

January 2020

## Formaldehyde in Air

Formaldehyde is a colorless, strong-smelling chemical that is a gas at room temperature. Most people can smell formaldehyde in the air at levels between 600 – 1200 micrograms per meter cubed ( $\mu\text{g}/\text{m}^3$ ). Formaldehyde can be irritating to the eyes and nose at levels close, or even below levels where people can smell it. In Minnesota, outdoor background levels of formaldehyde average about  $2.5 \mu\text{g}/\text{m}^3$ . In general, Minnesotans are not likely to experience harmful health effects from the levels of formaldehyde found in the outdoor environment.

### About Formaldehyde

Formaldehyde is used in a variety of industrial processes and products and is emitted by certain industries and manufacturers. Formaldehyde is also used in the production of adhesives, bonding agents, and solvents and is commonly found in consumer products, including:

- glues and adhesives
- foam insulation
- some synthetic fabrics (permanent press)
- some cosmetics and personal care products
- pressed-wood products, such as particleboard, plywood, and fiberboard
- cigarette/tobacco smoke

Formaldehyde is also a byproduct of combustion. Vehicle exhaust is a common source of formaldehyde in the air and it can also be produced when burning natural gas, kerosine, gasoline, wood, and tobacco. Formaldehyde also occurs naturally in the environment and is produced in small amounts in the human body.

### Potential Health Concerns from Breathing Formaldehyde

Most exposures to airborne formaldehyde are in low amounts and are not likely to result in negative health effects. You are more likely to experience health effects from breathing formaldehyde if you have been exposed to high levels of formaldehyde over a long time. Your age, body size, lifestyle, and current health status may also influence any effect formaldehyde could have on your health.

Human and animal studies show the most sensitive endpoint from formaldehyde exposure is irritation to the eyes, nose, and respiratory tract. In high concentrations over a long period, studies of human workers have shown effects on lung function; however, the risk to lung function is likely very low for most people.

## MDH 2019 Formaldehyde Health-Based Values

MDH has developed health-based values (HBV) for acute, subchronic, and chronic exposures (see table). The HBV is an air level of formaldehyde that is likely to pose little or no risk to human health. The chronic HBV of 9 µg/m<sup>3</sup> is protective for the general public, including sensitive subpopulations, for exposures lasting a lifetime.

Formaldehyde is considered to be a probable human carcinogen at levels far higher than the chronic HBV of 9 µg/m<sup>3</sup>. As the noncancer HBV is protective of cancer, a cancer value was not developed for formaldehyde at this time.

HBV Duration	2019 HBV (µg/m <sup>3</sup> )	Health Endpoint
Acute (1-hour)	50	Eye irritation
Subchronic (13 weeks)	9	Eye/nose irritation
Chronic (1 year +)	9	Eye/nose irritation
Cancer (lifetime)	not developed	--

Breathing an amount of formaldehyde that is above the HBV does not mean health effects will occur; however, the risk for health effects can increase as the level of exposure and time of exposure increases. When HBVs are exceeded, MDH recommends taking steps to reduce or avoid exposures.

## MDH Air Guidance Evaluations

Minnesota Pollution Control Agency’s (MPCA) Risk Evaluation and Air Modeling Unit requested air guidance evaluations for a number of chemicals (including formaldehyde) as part of a collaborative effort between MPCA and MDH Environmental Impacts Analysis Unit initiated in March 2018.

For further information contact:  
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