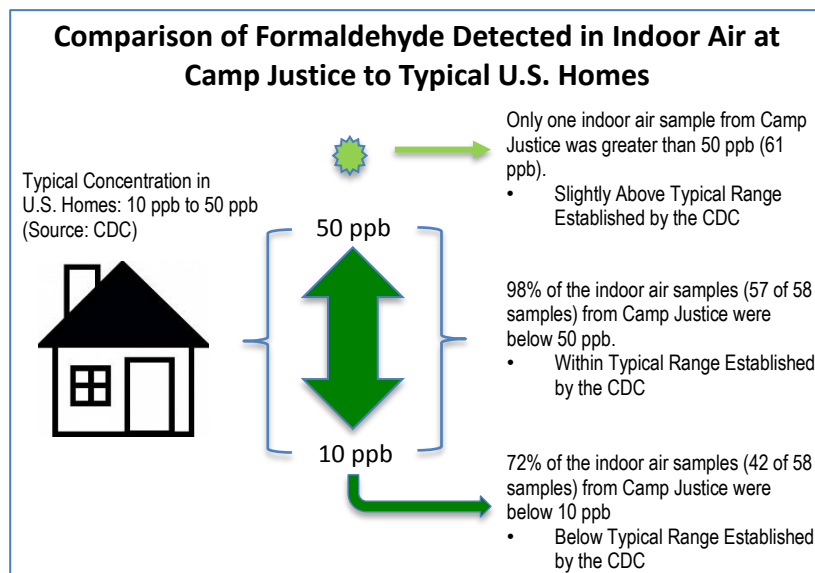
Formaldehyde is used in the production of fertilizer, paper, plywood, and urea formaldehyde resins. It is also used as a preservative in some foods and in many house-hold products, such as antiseptics, medicines, and cosmetics.

What Happens To Formaldehyde When It Enters The Environment?

- Formaldehyde is quickly broken down once it is released to air.
- Formaldehyde dissolves easily in water but does not remain in water for a long time.
- Formaldehyde evaporates from shallow soils and surface waters.
- Formaldehyde does not build up or accumulate in plants and animals.

How Might I Be Exposed To Formaldehyde?

- Inhalation of contaminated air is the primary means of exposure to formaldehyde. The highest potential exposure occurs in the formaldehyde based resins industry.
- Releases of formaldehyde into air can occur in industries using or manufacturing formaldehyde, wood products (such as particle-board, plywood, and furniture), automobile exhaust, cigarette smoke, and as a gas emanating from paints and varnishes, carpets, permanent press fabrics, and urea foam insulation.
- Indoor air tends to contain higher levels of formaldehyde than outdoor air. Background levels of formaldehyde measured in indoor air range from 24.6 to $4,913 \mu\text{g}/\text{m}^3$ (20 to 4,000 ppb). Formaldehyde levels in outdoor air range from 0.2 to $7.4 \mu\text{g}/\text{m}^3$ (0.6 to 6 ppb) in rural and suburban areas and 0 to $24.6 \mu\text{g}/\text{m}^3$ (0 to 20 ppb) in urban areas.
- Breathing contaminated workplace air.



Comparison of Maximum Formaldehyde Concentrations at Camp Justice with U.S. Background Concentrations from the CDC

1000	If your reading falls into the higher range , you need to place a high priority on lowering your exposure to formaldehyde. This is especially important if family members are elderly, young children, or have health conditions such as asthma.	Oct 2015: Maximum = 61 ppb
100		
10	If your reading falls into the intermediate range , your risk of irritation from formaldehyde exposure is lower, but it is still important to take steps to reduce your formaldehyde exposure. This is especially important if family members are elderly, young children, or have health conditions such as asthma.	Apr 2016: Maximum = 13 ppb
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HVAC Modifications Implemented by OMC were Very Effective



There was a 79% decrease in the maximum formaldehyde concentration from October 2015 to April 2016

How Can Formaldehyde Affect My Health?

Nasal and eye irritation, neurological effects, and increased risk of asthma and/or allergy have been observed in humans breathing 123 to 614 $\mu\text{g}/\text{m}^3$ (100 to 500 ppb). Eczema and changes in lung function have been observed in humans at 737 to 2,334 $\mu\text{g}/\text{m}^3$ (600 to 1,900 ppb). Decreased body weight, gastrointestinal ulcers, liver and kidney damage were observed in animals orally exposed to 50–100 milligrams/kilogram/day (mg/kg/day) formaldehyde. Animal studies have suggested that formaldehyde will not cause birth defects in humans.

How likely is Formaldehyde to Cause Cancer?

EPA has classified formaldehyde as a probable human carcinogen (Group B1), based on limited evidence in humans, and sufficient evidence in animals. The overall evaluation by the International Agency for Research on Cancer (IARC) concluded that formaldehyde is carcinogenic to humans. The Department of Health and Human Services (HHS) determined that formaldehyde is a known human carcinogen based on sufficient human and animal inhalation studies.

How Can You Reduce The Risk Of Exposure to Formaldehyde?

- Do not smoke or use unvented heaters indoors.
- Formaldehyde is usually found in the air, and levels are usually higher indoors than outdoors. Opening windows and using fans to bring fresh air indoors are the easiest ways to lower levels in the house.
- Formaldehyde is given off from a number of products used in the home. Removing formaldehyde sources in the home can reduce exposure. Providing fresh air, sealing unfinished manufactured wood surfaces, and washing new permanent press clothing before wearing can help lower exposure.

Is There a Medical Test to Determine Whether I've Been Exposed to Formaldehyde?

Formaldehyde cannot be reliably measured in blood, urine, or body tissues following exposure. Formaldehyde is normally produced in the body and is a normal constituent of body tissues and fluids.

For more information, contact **Navy and Marine Corps Public Health Center**
 620 John Paul Jones Circle, Suite 1100 Portsmouth, VA 23708 | 757-953-0700 | www.nmcphc.med.navy.mil
 For ATSDR ToxFAQs™, visit www.atsdr.cdc.gov/toxFAQs

References: Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological Profile for Formaldehyde. Addendum to the Profile for Formaldehyde. 2010. Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.
 CDC Fact Sheet [No Date Provided]. "What You Should Know about Formaldehyde". <http://www.cdc.gov/nceh/drywall/docs/WhatYouShouldKnowaboutFormaldehyde.pdf>. Last accessed: 12 Feb 2016.