

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
 	Flammable material; avoid heat and sources of ignition. Toxic compound, do not ingest or inhale. Avoid all contact with this material. Irritating to skin, eyes, and the respiratory system.	   

Section I. Chemical Product and Company Identification

Chemical Name	Methyl Formate		
Catalog Number	F0057	Supplier	TCI America 9211 N. Harborgate St. Portland OR 1-800-423-8616
Synonym	Formic Acid Methyl Ester		
Chemical Formula	C ₂ H ₄ O ₂		
CAS Number	107-31-3	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
Methyl Formate	107-31-3	Min. 95.0%(GC)	Not available.	Rat LD ₅₀ (oral) 475 mg/kg Rabbit LD ₅₀ (dermal) >5 g/kg Rat LD ₅₀ (inhalation) 5200 mg/m ³

Section III. Hazards Identification

Acute Health Effects	Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : Not available. Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

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	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. 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	Flammable.	Auto-Ignition	449 °C (840.2 °F)
Flash Points	-20 °C (-4 °F).	Flammable Limits	LOWER: 5% UPPER: 23%
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	Flammable 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
 Flammable liquid. Toxic material. Irritating 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 touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage

Handling and Storage Information
 FLAMMABLE. TOXIC. IRRITANT. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe gas/fumes/ vapor/spray. Always store away from incompatible compounds such as oxidizing agents, acids, 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
 Splash goggles. 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	Soluble in water, methanol ether, and other organic solutions.
Specific Gravity	0.97 to 0.976 (water=1)		
Molecular Weight	60.05	Partition Coefficient	-0.21 (Log K _{ow})
Boiling Point	32°C (89.6 °F)	Vapor Pressure	64KPa @ 20°C
Melting Point	-100°C (-148 °F)	Vapor Density	2.07 (Air = 1)
Refractive Index	1.342 to 1.346	Volatility	Not available.
Critical Temperature	Not available.	Odor	Characteristic.
Viscosity	0.001 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 moisture, oxidizing agents, acids, alkalis (bases).

Section XI. Toxicological Information

RTECS Number
 LQ8925000

Routes of Exposure
 Eye Contact. Ingestion. Inhalation.

Toxicity Data
 Rat LD₅₀ (oral) 475 mg/kg
 Rabbit LD₅₀ (dermal) >5 g/kg
 Rat LD₅₀ (inhalation) 5200 mg/m³/4H

Chronic Toxic Effects
CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Not available.
DEVELOPMENTAL TOXICITY: Not available.
 Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Acute Toxic Effects
 Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
 Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness 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 Methyl formate can be released to the environment in gases from the combustion of hydrocarbon fuels. Release can also occur at sites of production and use. Methyl formate may be formed in ambient air as a by-product of the photochemical reaction of methane and hydroxyl radicals. It has been found to occur naturally in tomatoes and apples. If released to air, methyl formate will degrade relatively slowly by reaction with photochemically produced hydroxyl radicals (estimated half-life of 74 days). Physical removal from air via wet deposition is likely to occur since it is very soluble in water. If released to soil or water, hydrolysis and volatilization will be important removal mechanisms. Aqueous hydrolysis half-lives of 21.9 days, 2.19 days, 9.1 hr, and 0.91 hr can be predicted at respective pHs of 6, 7, 8, and 9 using an experimentally determined base-catalyzed rate constant at 25 deg C. Volatilization half-lives from a model environmental river (1 meter deep) and model pond have been estimated to be 5.3 and 60 hr, respectively. Rapid evaporation from dry surfaces is likely to occur. Occupational exposure can occur through inhalation of vapor and dermal contact. Since methyl formate has been detected in tomatoes, apples, and coffee, exposure through ingestion will occur.

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 3: Flammable liquid.

PIN Number UN1243

Proper Shipping Name Methyl Formate

Packing Group (PG) I

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) On DSL.

EINECS Number (EEC) 203-481-7

EEC Risk Statements
R10- Flammable.
R18- In use, may form flammable/explosive vapor-air mixture.
R23/24/25- Toxic by inhalation, in contact with skin and if swallowed.
R36/37/38- Irritating to eyes, respiratory system and skin.

Japanese Regulatory Data ENCS No. (2)-677

Section XVI. Other Information

Version 1.0
Validated on 9/25/2008.
Printed 9/25/2008.

Notice to Reader

TCl laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.