GPS Safety Summary
Formaldehyde

Chemical Identity

Name: Formaldehyde
CAS number: 50-00-0
Molecular formula: CH₂O

IUPAC name: Formaldehyde

BASF brand names:
Formaldehyde
Formaldehyde solution

Structure

General

Formaldehyde is the most simple aldehyde. It has a pungent odor and is an irritant to the eye, nose, and throat even at low concentrations; the threshold concentration for odor detection is 0.4 ppm. Formaldehyde occurs in nature and is formed from naturally occurring volatile organic materials by photochemical processes in the atmosphere as long as life exists on earth. Formaldehyde is an important metabolic product in plants and animals (including humans), where it is used for the biosynthesis of a number of amino acids. Thus, in living organisms including man, formaldehyde occurs in low but measurable concentrations. Formaldehyde is also formed when organic material is incompletely combusted; therefore, formaldehyde is found in combustion gases from, for example, automotive vehicles, heating plants, gasfired boilers, and in cigarette smoke.

Product Uses

Formaldehyde is an important industrial chemical, used in the manufacture of many industrial products and consumer articles. More than 50 branches of industry are now using
formaldehyde, mainly in the form of aqueous solutions and formaldehyde-containing resins. Most of the industrial uses of formaldehyde are intermediate applications. Consumer products produced from this intermediate applications do contain only traces of formaldehyde, the concentration of this free formaldehyde is fulfilling today's threshold values.

The industrial applications of formaldehyde include construction materials, automotive and aircraft components, healthcare and cosmetic products, and clothing. It can be used as an industrial disinfectant and/or as a preservative.

Formaldehyde is an important raw material in the manufacture of glues, which are used in the production of a multitude of different household products including furniture, flooring, cabinets. It is an essential raw material for inks used for publications and photocopiers. It is also found in a number of different car components such as the transmission, break pads, and door panels. Formaldehyde is also used in textiles to help bind dyes and make clothes more wrinkle resistant.

Health Information

Human Health Safety Assessment

Note: The information contained in the table below may be useful to someone handling the concentrated substance such as a manufacturer or transporter. Consumers are not likely to come in contact with the concentrated substance. The data, while verifiable, are not intended to be comprehensive nor replace the data found in the (M)SDS.

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td>Of high toxicity after single ingestion, short-term skin contact and short-term inhalation.</td>
</tr>
<tr>
<td>Irritation</td>
<td>Corrosive! Damages skin and eyes. Causes temporary irritation of the respiratory tract.</td>
</tr>
<tr>
<td>Sensitization</td>
<td>Sensitization after skin contact possible.</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Reliable studies did not give evidence for genotoxicity in experimental animals and humans.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>After lifelong inhalation exposure to concentrations that were severely damaging to the nasal epithelium, nasal tumors were induced in rats; in other species these findings were not found or were considerably less pronounced. No adverse health effects are anticipated if recommended personal protective equipment and industrial hygiene practices are used.</td>
</tr>
</tbody>
</table>
Toxicity after repeated exposure

After repeated exposure the prominent effect is local irritation.

Toxicity for reproduction

The results of animal studies gave no indication of a fertility impairing effect. No indications of a developmental toxic/teratogenic effect were seen in animal studies.

Environmental Information

Environmental Safety Assessment

Note: The information in this chapter is intended to provide brief and general information of this substance’s environmental impact. The results in the table below refer to testing performed with the concentrated substance. The data contained in this section explain the relative effect of the concentrated substance on the environment, as defined by certain tests.

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Toxicity</td>
<td>Toxic to aquatic life.</td>
</tr>
<tr>
<td>Persistence and degradability</td>
<td>Readily biodegradable. Not persistent.</td>
</tr>
<tr>
<td>Bioaccumulation potential</td>
<td>Not bioaccumulative.</td>
</tr>
</tbody>
</table>

Physical/Chemical Properties

Phys/Chem Safety Assessment

- Formaldehyde is a colorless gas with a characteristic pungent odor at room temperature. It is usually offered as an aqueous solution. Formaldehyde is highly soluble in water, non-flammable and possesses no explosive properties.

Note: The results in the table below refer to testing performed with the concentrated substance. It is not intended to be comprehensive or to replace information found in the (M)SDS.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>liquid</td>
</tr>
<tr>
<td>Melting / freezing point</td>
<td>-16 °C at 1013 hPa</td>
</tr>
<tr>
<td>Boiling point</td>
<td>99 °C at 1013 hPa</td>
</tr>
<tr>
<td>Flash point</td>
<td>80 °C at 1013 hPa</td>
</tr>
<tr>
<td>Flammability</td>
<td>Non flammable</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Non explosive</td>
</tr>
<tr>
<td>Self-ignition temperature</td>
<td>430 °C at 1013 hPa</td>
</tr>
</tbody>
</table>

**Exposed Potential**

- **Workplace exposure**: Exposure can occur either in a formaldehyde manufacturing facility or in the various industrial facilities that use formaldehyde. Those working with formaldehyde in industrial operations could be exposed during maintenance, sampling, testing, or other procedures. Observations of Risk Management Measures under Recommended Handling Measures ensure that the expected concentrations in the workplace atmosphere during these operations are well below levels that may produce toxic effects. The risk of accidental exposure should be controlled by selecting and applying the appropriate Risk Management Measures.

- **Consumer exposure**: The general public may come in contact with formaldehyde contained in preparations like detergents, coatings and adhesives. Formaldehyde is further used in resins in the production of consumer articles like paper, panel boards and textiles. These consumer products contain only trace amounts of formaldehyde (< 0.1%). Therefore use of these consumer products is considered safe. However, carefully read and follow the instructions given on product labels for proper use.

- **Environmental exposure**: Formaldehyde can be emitted into the environment during the manufacture process and its use in industrial and consumer applications. In the environment formaldehyde will mainly partition to the aquatic compartment and to the atmosphere, where it is photochemically rapidly degraded. Due to its readily biodegradability formaldehyde will be rapidly degraded in wastewater treatment plants as well as in surface waters and in soil. Despite its toxicity the identified uses are considered to be safe for the environment because of a negligible exposure of surface waters (due to the ready biodegradability) and the low bioaccumulation potential of the substance. Conclusively, all identified uses are safe for the environment based on the scientific facts summarized above and when carried out in compliance with recommended risk management measures and applicable regulations.

**Recommended Handling Measures**
The recommended safety measures generally apply in contact with the concentrated substance. It is NOT intended to replace the comprehensive guidance found in the (M)SDS, only supplement it. Please refer to the (M)SDS for specific safety and first aid measures.

When using concentrated chemicals always make sure that there is adequate ventilation. Always use appropriate chemical resistant gloves to protect your hands and skin and always wear eye protection such as chemical goggles. Do not eat, drink, or smoke where chemicals are handled, processed, or stored. Wash hands and skin following contact. If the substance gets into your eyes, rinse eyes thoroughly for at least 15 minutes with tap water and seek medical attention. For specific advice please consult the corresponding (Material) Safety Data Sheet of the substance.

All effluent releases that may include the substance must be directed to a (municipal) waste water treatment plant that removes the substance from the final releases to the receiving water.

Regulatory Information / Classification and Labelling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (M)SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

Note: The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance’s labelling. It is not intended to be comprehensive or to replace information found in the (M)SDS.

Labeling according to UN GHS

UN GHS is the basis for country specific GHS labeling

Signal word: Danger

Hazard statements:

H301: Toxic if swallowed
H311: Toxic in contact with skin
H314: Causes severe skin burns and eye damage
H317: May cause an allergic skin reaction
H331: Toxic if inhaled
H351: Suspected of causing cancer
H401: Toxic to aquatic life

International
The international Agency for Research on Cancer (IARC) has classified formaldehyde as a group 1 (known) human carcinogen based on epidemiological evidence linking formaldehyde exposure to occurrence of nasopharyngeal cancer and leukemia.

Additional information

1. FormaCare Website
   http://www.formacare.eu

2. IFA GESTIS-database on hazardous substances
   http://www.dguv.de/ifa/en/gestis/stoffdb/index.jsp

3. Information on registered substance (ECHA)

4. OECD SIDS (September 2001)
   http://www.inchem.org/documents/sids/sids/FORMALDEHYDE.pdf

Most commonly used synonyms

» Methyl aldehyde
» Methanal
» Formol
» Formalin
» Formaldehyde (8CI, 9CI)
» Formaldehyde solution
Disclaimer

This Product Safety Summary is intended to provide a general overview of the chemical substance. It contains basic information and is not intended to provide emergency response information, medical information or treatment information. The summary cannot be relied on to provide in-depth safety and health information. In-depth safety and health information must be obtained from the Material Safety Data Sheet ((M)SDS) for the chemical substance.

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Contact

For further information on this substance or GPS safety summaries in general, please contact:
info.gps@basf.com