

# FORMALDEHYDE

#10

## Minimum Risk Level

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- Formaldehyde - 0.004 mg/m<sup>3</sup> (0.003 ppm) for respiratory effects - people

### Inventory Estimates of Formaldehyde

Community	Ranking by Mass	Total Emitted (tons per year)	Top Sources
Anchorage	4 of 71	172	Off-road mobile: aircraft, cars/trucks, area sources
Fairbanks	5 of 58	104	Off-road: military jets, area sources: home heating oil, cars/trucks
Juneau	5 of 52	46	Off-Road: aircraft, area sources: home heating oil
Total of 3 Communities		322	

### Formaldehyde Sources Expected in Alaska

vehicles	structural fires	boats and ships
consumer products like automotive care and sealants	aircraft	home heating
locomotives	power generators	airports
off-road equipment like construction equipment and chainsaws	asphalt plants and paving	military bases
open burning	hospitals	

### Potential Occupational Exposure to Formaldehyde

The highest levels of airborne formaldehyde have been detected in indoor air, where it is released from various consumer products such as building materials and home furnishings. Higher levels have been found in new manufactured or mobile homes than in older conventional homes.

synthetic resin production	embalming	textiles
farming	use and production of resin treated fabric, rugs, paper,	adhesive production and use
particle board and plywood use and production	foundries	hospitals and clinics
fertilizers	dye production	lacquer production
photographic film makers	taxidermy	rubber production
laboratories		

## Formaldehyde Emission Inventory Improvements

- Assess indoor release from carpets, glues, and solvents.
- Refine off-road assessments such as locomotives if possible
- Refinement of emission factor data

## Formaldehyde Compound Health Effects

**Low level (< 0.5 ppm):** Immune system cellular alterations from long-term exposures. Reports of nose and upper respiratory symptoms, and lower forced vital capacity. Alterations in nasal cells. Exposure in children led to greater rates of asthma and chronic bronchitis, peak expiratory flow decreased as well. Children self reporting of symptoms decreased when moved from levels 0.075-0.043 ppm to levels 0.023-0.029 ppm.

**Medium level (0.5 – 2 ppm):** 6 minute exposure to workers had significant irritant response at 1 ppm. For 0.5-0.9 ppm exposure over 14 week study, lab workers had small decrease in peak expiratory flow during first 4 weeks of exposure; no difference after week 4. Increase in DNA cross links after long term (14 years) exposure. Worker complaints of odor, prickling sensation in nose, and disturbed sleep.

**High level (> 2 ppm):** Irritated eyes, nose, throat, headache, odor detection, cough, tight chest, wheezing, and shortness of breath. One study found smaller forced exhalation volume. Possible increased risk of lung cancer from long term exposure.

**Very high level (> 50 ppm):** Injury to airways and alveoli leading to fluid in the lungs.

**NOTE:** Cigarette smoke contains formaldehyde.

**Cancer ranking:** EPA classified as a probable human carcinogen: squamous cell carcinoma - Cancer originating from squamous cells on the skin, lips, inside the mouth, or throat. EPA estimates a  $1.3 \times 10^{-2}$  (approximately 1 in 100) increase in lifetime risk of cancer for every one mg/m<sup>3</sup> of formaldehyde exposed to over a lifetime.

## ALASKA TOP HAZARDOUS AIR POLLUTANTS

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