

SAFETY DATA SHEET

Nova Molecular Technologies, Inc.



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SDS No: NMT205-002

Nova Sulfolane – 97**1. PRODUCT AND COMPANY IDENTIFICATION****PRODUCT NAME:** Nova Sulfolane - 97**GENERAL USE:** Solvent.**MOLECULAR FORMULA:** C₄H₈O₂S**GENERIC NAME:** thiolane 1,1-dioxide, Thiophene, tetrahydro-, 1,1-dioxide, Tetramethylene sulfone**MANUFACTURER**

Nova Molecular Technologies, Inc.
1 Parker Place, Suite 725
Janesville, WI 53545
Customer Service: 800-445-6682 or 281-474-5550

24 HR. EMERGENCY TELEPHONE NUMBERS

For emergency, spill, leak, fire, exposure or accident, call: CHEMTREC: 1-800-424-9300
Outside the United States, call: 703-527-3887 (collect calls accepted)

2. HAZARDS IDENTIFICATION**GHS CLASSIFICATIONS****Health:**

Acute Toxicity (Oral), Category 4
Eye Irritation, Category 2B
Hazard Not Otherwise Classified (Acute Toxicity (Dermal))

GHS LABEL

Exclamation
mark

SIGNAL WORD: WARNING**HAZARD STATEMENTS**

H302: Harmful if swallowed.
H320: Causes eye irritation.

PRECAUTIONARY STATEMENT(S)**Prevention:**

P264: Wash thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.

Response:

P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P330: Rinse mouth.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

Disposal:

P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

EMERGENCY OVERVIEW

IMMEDIATE CONCERNS: HAZARD DESCRIPTION / WARNING INFORMATION SUMMARY - This product may be harmful if ingested. This product may cause irritation if inhaled or comes in contact with eyes. Please read the entire contents of Section 2 of this Safety Data Sheet (SDS) for details.

POTENTIAL HEALTH EFFECTS

EYES: Contact may cause eye irritation.

SKIN: Contact may cause skin irritation.

SKIN ABSORPTION: May be harmful if absorbed through skin.

INGESTION: May be harmful if swallowed.

INHALATION: May be harmful if inhaled. Vapor or mist is irritating to the eyes, mucous membranes and upper respiratory tract.

REPRODUCTIVE TOXICITY

REPRODUCTIVE EFFECTS: Not Established.

TERATOGENIC EFFECTS: Not Established.

CARCINOGENICITY: No component of this product present, at levels greater than or equal to 0.1%, is identified as a probable, possible, or confirmed carcinogen by IARC, NTP, OSHA or ACGIH.

MUTAGENICITY: Not Established.

ROUTES OF ENTRY: Inhalation, skin contact, eye contact, ingestion.

TARGET ORGAN STATEMENT: Eyes, skin, respiratory system.

SENSITIZATION: Not Established.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Wt. %	CAS
Tetrahydrothiophene 1,1-dioxide	> 97	126-33-0
Water	< 3	7732-18-5

4. FIRST AID MEASURES

EYES: Immediately flush with large amounts of water, holding eyelids open, for at least 20 minutes. Repeat if necessary. Remove contact lenses, if present and easy to do. Get medical attention.

SKIN: Immediately remove contaminated clothing or shoes, wipe excess from skin and flush with plenty of water for at least 15 minutes. Do not reuse clothing until thoroughly cleaned. Get medical attention if irritation persists.

INGESTION: Do not induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Have exposed individual rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person. Contact a physician or poison control center immediately.

INHALATION: Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician if symptoms develop or persist.

NOTES TO PHYSICIAN: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

CLINICAL TESTING & MEDICAL MONITORING FOR DELAYED EFFECTS - Not Established.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water, dry chemical, foam or carbon dioxide when fighting fires involving this material.

FIRE FIGHTING PROCEDURES: PROTECTIVE ACTIONS TO TAKE DURING FIRE FIGHTING - Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal; do not scatter the material. Persons involved in fire-fighting response involving this product and its containers/packaging should refer to Section 8 of this SDS for the proper selection of exposure controls and personal protective equipment.

FIRE FIGHTING EQUIPMENT: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

HAZARDOUS DECOMPOSITION PRODUCTS: This product emits toxic fumes under fire conditions. Incomplete combustion may form sulfur and carbon oxides.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1 of this SDS. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into

waterways, sewers, basements or confined areas. Use water spray to disperse vapors or to flush liquid away from fire exposure. Use clean non-sparking tools to collect absorbed material.

LARGE SPILL: Use similar response procedures as indicated under Small Spill.

RELEASE NOTES: ENVIRONMENTAL PRECAUTIONS - Prevent entry into waterways, sewers, basements or confined areas. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Avoid allowing water runoff to contact spilled material. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of Reportable Quantities. Comply with all federal, state and local regulations.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Handle in accordance with good industrial hygiene and safety practices. These practices include but are not limited to avoiding unnecessary exposure and prompt removal of material from eyes, skin and clothing. Do not breathe material. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. If needed, take first aid actions as indicated in Section 4 of this SDS.

HANDLING: Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8 of this SDS. Keep away from heat and flame. Do not weld, heat or drill container. Remove contaminated clothing immediately. Do not wear contaminated clothing or shoes. Wash with soap and water after working with this product.

STORAGE: Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures. Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Launder contaminated clothing before reuse.

STORAGE TEMPERATURE: Store containers in a room at ambient temperature.

STORAGE PRESSURE: Containers should be stored in a room at ambient pressure.

ELECTROSTATIC ACCUMULATION HAZARD: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations, which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)					
		EXPOSURE LIMITS			
		OSHA PEL		ACGIH TLV	
Chemical Name		ppm	mg/m ³	ppm	mg/m ³
Tetrahydrothiophene 1,1-dioxide	TWA	N/E	N/E	N/E	N/E
	STEL	N/E	N/E	N/E	N/E
Water	TWA	N/E	N/E	N/E	N/E
	STEL	N/E	N/E	N/E	N/E

ENGINEERING CONTROLS: A system of local or general exhaust is recommended to keep employee exposures below the airborne exposure limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent addition, for details.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Employees should be provided with and required to use splash-proof safety goggles and face shields where there is any possibility of product coming in contact with eyes. Ensure that an eye wash station is operable and nearby.

SKIN: Neoprene coated gloves such as Ansell Scorpio™ or equivalent and additional protection including impervious boots, apron or coveralls, as needed in areas of unusual exposure.

RESPIRATORY: A respirator is generally not required for use. However, depending on the airborne concentration, NIOSH approved respirator that provides adequate protection from measured concentrations of this material if exposure is unknown or exceeds permissible limits. Use a positive pressure, air-supplying respirator if there is a potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

WORK HYGIENIC PRACTICES: Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove contaminated clothing and launder before reuse. Shower after work using plenty of soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear liquid with pungent odor.

pH: 8 to 10

Notes: 50/50 by volume mixture with water.

FLASH POINT: 177°C (351°F) Closed Cup.

FLAMMABLE LIMITS: Not Applicable.

AUTOIGNITION TEMPERATURE: Not Applicable.

VAPOR PRESSURE: 0.01 mmHg at 20°C (68°F)

VAPOR DENSITY: 4.2 (Air = 1)

BOILING POINT: 228°C (550°F)

FREEZING POINT: 9°C (48°F)

SOLUBILITY IN WATER: Soluble.

DENSITY: 1.261 at 25°C (77°F)

SPECIFIC GRAVITY: 1.264 at 4°C (39°F)

MOLECULAR WEIGHT: 120.17

10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

STABILITY: This product is anticipated to be stable under normal ambient storage and handling conditions of temperature and pressure.

CONDITIONS TO AVOID: Avoid contact with strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Products of thermal decomposition include carbon oxides and sulfur oxides.

INCOMPATIBLE MATERIALS: May react with oxygen and strong oxidizing agents such as chlorates, nitrates, and peroxides.

11. TOXICOLOGICAL INFORMATION

ACUTE

Chemical Name	ORAL LD ₅₀ (rat)	DERMAL LD ₅₀ (rabbit)	INHALATION LC ₅₀ (rat)
Tetrahydrothiophene 1,1-dioxide	1900 mg/kg	> 3180 ml/kg (rabbit)	> 250 mg/m ³

EYE EFFECTS: May cause eye irritation.

SKIN EFFECTS: May cause skin irritation. May be harmful if absorbed through the skin.

Organism	Test Type	Route	Reported Dose (Normalized Dose)	Effect	Source
MOUSE	LD ₅₀	Intraperitoneal	1250mg/kg (1250mg/kg)		Russian Pharmacology and Toxicology Vol. 42, Pg. 97, 1979.
MOUSE	LD ₅₀	Intravenous	1080mg/kg (1080mg/kg)	Behavioral: convulsions or effect on seizure threshold Behavioral: excitement	Archives Internationales de Pharmacodynamie et de Therapie. Vol. 119, Pg. 423, 1959.

MOUSE	LD ₅₀	Oral	1900mg/kg (1900mg/kg)		"Toxicology of Drugs and Chemicals," Deichmann, W.B., New York, Academic Press, Inc., 1969Vol. -, Pg. 560, 1969.
RABBIT	LD ₅₀	Skin	3180uL/kg (3180mL/kg)	Liver: other changes Kidney, ureter, and bladder: other changes Skin: "dermatitis, other: after systemic exposure"	National Technical Information Service. Vol. OTS0535072,
RAT	LC	Inhalation	>250mg/m ³ /8H (250mg/m ³)		National Technical Information Service. Vol. OTS0535072,
RAT	LD ₅₀	Intraperitoneal	1600mg/kg (1600mg/kg)		Toxicologist. Vol. 4, Pg. 22, 1984.
RAT	LD ₅₀	Oral	1540uL/kg (1540mL/kg)		American Industrial Hygiene Association Journal. Vol. 30, Pg. 470, 1969.
RAT	LD ₅₀	Skin	>3800mg/kg (3800mg/kg)		British Journal of Industrial Medicine. Vol. 23, Pg. 302, 1966.
RAT	LD ₅₀	Subcutaneous	1620uL/kg (1620mL/kg)		National Technical Information Service. Vol. OTS0535072,

* NOTE: Data based on 99+% pure sulfolane product.

CARCINOGENICITY: No component of this product at levels greater than 0.1% is identified as a carcinogen by IARC, NTP or OSHA.

SENSITIZATION: Not Established.

NEUROTOXICITY: Not Established.

GENETIC EFFECTS: Not Established.

REPRODUCTIVE EFFECTS: Not Established.

TARGET ORGANS: Since this product is used as a solvent in many extraction processes including aromatic hydrocarbons from oil refinery, fatty acids and polymerization, the most probable route of exposure is by skin absorption.

TERATOGENIC EFFECTS: Not Established.

MUTAGENICITY: Not Available.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: This product is not expected to be harmful to aquatic organisms.

ECOTOXICOLOGICAL INFORMATION: TERRESTRIAL/MICROORGANISM TOXICITY -

ACUTE: Ecological data does not exist for this mixture.

CHRONIC: Ecological data does not exist for this mixture.

AQUATIC TOXICITY (ACUTE)

96-HOUR LC₅₀: > 1000 mg/L for rainbow trout (*Salmo gairdner*).

48-HOUR EC₅₀: 852 mg/L for *Daphnia magna* (OECD 202).

CHEMICAL FATE INFORMATION: In a 5-day standard BOD test with or without acclimated sewage as microbial inoculum, no biodegradation of sulfolane was observed. In a standard Japanese MITI test with activated sludge as microbial inoculum, biodegradation equivalent to 0-29% theoretical BOD was observed in 14 days for a 100 mg/L aqueous sulfolane solution. On the other hand, more than 99% of sulfolane at an initial concentration of 100 mg/L biodegraded by activated sludge cultures in 1 day in a batch die-away test. In a bench scale aerated lagoon reactor, more than 90% of sulfolane at an initial concentration 20-80 mg/L biodegraded at hydraulic retention time of 2-2.4 days. It was concluded that sulfolane can be biodegraded by activated sludge cultures. Inorganic sulfate has been identified as the biodegradation product of sulfolane.

GENERAL COMMENTS: Any other adverse environmental effects, such as environmental fate (exposure), ozone depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and global warming potential are indicated in this section if data exists. Otherwise, this data has not been established.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste

disposal facility.

EMPTY CONTAINER: Dispose of domestic waste in accordance with the necessary technical regulations following consultation with waste experts and the responsible authorities.

COMMENTS: Dispose of material in accordance with national, state, regional, and local regulations. Never discharge directly into sewers or surface water. Consult with environmental regulatory agencies for guidance on acceptable disposal practices for the product, in any form, and its containers/packaging.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: Not regulated as a dangerous good.

ROAD AND RAIL (ADR/RID)

PROPER SHIPPING NAME: Not regulated as a dangerous good.

AIR (ICAO/IATA)

SHIPPING NAME: Not regulated as a dangerous good.

VESSEL (IMO/IMDG)

SHIPPING NAME: Not regulated as a dangerous good.

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES: Immediate (acute) health hazard. Delayed (chronic) health hazard.

FIRE: No **PRESSURE GENERATING:** No **REACTIVITY:** No **ACUTE:** Yes **CHRONIC:** Yes

TSCA (TOXIC SUBSTANCE CONTROL ACT)

Chemical Name	CAS
Tetrahydrothiophene 1,1-dioxide	126-33-0
Water	7732-18-5

STATES WITH SPECIAL REQUIREMENTS

Chemical Name	Requirements
Tetrahydrothiophene 1,1-dioxide	Massachusetts Hazardous Substance Pennsylvania Hazardous Substance

CARCINOGEN: This product is not listed under IARC, OSHA, or NTP.

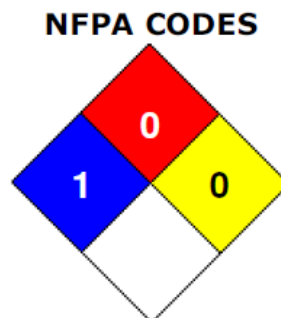
CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM): Not a controlled product.

16. OTHER INFORMATION

PREPARED BY: Total Safety d/b/a EHS Services

HMIS RATING	
HEALTH	* 1
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B



HMIS RATINGS NOTES: Please refer to Section 8 of this SDS for recommended personal protective equipment.

DATA SOURCES:

REFERENCES

ACGIH. 2013 Guide to Occupational Exposure Values. Cincinnati, OH. Signature Publications, 2013.

Forsberg, K.; Mansdorf, S.Z. Quick Selection Guide to Chemical Protective Clothing. Fifth Edition. Hoboken, NJ. John Wiley & Sons, 2007.

Lide, D.R. CRC Handbook of Chemistry and Physics. 88th Edition. Boca Raton, FL. CRC Press, 2008.

UNECE. Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Third Revised Edition. New York and Geneva. United Nations, 2009.

US DOT; Pipeline and Hazardous Materials Safety Administration. 2008 Emergency Response Guidebook. Neenah, WI.

J.J. Keller & Associates, Inc. 2008.

US EPA. Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) and Section 112(r) of the Clean Air Act. [Available] Online: <http://www.epa.gov/ceppo/pubs/title3.pdf>. Retrieved 02/02/2011.

ADDITIONAL SDS INFORMATION:

KEY /LEGEND

ACGIH - American Conference of Governmental Industrial Hygienists

ADR - Agreement on Dangerous Goods by Road

CAA - Clean Air Act

CAS - Chemical Abstracts Service Registry Number

CDG - Carriage of Dangerous Goods By Road and Rail Manual

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CFR - Code of Federal Regulations

EINECS - European Inventory of Existing Chemical Substances Registry Number

ERG - Emergency Response Guidebook

EPCRA - Emergency Planning and Community Right-to-Know Act

GHS - Globally Harmonized System of Classification and Labeling of Chemicals

IARC - International Agency for Research on Cancer

IATA - International Air Transport Association

ICAO - International Civil Aviation Organization

IMDG - International Maritime Dangerous Goods Code

IMO - International Maritime Organization

N/E - Not Established

NTP - National Toxicology Program

OSHA - Occupational Safety and Health Administration

PEL - Permissible Exposure Limit

PPE - Personal Protective Equipment

RCRA - Resource Conservation and Recovery Act

RID - Regulations Concerning the International Transport of Dangerous Goods by Rail

RQ - Reportable Quantities

SARA - Superfund Amendments and Reauthorization Act of 1986

SDS - Safety Data Sheet

TCC - Tag Closed Cup

TDG - Transportation of Dangerous Goods

TLV - Threshold Limit Value

TSCA - Toxic Substance Control Act

UN/NA - United Nations / North American Number

UNECE - United Nations Economic Commission for Europe

US DOT - United States Department of Transportation
US EPA - United States Environmental Protection Agency
Vol. - Volume
WHMIS - Workplace Hazardous Materials Information System

GENERAL STATEMENTS: Other information not included anywhere else in this SDS is included in this section if, in fact, such data exists.

MANUFACTURER DISCLAIMER: This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION HEREIN PROVIDED. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.