MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 2277
MSDS Number: 2277
SRM Name: Organic Acids in Methanol:Methylene Chloride

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Description: This Standard Reference Material (SRM) is a solution of 24 organic acids in methanol:methylene chloride. This SRM is intended primarily for use in the calibration of chromatographic instrumentation used for the determination of organic acids. A unit of SRM 2277 consists of five 2 mL ampoules, each containing approximately 1.2 mL of solution.

Substance: Methanol:Methylene Chloride

Other Designations: **Methanol** (methyl alcohol; wood alcohol; methyl hydroxide; carbinol; monohydroxymethane; wood spirit; wood naphtha; methylol)/**Methylene Chloride** (dichloromethane; methylene dichloride; methane dichloride; methylene bichloride) mixture.

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Registry	EC Number (EINECS)	Nominal Concentration
Methanol	67-56-1	200-659-6	complex solution
Methylene Chloride	75-09-2	200-838-9	complex solution

EC Classification: F+ (Extremely Flammable); T (Toxic); Carcinogen Category 3

EC Risk (R No.): 11, 23/24/25, 39, 40

EC Safety (S No.): 1/2, 7, 16, 23, 24/25, 36/37, 45

EC Risk/Safety Phrases: See Section 15, "Regulatory Information".

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 2 Fire = 3 Reactivity = 0

Major Health Hazards: Respiratory tract irritation, skin irritation, eye irritation, blood damage, liver damage, central nervous system depression, nerve damage, cancer hazard (in humans).

Physical Hazards: Ampoules may break or shatter. Flammable liquid and vapor. Vapor may cause flash fire.

Potential Health Effects (Short Term Exposure)

Inhalation: Irritation, cough, ringing in the ears, constipation, headache, drowsiness, dizziness, tingling sensation, pain in extremities, tremors, loss of coordination, blood disorders, nerve damage.

Skin Contact: Irritation, absorption may occur, headache, drowsiness, loss of coordination, blood disorders.

Eye Contact: Irritation, eye damage.

Ingestion: Irritation, sensitivity to light, changes in blood pressure, nausea, vomiting, diarrhea, stomach pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, pain in extremities, loss of coordination, visual disturbances, dilated pupils or pin-point pupils, blindness, bluish skin color, lung congestion, heart damage, kidney damage, liver damage, nerve damage, effects on the brain, convulsions, unconsciousness, coma.

Listed as a Carcinogen/Potential Carcinogen

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	X	
In the International Agency for Research on Cancer (IARC) Monographs	X	
By the Occupational Safety and Health Administration (OSHA)	X	

4. First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. If breathing is difficult, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash affected skin with soap and water for at least 15 minutes while removing contaminated clothing. Seek medical attention, if needed.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: If ingested, seek medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive.

Extinguishing Media: Alcohol resistant foam, carbon dioxide, regular dry chemical, water.

Fire Fighting: Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C): 11 (52 °F)
Method Used: Closed Cup

Autoignition Temp. (°C): 385 (725 °F)

Flammability Limits in Air
UPPER (Volume %): 36
LOWER (Volume %): 6

6. Accidental Release Measures

Occupational Release: Stop leak if possible without personal risk. Isolate hazard area and deny entry. Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Reduce vapors with water spray. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for proper disposal.

Disposal: Refer to Section 13, "Disposal Considerations".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Store sealed ampoules in the dark at temperatures lower than 30 °C. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. Exposure Controls and Personal Protection

Dichloromethane (Methylene Chloride):

OSHA PEL TWA: 25 ppm
ACGIH TWA: 50 ppm
UK WEL TWA (skin): 350 mg/m^3 (100 ppm)

Methanol:

OSHA TWA (skin): 260 mg/m^3 (200 ppm)
ACGIH TWA (skin): 260 mg/m^3 (200 ppm)
UK WEL TWA (skin): 266 mg/m^3 (200 ppm)

Ventilation: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Respirator: If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators with organic vapor cartridges certified by NIOSH.

Eye Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near of handling and use areas.

Personal Protection: Wear protective clothing and chemically resistant gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Methylene Chloride	Methanol
Appearance and Odor: clear, colorless liquid, chloroform-like odor	**Appearance and Odor:** clear, colorless liquid, alcohol-like odor
Relative Molecular Mass: 84.93	**Molecular Molecular Mass:** 32.04
Molecular Formula: CH_2Cl_2	**Molecular Formula:** CH_3OH
Density (g/cm^3): 1.3266	**Density (g/cm^3):** 0.7914
Boiling Point (°C): 40 (104 °F)	**Boiling Point (°C):** 65 (149 °F)
Freezing Point (°C): –95 (–135 °F)	**Freezing Point (°C):** –94 (–137 °F)
Volatility (%): 100	**Volatility (%):** 100
Solubility in Water (%): 1.32 @ 20 °C	**Solubility in Water (%):** soluble
Solvent Solubility: soluble in alcohols, ether, dimethylformamide, phenols, aldehydes, ketones, acetic acid, triethyl phosphate, acetoacetic acid, cyclohexylamine, chlorinated solvents	**Solvent Solubility:** soluble in ether, benzene, alcohol, acetone, chloroform, ethanol, ketones, organic solvents

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for the SRM solution do not exist. The actual behavior of the solution may differ from the individual components.

10. STABILITY AND REACTIVITY

Stability: X Stable _____ Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Protect from physical damage.

Incompatible Materials: Halo carbons, combustible materials, metals, oxidizing materials, halogens, metal carbide, bases, acids, amines.

Fire/Explosion Information: Refer to Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of carbon, various organic fragments, halogenated compounds, phosgene.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Dichloromethane (Methylene Chloride) Toxicity Data:

TC_{Lo} (inhalation-human): 500 ppm/8 h
LD_{Lo} (oral-human): 357 mg/kg

Methanol Toxicity Data:

TC_{LO} (inhalation-human): 300 ppm

Health Effects: See Section 3: "Hazards Identification" for potential health effects.

Target Organs: Blood, central nervous system, liver.

Medical Conditions Aggravated by Exposure: Blood system disorders, heart or cardiovascular disorders, hormonal disorders, respiratory disorders.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data

Dichloromethane (Methylene Chloride):

Fish Toxicity: 193 mg/L/96 hour(s) LC_{50} (Mortality) Fathead minnow (Pimephales promelas).
Algal Toxicity: >662 mg/L/96 hour(s), EC_{50} (Photosynthesis) Diatom (Skeletonema costatum).

Methanol:

Fish Toxicity: 74.3 µg/L 96 hour(s) LC50 (Mortality) Gudgeon (Gobio gobio).
Algal Toxicity: 200–480 µg/L 8 hour(s) (Population) Algae, phytoplankton, algal mat (Algae).

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Methanol; UN1230; Hazard Class 3.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21)

ACUTE:	Yes
CHRONIC:	Yes
FIRE:	Yes
REACTIVE:	No
SUDDEN RELEASE:	No

STATE REGULATIONS

California Proposition 65: Known to cause the following: Dichloromethane (Methylene Chloride) Cancer (Apr 01, 1988).

CANADIAN REGULATIONS

WHMIS Classification: Not determined.

EUROPEAN REGULATIONS

EC Classification

Dichloromethane (Methylene Chloride):

Xn Harmful. Carcinogen Category 3

Methanol:

F Flammable.
T Toxic.

EC Risk Phrases

Dichloromethane (Methylene Chloride):

R40	Limited evidence of a carcinogenic effect.

Methanol:

R11	Highly flammable.
R23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
R39/23/24/25	Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

EC Safety Phrases:

Dichloromethane (Methylene Chloride):

S2	Keep out of reach of children.
S23	Do not breathe gas, fumes, vapor, or spray.
S24/25	Avoid contact with skin and eyes.
S36/37	Wear suitable protective clothing and gloves.

Methanol:

S1/2	Keep locked-up and out of the reach of children. Keep container tightly closed.
S7	Keep container tightly closed.
S16	Keep away from sources of ignition. No smoking.
S36/37	Wear suitable protective clothing and gloves.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Listed on inventory.

TSCA 12(b), Export Notification: Not listed.

16. OTHER INFORMATION

Sources:

ChemAdvisor, Inc., MSDS *Dichloromethane*, 13 September 2007.
ChemAdvisor, Inc., MSDS *Methyl Alcohol*, 13 December 2007.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.