

# Formaldehyde

Formaldehyde is a colourless, flammable gas with a pungent odour. It goes by a number of names including: formaldehyde solution, formaldehyde gas, formalin, formalith, formol, formic aldehyde, methaldehyde, methyl aldehyde, methylene oxide, morbidic, oxomethane, oxymethylene and paraform.

Water-based solutions containing dissolved formaldehyde, known as 'formalin', are used in:

- forensic/hospital mortuaries and pathology laboratories
- funeral (embalming) industry
- resins manufacture
- leather and fur tanning
- photographic film processing
- sanitising treatments
- lubricants
- analytical laboratories
- fumigation

Resins manufactured with formalin are used in:

- pressed wood manufacture
- paper and textile treatments
- fibreglass industry
- foam insulation
- foundry industry
- firelighter manufacture
- anti-graffiti wall sealer

The major use of formalin is in adhesives used in the manufacture of resins used to make pressed wood products, particularly particleboard and medium-density fibreboard.

Another major use is in medicine-related laboratories where it is used to fix tissues and organs, and in the funeral industry, in embalming processes, where it functions as a disinfectant and preservative.

Formaldehyde is also present at low concentrations as a preservative in a range of personal care and consumer products including hair straightening treatments.

Formaldehyde is naturally produced during burning of organic matter and by a variety of natural biological and chemical processes. It is found in cigarette smoke, and is emitted from cooking and heating appliances such as gas stoves and heaters.

Additional information about particular common uses of formaldehyde is available in a series of use-specific NICNAS information sheets (listed at the end of this fact sheet).

## How does formaldehyde affect human health and the environment?

Formaldehyde is toxic by inhalation, by skin contact, and by swallowing.

Breathing formaldehyde vapour can result in irritation of nerves in the eyes and nose, which may cause burning, stinging or itching sensations, a sore throat, teary eyes, blocked sinuses, runny nose, and sneezing.

This health effect is commonly referred to as sensory irritation.

Skin contact with formalin solution or paraformaldehyde can cause skin rashes and allergic skin reactions.

For the individual allergic to formaldehyde, even very low concentrations are likely to cause skin reactions.

Splashes into the eyes can cause irritation, corrosion of the cornea, and possibly blindness.

Formaldehyde has been shown to cause nasal cancers in animals at levels not found in the majority of workplaces.

Formaldehyde is a highly reactive, flammable gas and can form explosive mixtures in air. It presents a fire hazard when exposed to flame or heat. Formaldehyde solutions can be flammable when formaldehyde or methanol concentrations in the solutions are high.

Formaldehyde is incompatible with many chemicals and can react, sometimes violently, with some chemicals, including strong oxidisers (eg. bleach) and acids.

### **Who uses the chemical in Australia?**

Workers potentially at risk of experiencing health effects (sensory irritation) include embalmers, forensic/hospital mortuary workers, pathology laboratory workers, formaldehyde resin manufacturers, workers who repack raw formaldehyde or use it in the formulation of other products, and users of formaldehyde resins.

Factors that can contribute to the greater risk of health effects in these industries are high concentrations of formaldehyde in the products that are handled, long exposure durations, high levels of manual handling of the products and specific work processes such as weighing out, mixing in open tanks, cleaning and maintaining equipment, and heating and spraying products, which can generate vapour.

### **What is NICNAS's role?**

NICNAS regulates all industrial chemicals imported or manufactured in Australia.

It assesses chemicals used in all consumer products and administers regulations to protect the workers who handle them during production, the people that use the products, and the environment following use and disposal of the products.

Companies which introduce industrial chemicals must register with NICNAS.

To assist in managing industrial chemicals, the Australian Inventory of Chemical Substances (AICS) was established at the time NICNAS was set up. It is the legal list of chemicals already in use in Australia.

If a chemical is not included in this inventory, it is classed as a new industrial chemical (unless it is outside the scope of *the Industrial Chemicals (Notification and Assessment) Act 1989* or otherwise exempt from notification).

All new industrial chemicals must be scientifically assessed by NICNAS before being manufactured or imported into Australia and before they can be used in consumer products (unless exemptions apply or they are naturally occurring).

NICNAS reviews chemicals that are already used in Australia on a priority basis, using human health, environmental and exposure indicator criteria to make sure they remain safe.

In either case, NICNAS assesses all the scientific studies that have been done on the effects of the chemicals on human health and the environment, and when it identifies risks, NICNAS advises if and how these risks can be controlled for safe use.

Through the Therapeutic Goods Administration (TGA), the Department of Health and Ageing (DoHA) administers the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP or 'Poisons Standard').

The Australian Competition and Consumer Commission (ACCC) oversees labelling and ensures that advice about controlling risks is followed and communicated to industry and community organisations.

Recommendations are made both to industry and other bodies. Labelling may be required under other bodies than ACCC. NICNAS can also give warnings, seize goods or prosecute if a manufacturer or distributor acts illegally.

NICNAS can give warnings, seize goods or prosecute if a manufacturer or distributor acts illegally. Manufacturers and distributors must, by law, tell NICNAS about any new chemicals they import or manufacture and comply with regulations for existing chemicals. This applies to all industrial chemicals, whether they are made in Australia, or manufactured overseas and imported. NICNAS can review manufacturers' and distributors' operations, ask for information, check records, and test and inspect chemicals.

NICNAS released its Priority Existing Chemical assessment report on Formaldehyde in November 2006. The report contained eighteen recommendations: eight relating to OHS, eight relating to public health and two relating to environmental protection.

### **How do other countries regulate the chemical?**

Formaldehyde has been assessed by several national and international bodies, who have reviewed and evaluated data pertaining to the health and/or environmental hazards posed by it. These include:

- The International Agency for Research on Cancer, which examined a number of recent epidemiology studies on carcinogenicity (IARC, 2004a) and concluded that the carcinogen classification for formaldehyde be upgraded from probable human carcinogen (Category 2A) to known human carcinogen (Category 1) based on evidence that exposure to formaldehyde may cause nasopharyngeal cancer in humans
- A Screening Information Data Set (SIDS) Initial Assessment Report (SIAR) prepared by the German BMU (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit) which concluded that further work on the environmental exposure assessment was needed.

Several European countries restrict the use of formaldehyde, including the import of formaldehyde-treated products and in embalming. In September 2007, the European Union banned the use of formaldehyde due to its carcinogenic properties in certain applications (preservatives for liquid-cooling and processing systems, slimicides, metalworking-fluid preservatives, and antifouling products) under the Biocidal Products Directive.

The United States Environmental Protection Agency allows no more than 16 ppb formaldehyde in the air in new buildings constructed for that agency.

### **Where can I find more information?**

Additional information about the uses of formaldehyde is available in a series of NICNAS information sheets:

Formaldehyde (General) – Safety information sheet No 26 – November 2007 – available at [www.nicnas.gov.au/Publications/Information\\_Sheets/Safety\\_Information\\_Sheets/SIS\\_26\\_Formaldehyde\\_General.pdf](http://www.nicnas.gov.au/Publications/Information_Sheets/Safety_Information_Sheets/SIS_26_Formaldehyde_General.pdf)

Formaldehyde in embalming – Safety information sheet No 27, November 2007 – available at: [www.nicnas.gov.au/Publications/Information\\_Sheets/Safety\\_Information\\_Sheets/SIS\\_27\\_Formaldehyde\\_Embalming.PDF](http://www.nicnas.gov.au/Publications/Information_Sheets/Safety_Information_Sheets/SIS_27_Formaldehyde_Embalming.PDF)

Formaldehyde in the indoor environment of caravans, mobile homes and demountable buildings – Safety information sheet No 28, November 2007 – available at: [www.nicnas.gov.au/Publications/Information\\_Sheets/Safety\\_Information\\_Sheets/SIS\\_28\\_Formaldehyde\\_Mobile\\_Homes.pdf](http://www.nicnas.gov.au/Publications/Information_Sheets/Safety_Information_Sheets/SIS_28_Formaldehyde_Mobile_Homes.pdf)

Formaldehyde in laboratories – Safety information sheet No 29, November 2007 – available at: [www.nicnas.gov.au/Publications/Information\\_Sheets/Safety\\_Information\\_Sheets/SIS\\_29\\_Formaldehyde\\_Pathology.pdf](http://www.nicnas.gov.au/Publications/Information_Sheets/Safety_Information_Sheets/SIS_29_Formaldehyde_Pathology.pdf)

Cabinet makers and construction workers: Formaldehyde exposures from pressed wood products – Safety information sheet No 30, September 2009 – available at:

[www.nicnas.gov.au/Publications/Information\\_Sheets/Safety\\_Information\\_Sheets/SIS\\_30\\_Formaldehyde\\_Cabinet\\_PDF.pdf](http://www.nicnas.gov.au/Publications/Information_Sheets/Safety_Information_Sheets/SIS_30_Formaldehyde_Cabinet_PDF.pdf)

Formaldehyde in clothing and other textiles – Existing chemicals information sheet, October 2007 – available at

[www.nicnas.gov.au/Publications/Information\\_Sheets/Existing\\_Chemical\\_Information\\_Sheets/EC\\_IS\\_Formaldehyde\\_102007\\_PDF.pdf](http://www.nicnas.gov.au/Publications/Information_Sheets/Existing_Chemical_Information_Sheets/EC_IS_Formaldehyde_102007_PDF.pdf)

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