

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	<p>Corrosive to eyes and skin on contact. Combustible material; avoid heat and sources of ignition. Harmful compound, minimize exposure. This compound is a possible skin sensitizer. Hygroscopic -- keep container tightly sealed. Vent Periodically. May develop pressure.</p>	

Section I. Chemical Product and Company Identification

Chemical Name	Formic Acid [for LC-MS]		
Catalog Number	F0654	Supplier	TCI America 9211 N. Harborgate St. Portland OR 1-800-423-8616
Synonym	Not available.		
Chemical Formula	CH ₂ O ₂		
CAS Number	64-18-6	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Formic Acid [for LC-MS]	64-18-6	Min. 98.0 (GC)	Not available.	Rat LD ₅₀ (oral) 1100 mg/kg Rat LD ₅₀ (inhalation) 15 gm/m ³ /15M

Section III. Hazards Identification

Acute Health Effects	Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested. Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury or death. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	<p>CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY: Not available.</p> Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.
Ingestion	DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data

Flammability	Combustible.	Auto-Ignition	520 °C (968 °F)
Flash Points	57 °C (134.6 °F).	Flammable Limits	LOWER: 18% UPPER: 51%
Combustion Products	These products are toxic carbon oxides (CO, CO ₂).		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	Combustible liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions Corrosive liquid. Combustible material. Harmful material. Possibly skin sensitizing material. Hygroscopic material. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT get water inside container. DO NOT touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal. **Neutralize the residue with a dilute solution of sodium carbonate.**

Section VII. Handling and Storage

Handling and Storage Information CORROSIVE. COMBUSTIBLE. HARMFUL. POSSIBLE SENSITIZER. HYGROSCOPIC. VENT PERIODICALLY. MAY DEVELOP PRESSURE. Keep container dry. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. Wear suitable protective clothing. If you feel unwell, seek medical attention and show the label when possible. Treat symptomatically and supportively. Always store away from incompatible compounds such as oxidizing agents, metals, alkalis (bases).

Section VIII. Exposure Controls/Personal Protection

Engineering Controls Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.

Personal Protection Face shield. Lab coat. Vapor respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent.



Exposure Limits Not available.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Clear, colorless.)	Solubility	Miscible with water, methanol, ethanol, ether, glycerin. Soluble in benzene, toluene, xylene.
Specific Gravity	1.22 (water=1)		
Molecular Weight	46.03	Partition Coefficient	Log P _{ow} : -0.54
Boiling Point	100.8°C (213.4°F)	Vapor Pressure	4.6 kPa (@ 20°C)
Melting Point	8.4°C (47.1°F)	Vapor Density	1.6 (Air = 1)
Refractive Index	1.3690 - 1.3730	Volatility	Not available.
Critical Temperature	Not available.	Odor	Pungent.
Viscosity	0.002 Pas (20°C)	Taste	Not available.

Section X. Stability and Reactivity Data

Stability This material is stable if stored under proper conditions. (See Section VII for instructions)

Conditions of Instability Avoid excessive heat and light.

Incompatibilities Reactive with strong oxidizing agents, finely powdered metals, strong alkalis (bases).

Section XI. Toxicological Information

RTECS Number LQ4900000

Routes of Exposure Eye Contact. Ingestion. Inhalation. Skin contact.

Toxicity Data
Rat LD₅₀ (oral) 1100 mg/kg
Rat LD₅₀ (inhalation) 15 gm/m³/15M

Chronic Toxic Effects
CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Acute Toxic Effects
Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested. Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury or death. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity Not available.

Environmental Fate Formic acid's production and use in textile dyeing, leather tanning, rubber production, as a chemical intermediate, as a solvent for perfumes and lacquers, in electroplating, silvering glass, and ore flotation, in the treatment of animal feeds, and as a food preservative and flavor adjunct may result in its release to the environment through various waste streams. It is widely used outside the U.S. as a silage additive. Formic acid occurs in fruits, vegetables, and leaves and roots of plants, and also in the secretions of numerous insects. It is also an intermediate product in the decomposition of organic matter in lake sediment and a photooxidation product of alkanes, alkenes, and biogenic terpenes by hydroxyl-radical and ozone-olefin reactions. Formic acid is also produced in clouds by the oxidation of formaldehyde by hydroxyl radicals, oxygen, or hydrogen peroxide. Formic acid is an intermediary human metabolite that is immediately transformed to formate. If released to air, a vapor pressure of 42.6 mm Hg at 25 deg C indicates formic acid will exist solely as a vapor in the atmosphere. Vapor-phase formic acid will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 36 days. Formic acid does not absorb at wavelengths >290 nm and therefore is not expected to be susceptible to direct photolysis by sunlight. If released to soil, formic acid is expected to have very high mobility based upon an estimated Koc of 12. Volatilization from moist soil surfaces is expected to be an important fate process based upon a Henry's Law constant of 1.67×10^{-7} atm-cu m/mole. The pKa of formic acid is 3.8, indicating that this compound will primarily exist in anion form in the environment and anions generally do not adsorb more strongly to organic carbon and clay than their neutral counterparts. Formic acid may volatilize from dry soil surfaces based upon its vapor pressure. If released into water, formic acid is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. Theoretical BOD values ranging from 4.3% to 77.6% after 5 days using sewage, activated sludge, fresh water, and synthetic sea water inocula indicate that biodegradation may be an important environmental fate process. Volatilization from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 150 and 1,100 days, respectively. An estimated BCF of 3.2 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions. Occupational exposure to formic acid may occur through inhalation and dermal contact with this compound at workplaces where formic acid is produced or used. Monitoring data indicate that the general population may be exposed to formic acid via inhalation of ambient air, ingestion of food, and dermal contact with this compound and other products containing formic acid. Formic acid is found in fruits and vegetables. Formic acid is widely detected in the atmosphere and in precipitation.

Section XIII. Disposal Considerations

Waste Disposal Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information

DOT Classification DOT Class 8: Corrosive material
DOT Class 3: Flammable liquid

PIN Number UN1779

Proper Shipping Name Formic acid

Packing Group (PG) II

DOT Pictograms

**Section XV. Other Regulatory Information and Pictograms**

TSCA Chemical Inventory (EPA) This compound is **ON** the EPA Toxic Substances Control Act (TSCA) inventory list.

WHMIS Classification (Canada) CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
CLASS E: Corrosive liquid.
On DSL

EINECS Number (EEC) 200-579-1

EEC Risk Statements R20/21/22- Harmful by inhalation, in contact with skin and if swallowed.
R34- Causes burns.

Japanese Regulatory Data ENCS No. 2-670

Section XVI. Other Information

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Notice to Reader

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