

## SAFETY DATA SHEET

### 1. SUBSTANCE AND SOURCE IDENTIFICATION

#### Product Identifier

**RM Number:** 8509

**RM Name:** Moisture in Methanol

**Other Means of Identification:** Not applicable.

#### Recommended Use of This Material and Restrictions of Use

This Reference Material (RM) is intended primarily for use in the calibration of instruments and the evaluation of methods used for moisture determination. A unit of RM 8509 consists of five ampoules, each containing approximately 5 mL of methanol solution with a trace concentration level of water.

#### Company Information

National Institute of Standards and Technology  
Standard Reference Materials Program  
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### 2. HAZARDS IDENTIFICATION

#### Classification

**Physical Hazard:** Flammable Liquid, Category 2  
**Health Hazard:** Acute Toxicity, Oral, Category 3  
Acute Toxicity, Inhalation, Category 3  
Acute Toxicity, Dermal, Category 3  
STOT - Single Exposure, Category 1

#### Label Elements

##### Symbol



##### Signal Word

DANGER

##### Hazard Statement(s)

H225 Highly flammable liquid and vapor.  
H301+H311+H331 Toxic if swallowed, in contact with skin or if inhaled.  
H370 Causes damage to organs <central nervous system>.

##### Precautionary Statement(s)

P210 Keep away from heat, sparks, open flames, hot surfaces. — No smoking.  
P233 Keep container tightly closed.  
P241 Use explosion-proof electrical, ventilating, lighting equipment.  
P242 Use only non-sparking tools.  
P243 Take precautionary measures against static discharge.  
P260 Do not breathe fumes, mist, vapors, or spray.  
P264 Wash hands thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P271 Use only outdoors or in a well-ventilated area.  
P280 Wear protective gloves, eye protection, and protective clothing.

P301+P310 P330	If swallowed: Immediately call a doctor. Rinse mouth.
P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340 P308+P311	If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed or concerned: Call a doctor.
P403+P235 P405	Store in a well-ventilated place. Keep cool. Store locked up.
P501	Dispose of contents and container according to local regulations.

**Hazards Not Otherwise Classified:** None.

**Ingredients(s) with Unknown Acute Toxicity:** None.

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### 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

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**Substance:** Methanol

**Other Designations:** Methyl alcohol; wood alcohol; methyl hydroxide; wood spirit; wood naphtha

**NOTE:** Components are listed in compliance with OSHA's 29 CFR 1910.1200. The health and physical hazard information provided in this SDS is for methanol, the main component of the solution. For actual values, see the NIST Report of Investigation.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Methanol	67-56-1	200-659-6	>99.9

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### 4. FIRST AID MEASURES

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**Description of First Aid Measures**

**Inhalation:** If adverse effects occur, remove to well-ventilated (uncontaminated) area. If breathing is difficult, qualified personnel may administer oxygen. If not breathing, qualified personnel should give artificial respiration. Seek immediate medical attention.

**Skin Contact:** Rinse affected skin with water for at least 15 minutes, then wash thoroughly with soap or mild detergent and water. If skin irritation persists, seek medical aid and bring the container or label.

**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.

**Most Important Symptoms/Effects, Acute and Delayed:** Skin irritation, eye irritation, central nervous system depression, and nerve damage. May cause blindness.

**Indication of any immediate medical attention and special treatment needed, if necessary:** If any of the above symptoms are present, seek immediate medical attention.

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### 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Severe fire hazard. Vapor/air mixtures are explosive above the flash point. Vapors or gases may ignite at distant ignition sources and flash back. See Section 9, "Physical and Chemical Properties" for flammability properties.

**Extinguishing Media**

Suitable: Regular dry chemical, carbon dioxide, water, or alcohol-resistant foam.

Unsuitable: None listed.

**Specific Hazards Arising from the Chemical:** Not applicable.

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

**NFPA Ratings** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2                      Fire = 3                      Reactivity = 0

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## 6. ACCIDENTAL RELEASE MEASURES

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**Personal Precautions, Protective Equipment and Emergency Procedures:** Use suitable protective equipment; see Section 8, “Exposure Controls and Personal Protection”. Keep out of waters supplies and sewers.

**Methods and Materials for Containment and Clean up:** Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk, with water spray to reduce vapors. Absorb spilled material with sand or non-combustible material and collect in appropriate container for disposal.

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## 7. HANDLING AND STORAGE

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**Safe Handling Precautions:** See Section 8, “Exposure Controls and Personal Protection”.

**Storage and Incompatible Materials:** Store in a well-ventilated area. Keep separated from incompatible substances (see Section 10, “Stability and Reactivity”).

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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### Exposure Limits

OSHA (PEL):	260 mg/m <sup>3</sup> ; 200 ppm (TWA)
ACGIH (TLV):	200 ppm (TWA) 250 ppm (STEL) Skin – potential significant contribution to overall exposure by the cutaneous route.
NIOSH (REL):	260 mg/m <sup>3</sup> ; 200 ppm (TWA) 325 mg/m <sup>3</sup> ; 250 ppm (STEL) 6000 ppm (IDLH) Potential for dermal absorption.

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

**Personal Protection Measures:** In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

**Respiratory Protection:** If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

**Eye Protection:** Splash resistant safety goggles and emergency eyewash are recommended.

**Skin and Body Protection:** Chemical resistant clothing and gloves are recommended.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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Properties	Methanol (>99.9 %)
Molar Mass (g/mol)	32.04
Molecular Formula	CH <sub>3</sub> OH
Appearance (physical state, color, etc.)	clear, colorless liquid
Odor	alcohol odor
Odor threshold	100 ppm
pH	not available
Evaporation rate (butyl acetate = 1)	4.6
Melting point/freezing point	–94 °C (–137 °F)
Relative Density as Specific Gravity (water = 1)	0.7914
Density	not available
Vapor Pressure	97.25 mmHg at 20 °C
Vapor Density (air = 1)	1.11
Viscosity	0.59 cP at 20 °C
Solubilities	soluble in water solvent: ether, benzene, acetone, chloroform, ethanol, ketones, organic solvents
Partition coefficient (n-octanol/water)	not available

<b>Thermal Stability Properties</b>	
<b>Autoignition Temperature</b>	385 °C (725 °F)
<b>Thermal Decomposition</b>	not available
<b>Initial boiling point and boiling range</b>	65 °C (149 °F)
<b>Explosive Limits, LEL (Volume %)</b>	6 %
<b>Explosive Limits, UEL (Volume %)</b>	36 %
<b>Flash Point (Closed Cup)</b>	11 °C (51.8 °F)
<b>Flammability (solid, gas)</b>	not applicable

## 10. STABILITY AND REACTIVITY

**Reactivity:** Stable at normal temperatures and pressure.

**Stability:** ☒ Stable ☐ Unstable

**Possible Hazardous Reactions:** Not applicable.

**Conditions to Avoid:** Avoid heat, flames, sparks, and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

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

**Hazardous Decomposition:** Oxides of carbon.

**Hazardous Polymerization:** ☐ Will Occur ☒ Will Not Occur

## 11. TOXICOLOGICAL INFORMATION

**Route of Exposure:** ☒ Inhalation ☒ Skin ☒ Ingestion

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Skin irritation, eye irritation, central nervous system depression, and nerve damage. May cause blindness.

### Potential Health Effects (Acute, Chronic, and Delayed)

**Inhalation:** Acute and chronic exposure may cause irritation, cough, ringing in the ears, constipation, headache, drowsiness, dizziness, tingling sensation, pain in extremities, tremors, loss of coordination, blood disorders, and nerve damage. Chronic exposure may also cause sensitivity to light, changes in blood pressure, digestive issues, difficulty breathing, irregular heartbeat, visual disturbances, blindness, bluish skin color, lung congestion, heart damage, kidney damage, liver damage, reproductive effects, effects on the brain, convulsions, unconsciousness, and coma.

**Skin Contact:** Acute and chronic exposure may result in irritation, absorption may occur, headache, drowsiness, loss of coordination, blood disorders, and nerve damage.

**Eye Contact:** Acute and chronic exposure may cause irritation; acute may cause eye damage.

**Ingestion:** Acute and chronic exposure may cause the same effects as listed for inhalation.

### Numerical Measures of Toxicity

**Acute Toxicity:** Category 3 for oral, inhalation, and dermal.

Human, Oral LDLo: 143 mg/kg

Rat, Oral LD50: 5628 mg/kg

Rat, Inhalation LC50: 83.2 mg/L (4 h); 145 000 ppm (1 h); 64 000 ppm (4 h)

Rabbit, Dermal LD50: 15 800 mg/kg

**Skin Corrosion/Irritation:** Not classified.

Rabbit, skin: 20 mg (24 h) moderate

**Serious Eye Damage/Eye Irritation:** Not classified.

Rabbit, eyes: 100 mg (24 h) moderate; 40 mg moderate

**Respiratory Sensitization:** No data available.

**Skin Sensitization:** No data available.

**Germ Cell Mutagenicity:** No data available.

**Carcinogenicity:** Not classified.

**Listed as a Carcinogen/Potential Carcinogen** \_\_\_\_\_ Yes \_\_\_\_\_ X No

Methanol is not listed by IARC, NTP, or OSHA as a carcinogen/potential carcinogen.

**Tumorigenic:** Rat, Inhalation TCLo: 1000 ppm (2 years)

**Mutagenic:** Mouse, Oral TD: 1 g/kg (cytogenetic analysis)

Rat, Oral TD: 10 µmol/kg (DNA damage)

Human, lymphocyte TC: 300 mmol/L (DNA inhibition)

**Reproductive Toxicity:** No data available.

**Specific Target Organ Toxicity, Single Exposure:** Category 1, Causes damage to central nervous system.

**Specific Target Organ Toxicity, Repeated Exposure:** No data available.

**Aspiration Hazard:** Not applicable.

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## 12. ECOLOGICAL INFORMATION

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### Ecotoxicity Data

Fish, Bluegill (*Lepomis macrochirus*), LC50: 13 500 mg/L to 17 600 mg/L (96 h) flow-through

Fathead minnow (*Pimephales promelas*), LC50: 28 200 mg/ L (96 h) flow-through

Fathead minnow (*Pimephales promelas*), LC50: >100 mg/L (96 h) static

**Persistence and Degradability:** No data available.

**Bioaccumulative Potential:** <10 species: fish.

**Mobility in Soil:** No data available.

**Other Adverse effects:** No data available.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose in accordance with all applicable federal, state, and local regulations.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** UN1230, Methanol, Hazard Class 3, 6.1, Packing Group II, Excepted Qty: E2.

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## 15. REGULATORY INFORMATION

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### U.S. Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): 5000 lbs (2270 kg) final RQ.

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): 1.0 % de minimis concentrations.

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

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

ACUTE HEALTH: Yes

CHRONIC HEALTH: Yes

FIRE: Yes

REACTIVE: No

PRESSURE: No

**State Regulations:** California Proposition 65: WARNING! This product contains a chemical (methanol) known to the state of California to cause reproductive/developmental effects.

**U.S. TSCA Inventory:** Methanol is listed.

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

**Canadian Regulations:** WHMIS Information: Not provided for this material.

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## 16. OTHER INFORMATION

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**Issue Date:** 13 March 2015

**Sources:** ChemADVISOR, Inc., SDS *Methyl Alcohol*, 15 December 2014.

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Methanol*, RTECS# PC1400000, CAS No. 67-56-1, May 2009; available at <http://www.cdc.gov/niosh-rtecs/PC155CC0.html> (accessed Mar 2015).

### Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration	STEL	Short Term Exposure Limit
LD50	Median Lethal Dose or Lethal Dose, 50 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified	WHMIS	Workplace Hazardous Materials Information System

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

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail [srmmsds@nist.gov](mailto:srmmsds@nist.gov); or via the Internet at <http://www.nist.gov/srm>.