

Formaldehyde

Definition of causal agent

Formaldehyde (methanal, formic aldehyde) is a colourless gas, flammable at ambient temperature. Workplace exposure is usually associated with the use of a 30 to 50% (by weight) of an aqueous solution called “formalin”. It is also a product of normal body metabolism.

Main occupational uses and sources of exposure:

Exposure to formaldehyde occurs during its production: the synthesis of formol-based plastics; the manufacture of several chemical substances; any kind of activity where there is the need of doing disinfection, including embalming; in the textile industry (dressing of hides and fabrics). It is also released during the combustion of a number of organic materials (incinerators, car exhaust fumes, etc.), and from chipboard made using formaldehyde based resins.

Toxic effects

1. Local effects

Irritant Effects

Formaldehyde is extremely irritant to the eyes, to the mucous membranes of the respiratory tract and to the skin. Intense exposure may cause pulmonary oedema. Because of its irritant effects, it is likely to aggravate any pre-existing asthma

Minimum intensity of exposure:

Guide values are:

Irritation of the eyes: 0.1 ppm = 0.12 mg/m³

Irritation of the respiratory tract: 0.5 ppm = 0.6 mg/m³

See section on *Occupationally caused irritation of the skin and mucous membranes* in Annex I entry nr. 202.

Allergic Effects

Formaldehyde is a well known skin sensitizer but the likelihood of respiratory sensitisation is uncertain.

See Annex I entry nr. 304.06 on *Allergic asthmas caused by the inhalation of substances consistently recognised as causing allergies and inherent to the type of work* and section on *Occupationally caused allergic contact dermatoses* in Annex I entry nr. 202.

2. Systemic effects

□ Nasopharyngeal cancer

The causal relationship between prolonged or repeated exposure to formaldehyde and nasopharyngeal cancer has been suggested by epidemiological studies, although the debate among experts still continues, particularly on dose/effect relationship. It appears that there is not a significant cancer risk for exposures at concentrations lower than those capable of causing inflammation and severe irritation and therefore cell proliferation.

Exposure criteria:

Occupational exposure confirmed and, if possible, assessed, by anamnesis and study of working conditions showing evidence of exposure.

Workplace air monitoring:

Guide value: atmospheric concentration exceeding peak values of 0.3 ppm, with a particular attention for very high concentrations, able to cause irritative effects.

Minimum duration of exposure: six months

Maximum latent period: does not apply

Induction period: More than 10 years

Due to the uncertainty still present, each case needs a separate evaluation.

□ Other cancers

Leukaemia

The evidence of a causal relationship between leukaemia and occupational exposure to formaldehyde has been suggested by some epidemiological studies but is not firmly established.

Sinonasal cancer

There is only very limited epidemiological evidence that formaldehyde causes sinonasal cancer in humans.