SAFETY DATA SHEET

TEDIA®
High Purity Solvents

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All non-emergency numbers should be directed to Customer Service at 800-PURITY1

FORMIC ACID — SDS No. M0110

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Formic Acid 88%, formic Acid 96%
Synonyms: Methanoic Acid; Hydrogen Carboxylic Acid; Aminic Acid
Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. HAZARDS IDENTIFICATION

Classification:
Flammable Liquids: GHS Category 4
Skin Corrosion: GHS Category 1A
Serious Eye Damage: GHS Category 1
Acute Aquatic Toxicity: GHS Category 3

Label Elements
Signal Word: DANGER!
Hazard Statements:
- H227 – Combustible liquid and vapor.
- H302 – Harmful if swallowed.
- H314 – Causes severe skin burns and eye damage.
- H318 – Causes serious eye damage.

Precautionary Statements:
- P280 – Wear protective gloves/protective clothing/eye protection/face protection.
- P284 – Wear respiratory protection.
- P301+P310 – If SWALLOWED: Immediately call or POISON CENTER or a doctor/physician.
- P303+P361+P353 – If on skin or hair: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304+P341 – If inhaled: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

Emergency Overview

May be harmful if swallowed. Causes eye and skin burns. May cause severe digestive tract and respiratory tract irritation with possible burns. Possible sensitizer. May cause central nervous system depression. Lachrymator. Combustible vapor. Corrosive to metal. Target Organs: Kidneys, liver, central nervous system, respiratory system, eyes, and skin.

HMIS Rating:

Health – 3* Flammability – 2 Physical Hazard – 0 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient	CAS No	Percent	Hazardous
Formic Acid	64-18-6	86-98%	Yes
Water	7732-18-5	2-14%	No

4. FIRST-AID MEASURES

Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Skin Contact: Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

Eye Contact: Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

Notes to Physician: Hemodialysis should be considered in severe intoxication. Persons with chronic respiratory, skin, kidney, or liver diseases or eye disorders may be at increased risk from exposure to this product. Folic acid may be of benefit by hastening the metabolism of formic acid to carbon dioxide.

5. FIRE FIGHTING MEASURES

Flammability: Combustible liquid and vapor (GHS Category 4)

Auto-ignition Temperature: 520° C (968° F)

Flash Point: 50° C (122°F)

Flammable Limits: Lower Limit – 10 vol %, Upper Limit – 45 %

Products of Combustion: May decompose into irritating and highly toxic gases under fire conditions (carbon monoxide and carbon dioxide).

Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Specific Explosion Hazards: Reacts with most metals to form highly flammable hydrogen gas which can form explosive mixtures with the air.

Fire Fighting Media: Do NOT get water inside containers. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.

National Fire Protective Association: Health - 3, Flammability - 2, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that

are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Use water spray to reduce vapors. Water spray may reduce vapors but still not prevent ignition in closed spaces. Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Do not use sawdust or any combustible material. Use spark-proof tools. Spill may be carefully neutralized with soda ash (sodium carbonate). Provide ventilation to the affected area and remove all ignition sources. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Always use proper personal protective equipment as described in section 8.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor or mist. Use corrosion-resistant transfer equipment when dispensing.
Storage: Keep away from heat, sparks, flames, and contact with oxidizing materials. Keep in a tightly closed container. Store in a cool, dry, well-ventilated area. Do not store near alkaline substances. Vent periodically.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Personal Protection: Wear protective chemical goggles and face shield for eye and face protection. Use neoprene or butyl rubber gloves, aprons, and/or protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Exposure Limits:

ACGIH – 5ppm TWA; 10ppm STEL
NIOSH – 5ppm TWA; 9mg/m^3 TWA; 30ppm IDLH
OSHA Final PELs – 5ppm TWA; 9mg/m^3 TWA
OSHA Vacated PELs: 5ppm TWA; 9mg/m^3 TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.
Odor: pungent-benzaldehyde-like odor
Molecular Formula: HCO_2H
Molecular Weight: 46.03
Auto-ignition Temperature: 520° C (968° F)
Flash Point: 50° C (122°F)
Flammable Limits: Lower Limit – 10 vol %, Upper Limit – 45 %
pH: Strong acid.
Boiling Point: 110.8° C @ 760 mm Hg
Freezing/Melting Point: 8° C
Decomposition Temperature: Not available
Specific Gravity: 1.22 g/cm^3
Vapor Density (Air=1): 1.6
Vapor Pressure: 44.8 mm Hg @ 20° C.

Evaporation Rate (Butyl acetate = 1): 2.1
Viscosity: 1.47 mPa
Solubility: Miscible
Conductivity (25°C): Conductive; Conductivity = 6.4×10^{9} pS/m; Dielectric Constant = 58.5; Relaxation Time Constant = 8.1×10^{-8} seconds

10. STABILITY AND REACTIVITY

Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Incompatible materials, metals, excess heat, combustible materials, oxidizers, plastics.
Incompatibility With Various Substances: Strong acids, strong bases, and finely powdered metals.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, irritating and toxic fumes and gases.
Hazardous Polymerization: Has not been reported.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact
Acute Exposure Hazards:

INHALATION HAZARD: May cause asthmatic attacks due to allergic sensitization of the respiratory tract. Causes chemical burns to the respiratory tract. Aspiration may lead to pulmonary edema. Vapors may cause dizziness, nausea, itching, burning, and swelling of the eyes.

INGESTION HAZARD: Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May be harmful if swallowed. May cause central nervous system depression. Ingestion may produce corrosive ulceration and bleeding and necrosis of the gastrointestinal tract accompanied by shock and circulatory collapse.

SKIN CONTACT HAZARD: May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Contact with liquid is corrosive and causes severe burns and ulceration. Absorbed through the skin. May cause erythema (redness) and blistering.

EYE CONTACT HAZARD: Contact with liquid is corrosive to the eyes and causes severe burns. Lachrymator (substance which increases the flow of tears). May cause corneal edema, ulceration, and scarring.

Chronic Exposure Hazards: Prolonged or repeated skin contact may cause dermatitis. May cause liver and kidney damage. Effects may be delayed. Laboratory experiments have resulted in mutagenic effects.
Animal Toxicity:
Skin Corrosion/irritation, rabbit, Severe;
Eye Serious damage/irritation, rabbit, Severe;
Inhalation, rat: LC50 = 7.4 mg/m3/4H;
Oral, rat: LD50 = 730 mg/kg.
Carcinogenicity: Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity:
Fish: Golden orfe: LC50 = 46-100 mg/L; 96 Hr;
Aquatic invertebrates: Water flea: EC50 = 34 mg/L; 48 Hr;
Environmental Fate: Readily biodegradable (>90%). Biological oxygen demand (BOD), 86 mg/kg. Chemical oxygen demand (COD), 348 mg/kg. Ratio BOD/ThBOD, 8.6%.
Physical: Formic acid can be degraded chemically to innocuous substances in most environments.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. This material is a "U: waste (U123 - Corrosive waste, Toxic waste) under 40 CFR 261.33.

14. TRANSPORT INFORMATION

US DOT
Proper Shipping Name: Formic Acid
Hazard Class: 8
UN Number: UN1779
Packing Group: II

IMDG
Proper Shipping Name: Formic Acid
Hazard Class: 8
UN Number: UN1779
Packing Group: II

IATA
Proper Shipping Name: Formic Acid
Hazard Class: 8
UN Number: UN1779
Packing Group: II

15. REGULATORY INFORMATION

US Federal Regulations:
CERCLA Hazardous Substances: CAS#64-18-6 – 5000 lb, 2270 kg final RQ
SARA Section 302: Does not have a TPQ
SARA Codes: CAS# 64-18-6 – acute, flammable
Section 313: Formic Acid (CAS# 64-18-6) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.
Clean Water Act: CAS# 64-18-6 is listed as a Hazardous Substance
OSHA: Not considered highly hazardous by OSHA.

US State Regulations:
CAS# 64-18-6 is found on the following state right-to-know lists: New Jersey, Pennsylvania, and Massachusetts
California Prop 65: This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Originally Prepared: 5/21/2007
Last Revised: 12/1/2015 – Updated information for eye and face protection in Section 8.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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