

CLIP, Chemical Laboratory Information Profile

"Only when you know the hazards, can you take the necessary precautionary measures."

Formic Acid (85–95%)

HCOOH

CAS No.: 64-18-6

Synonyms: Methanoic acid, Formylic acid, Aminic acid, Hydrogen carboxylic acid

Physical Properties

Colorless liquid with pungent, irritating odor. *The odor threshold for formic acid is no greater than 10 ppm for most persons!*

Vapor pressure at 20 °C: approx 35 Torr

Melting point: approx 8 °C

Boiling point: approx 101 °C

Exposure Limits

OSHA PEL: 5 ppm

ACGIH TLV: 5 ppm

ACGIH STEL/C: 10 ppm

Hazardous Characteristics

Overall toxicity	Flammability	Destructive to skin/eye	Absorbed through skin	Sensitizer?	Self-reactive?	Incompatible with:
2	2	3	2	No	No	Oxidizing agents, bases, some plastics, sulfuric acid, metals.*

0: None (or very low); 1: Slight; 2: Moderate; 3: High; 4: Severe.

*Reactivity Hazards

The reaction of formic acid with oxidizing agents, especially strong oxidizers, can be violent. Its reaction with bases is exothermic and can be violent. It reacts violently with strong bases, causing fires and explosions. With concentrated and partially diluted sulfuric acid it produces carbon monoxide. Formic acid corrodes most metals and attacks many plastics. See Bretherick's *Handbook of Reactive Chemical Hazards* for details and for other incompatibilities.

Cited as known to be or reasonably anticipated to be carcinogenic in NTP-9?

No

Identified as a reproductive toxin in Frazier and Hage, *Reproductive Hazards of the Workplace?*

No

Typical symptoms of acute exposures:

Severe damage if splashed in eyes, up the nose, or on skin. Discharge of tears from the eyes, discharge of mucus from the nose, dermatitis, burns, blisters. Coughing, difficulty in breathing, unconsciousness, lung edema, if sufficient vapor or mist is inhaled at levels exceeding the OSHA PEL or ACGIH TLV. If swallowed, sore throat, burning sensations, abdominal pain, vomiting, diarrhea.

Principal target organ(s) or system(s):

Eyes, skin, respiratory system.

Storage Requirements

With other flammables in a cool, dry, well-ventilated location, away from ignition sources, separated from oxidizing agents and bases.

Additional Remarks

At concentrations in air between 18 and 57%, formic acid vapors will explode if ignited. Formic acid decomposes forming carbon monoxide when strongly heated. Symptoms of lung edema are not manifest immediately in victims who have inhaled formic acid vapors or mist; some hours may elapse before they appear; physical effort can exaggerate these symptoms. Rest is essential for persons exposed to excess vapor or mist.

Notes

ReadMe

This Chemical Laboratory Information Profile is *not* a Material Safety Data Sheet. It is a brief summary for teachers and their students that describes some of the hazards of this chemical as it is typically used in laboratories. On the basis of your knowledge of these hazards and before using or handling this chemical, *you need to select the precautions and first-aid procedures to be followed*. For that information as well as for other useful information, refer to Material Safety Data Sheets, container labels, and references in the scientific literature that pertain to this chemical.

Reproductive Toxins

Some substances that in fact are reproductive toxins are not yet recognized as such. For the best readily available and up-to-date information, refer to "DART/ETIC". See the TOXNET home page at www.sis.nlm.nih.gov and click on "Toxicology search". *Note that some of the data in DART/ETIC have not been peer-reviewed*. See also Linda M. Frazier and Marvin L. Hage, *Reproductive Hazards of the Workplace*; Wiley, 1998; and T. H. Shepard, *Catalog of Teratogenic Agents*, 9th ed.; Johns Hopkins University Press, 1998.

Abbreviations

ACGIH TLV—American Conference of Governmental Industrial Hygienists—Threshold Limit Value. C—Ceiling. CAS—Chemical Abstracts Service. mg/m³—milligrams per cubic meter. NA—Not applicable. NE—Not established. NI—No information. NTP-9—National Toxicology Program, Ninth Annual Report on Carcinogens. OSHA PEL—Occupational Safety and Health Administration—Permissible Exposure Limit. ppm—parts per million. STEL/C—Short-term exposure limit and ceiling.

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