Trimethylboroxine

sc-253764

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Trimethylboroxine

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C3-H9-B3-O3, "boroxin, trimethyl"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	3		
Toxicity	2		
Body Contact	3		
Reactivity	1		
Chronic	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Causes burns.
Risk of serious damage to eyes.
Highly flammable.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
■ The material has NOT been classified as "harmful by ingestion".
This is because of the lack of corroborating animal or human evidence.

EYE

■ The material can produce chemical burns to the eye following direct contact.
Vapors or mists may be extremely irritating.
■ If applied to the eyes, this material causes severe eye damage.

SKIN

■ The material can produce chemical burns following direct contactwith the skin.
■ Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ If inhaled, this material can irritate the throat andlungs of some persons.
■ Inhalation of vapours may cause drowsiness and dizziness.
This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.
■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.
■ Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary edema.
■ Inhalation of high concentrations of gas/vapor causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.
■ Minor but regular methanol exposures may effect the central nervous system, optic nerves and retinae.
Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision and double vision.

CHRONIC HEALTH EFFECTS

■ Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Long-term exposure to methanol vapor, at concentrations exceeding 3000 ppm, may produce cumulative effects characterized by gastrointestinal disturbances (nausea, vomiting), headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, conjunctivitis and clouded or double vision. Liver and/or kidney injury may also result.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%

trimethylboroxine	823-96-1	>98
reacts with water/moisture to produce		
methanol	67-56-1	
in fires, burns to produce		
boron oxide	1303-86-2	

Section 4 - FIRST AID MEASURES

SWALLOWED

■

- For advice, contact a Poisons Information Center or a doctor at once.
- Urgent hospital treatment is likely to be needed.

EYE

■ If this product comes in contact with the eyes

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin or hair contact occurs

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.

INHALED

■

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.

Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

NOTES TO PHYSICIAN

■ For acute and short term repeated exposures to methanol

- Toxicity results from accumulation of formaldehyde/formic acid.
- Clinical signs are usually limited to CNS, eyes and GI tract Severe metabolic acidosis may produce dyspnea and profound systemic effects which may become intractable. All symptomatic patients should have arterial pH measured. Evaluate airway, breathing and circulation.

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung edema often do not manifest until a few hours have passed and they are aggravated by physical effort.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available
Specific Gravity (water=1)	0.989
Lower Explosive Limit (%)	Not available

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- May be violently or explosively reactive.

When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 1000 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Liquid and vapor are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidizers.

Combustion products include carbon dioxide (CO2), metal oxides, other pyrolysis products typical of burning organic material.
Inorganic boron compounds act as fire retardants. Under fire conditions they release water, in a heat absorbing reaction, and form a protective glassy layer on materials in which they are added. They can release boric acid, which also acts by charring the material, reducing the release of flammable gases.

FIRE INCOMPATIBILITY

Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- May be violently or explosively reactive.

When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 1000 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Liquid and vapor are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidizers.

Combustion products include carbon dioxide (CO2), metal oxides, other pyrolysis products typical of burning organic material.
Inorganic boron compounds act as fire retardants. Under fire conditions they release water, in a heat absorbing reaction, and form a protective glassy layer on materials in which they are added. They can release boric acid, which also acts by charring the material, reducing the release of flammable gases.

FIRE INCOMPATIBILITY

Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Containers, even those that have been emptied, may contain explosive vapours.
- Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

¦ Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid.

- For low viscosity materials (i) Drums and jerricans must be of the non-removable head type. (ii) Where a can is to be used as an inner package, the can must have a screwed enclosure.

- For materials with a viscosity of at least 2680 cSt. (23 deg. C)

STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.

Reacts with moisture.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	trimethylboroxine (Methanol (Methyl alcohol))	200	262	250	328				
Canada - British Columbia Occupational Exposure Limits	trimethylboroxine (Methanol)	200		250					Skin
US - Minnesota Permissible Exposure Limits (PELs)	trimethylboroxine (Methyl alcohol)	200	260	250	325				
US ACGIH Threshold Limit Values (TLV)	trimethylboroxine (Methanol)	200		250					TLV Basis headache; eye damage. BEI
US NIOSH Recommended Exposure Limits (RELs)	trimethylboroxine (Methyl alcohol)	200	260	250	325				[skin]
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	trimethylboroxine (Methyl alcohol)	200	260	250	325				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	trimethylboroxine (Methyl alcohol)	200	260						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	trimethylboroxine (Methyl alcohol)	200	260	250	310				
US - California Permissible Exposure Limits for Chemical Contaminants	trimethylboroxine (Methyl alcohol; methanol)	200	260	250	325	1000			

US - Idaho - Limits for Air Contaminants	trimethylboroxine (Methyl alcohol)	200	260				
US - Hawaii Air Contaminant Limits	trimethylboroxine (Methyl alcohol (methanol))	200	260	250	325		
US - Alaska Limits for Air Contaminants	trimethylboroxine (Methyl alcohol (Methanol))	200	260	250	310		
US - Michigan Exposure Limits for Air Contaminants	trimethylboroxine (Methyl alcohol)	200	260	250	325		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	trimethylboroxine (Methyl alcohol (methanol) - Skin)	200	260	250	310		
US - Washington Permissible exposure limits of air contaminants	trimethylboroxine (Methanol (Methyl alcohol))	200		250			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	trimethylboroxine (Methyl alcohol (methanol))	200		250			Skin
US - Oregon Permissible Exposure Limits (Z-1)	trimethylboroxine (Methyl alcohol (methanol))	200	260				
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	trimethylboroxine (Methyl alcohol)	200	260				
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	trimethylboroxine (Methyl alcohol)	200	262	250	328		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	trimethylboroxine (Methyl alcohol)	200	260				
Canada - Northwest Territories Occupational Exposure Limits (English)	trimethylboroxine (Methyl alcohol (Methanol) - Skin)	200	262	250	328		

Canada - Nova Scotia Occupational Exposure Limits	trimethylboroxine (Methanol)	200		250		TLV Basis headache; eye damage. BEI
Canada - Prince Edward Island Occupational Exposure Limits	trimethylboroxine (Methanol)	200		250		TLV Basis headache; eye damage. BEI
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	trimethylboroxine (BORON AND COMPOUNDS)		0.01			
Canada - British Columbia Occupational Exposure Limits	boron oxide (Boron oxide)		10			
US - Minnesota Permissible Exposure Limits (PELs)	boron oxide (Boron oxide - Total dust)		10			
US - Minnesota Permissible Exposure Limits (PELs)	boron oxide (Boron oxide - Respirable fraction)		5			
Canada - Alberta Occupational Exposure Limits	boron oxide (Boron oxide)		10			
US OSHA Permissible Exposure Levels (PELs) - Table Z1	boron oxide (Boron oxide - Total dust)		15			
US ACGIH Threshold Limit Values (TLV)	boron oxide (Boron oxide)		10			TLV Basis eye & upper respiratory tract irritation
US NIOSH Recommended Exposure Limits (RELs)	boron oxide (Boron oxide)		10			
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	boron oxide (Boron oxide - Respirable fraction)		5			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	boron oxide (Boron oxide. - Total dust)		10			
US - Vermont Permissible Exposure Limits Table Z-1-A Final	boron oxide (Boron oxide. - Respirable fraction)		5			

Rule Limits for Air Contaminants						
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	boron oxide (Boron oxide - Total dust)		15			
US - California Permissible Exposure Limits for Chemical Contaminants	boron oxide (Boron oxide)		10			
US - Idaho - Limits for Air Contaminants	boron oxide (Boron oxide - Total dust)		15			
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	boron oxide (Boron oxide Total dust)		10			
US - Alaska Limits for Air Contaminants	boron oxide (Boron oxide - Total dust)		10			
US - Alaska Limits for Air Contaminants	boron oxide (Boron oxide - Respirable fraction)		5			
US - Hawaii Air Contaminant Limits	boron oxide (Boron oxide - total dust)		10		20	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	boron oxide (Boron oxide)	-	10	-	20	
US - Washington Permissible exposure limits of air contaminants	boron oxide (Boron oxide - Total particulate)		10		20	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	boron oxide (Boron oxide)		10		20	
Canada - Prince Edward Island Occupational Exposure Limits	boron oxide (Boron oxide)		10			TLV Basis eye & upper respiratory tract irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	boron oxide (Boron oxide- Total dust)		15			

Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	boron oxide (Boron oxide)		10		
Canada - Nova Scotia Occupational Exposure Limits	boron oxide (Boron oxide)		10		TLV Basis eye & upper respiratory tract irritation
US - Michigan Exposure Limits for Air Contaminants	boron oxide (Boron oxide, Total dust)		10		
US - Oregon Permissible Exposure Limits (Z-1)	boron oxide (Boron oxide)	-	10		Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits.
Canada - Northwest Territories Occupational Exposure Limits (English)	boron oxide (Boron oxide)		10	20	

PERSONAL PROTECTION

RESPIRATOR

•Type AX-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Chemical goggles.
- Full face shield.

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- Neoprene gloves

OTHER

- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Corrosive.

State	LIQUID	Molecular Weight	125.53
Melting Range (°F)	-36	Viscosity	Not Available
Boiling Range (°F)	172- 176	Solubility in water (g/L)	Reacts
Flash Point (°F)	18	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	0.989
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

APPEARANCE

Liquid; reacts with water.

log Kow -0.82- -0.66

Material	Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

¦ Segregate from alcohol, water.

Avoid reaction with oxidizing agents.

- NOTE May develop pressure in containers; open carefully. Vent periodically.
- Organoborane or organoboron compounds are chemical compounds that are organic derivatives of BH3, for example trialkyl boranes.
- The C-B bond has low polarity (the difference in electronegativity 2.55 for carbon and 2.04 for boron) and therefore alkyl boron compounds are in general stable though easily oxidized. Vinyl groups and aryl groups donate electrons and make boron less electrophilic and the C-B bond gains some double bond character. Like the parent borane, organoboranes are classified as strong electrophiles because boron is unable to gain a full octet of electrons. Unlike diborane, however, organoboranes do not form dimers.

- Carbon-boron bonds are generally easily oxidised and some organoboranes may be spontaneously flammable when exposed to air. the less volatile organoboranes generally do not behave in this manner but nevertheless are readily oxidised by oxygen and a number of other reagents. Consequently it is normally necessary to carry out organoborane reactions in an inert atmosphere.
- The organoboranes are remarkably stable to water, aqueous bases, and aqueous mineral acids. However, they are susceptible to protonolysis by carboxylic acids.
- Controlled oxidation, followed by dissolution in water, yields dihydroxy(alkyl)boranes (RB(OH)2).
- Boranes react rapidly with alkenes in a process called hydroboration.
- Organoboron compounds also lend themselves to transmetalation reactions with organopalladium compounds. This reaction type is exemplified in the Suzuki reaction
- Organoboranes tolerate many functional groups and are often formed in a stereospecific manner. The boron atom in these organoboranes can be readily substituted with a variety of functional groups to give organic compounds under mild conditions such that organoboranes now appear to be among the most versatile intermediates available for organic synthesis.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

trimethylboroxine

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

BORON OXIDE

TRIMETHYLBOROXINE

■ No significant acute toxicological data identified in literature search.

TRIMETHYLBOROXINE

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

METHANOL

TOXICITY	IRRITATION
Oral (human) LDLo 143 mg/kg	Skin (rabbit) 20 mg/24 h-Moderate
Oral (man) LDLo 6422 mg/kg	Eye (rabbit) 40 mg-Moderate
Oral (man) TDLo 3429 mg/kg	Eye (rabbit) 100 mg/24h-Moderate
Oral (rat) LD50 5628 mg/kg	
Inhalation (human) TCLo 86000 mg/m^3	
Inhalation (human) TCLo 300 ppm	
Inhalation (rat) LC50 64000 ppm/4h	
Dermal (rabbit) LD50 15800 mg/kg	

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

TOXICITY	**IRRITATION**
BORON OXIDE	

Oral (Rat) LD50 3150 mg/kg		Skin (rabbit) 1000 mg Mild
Oral (Mouse) LD50 3163 mg/kg	erythema	
Intraperitoneal (Mouse) LD50 1868 mg/kg		Eye (rabbit) 50 mg
Inhalation (Rat) LC 150 mg/m³/2h	conjunctivitis	

[Genium]
Eye Mild
■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

CARCINOGEN

methanol	US - Rhode Island Hazardous Substance List	IARC	
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; NTP 11th ROC
boron oxide	US - Rhode Island Hazardous Substance List	IARC	

SKIN

methanol	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	X
methanol	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
methanol	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
methanol	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV Basis headache; eye damage. BEI
methanol	US NIOSH Recommended Exposure Limits (RELs) - Skin	Skin	Yes
methanol	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Skin	Skin	X
methanol	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin	Skin	X
methanol	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	X
methanol	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
methanol	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	X
methanol	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
methanol	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
methanol	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X

methanol	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
methanol	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S
methanol	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

B. Component Waste Numbers

When methanol is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U154 (waste code I).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

¦ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	3
Identification Numbers:	UN2924	PG:	II
Label Codes:	3, 8	Special provisions:	IB2, T11, TP2, TP27
Packaging: Exceptions:	150	Packaging: Non-bulk:	202
Packaging: Exceptions:	150	Quantity limitations: Passenger aircraft/rail:	1 L
Quantity Limitations: Cargo aircraft only:	5 L	Vessel stowage: Location:	B
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:

Flammable liquids, corrosive, n.o.s.

Air Transport IATA:

UN/ID Number:	2924	Packing Group:	II
Special provisions:	A3		
Cargo Only			
Packing Instructions:	363	Maximum Qty/Pack:	5 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	Y340	Maximum Qty/Pack:	1 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	352	Maximum Qty/Pack:	0.5 L

Shipping Name: FLAMMABLE LIQUID, CORROSIVE, N.O.S.
*(CONTAINS TRIMETHYLBOROXINE)

Maritime Transport IMDG:

IMDG Class:	3	IMDG Subrisk:	8
UN Number:	2924	Packing Group:	II
EMS Number:	F-E,S-C	Special provisions:	274
Limited Quantities:	1 L		

Shipping Name: FLAMMABLE LIQUID, CORROSIVE, N.O.S.(contains trimethylboroxine)

Section 15 - REGULATORY INFORMATION

trimethylboroxine (CAS: 823-96-1) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Industrial Hazardous Substances","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","GESAMP/EHS Composite List - GESAMP Hazard Profiles","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances","International Council of Chemical Associations (ICCA) - High Production Volume List","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut - Regulations Concerning the Designation of Controlled Drugs - Volatile substances","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z-1)","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US

ACGIH Threshold Limit Values (TLV)","US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","US Clean Air Act - Hazardous Air Pollutants","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes","US EPA Acute Exposure Guideline Levels (AEGLs) - Interim","US EPA High Production Volume Program Chemical List","US EPCRA Section 313 Chemical List","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NFPA 30A Typical Flammable and Combustible Liquids Found at Motor Fuel Dispensing Facilities","US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards","US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Regulations for ingredients

methanol (CAS: 67-56-1) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Industrial Hazardous Substances","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","GESAMP/EHS Composite List - GESAMP Hazard Profiles","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances","International Council of Chemical Associations (ICCA) - High Production Volume List","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut - Regulations Concerning the Designation of Controlled Drugs - Volatile substances","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z-1)","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","US Clean Air Act - Hazardous Air Pollutants","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes","US EPA Acute Exposure Guideline Levels (AEGLs) - Interim","US EPA High Production Volume Program Chemical List","US EPCRA Section 313 Chemical List","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NFPA 30A Typical Flammable and Combustible Liquids

Found at Motor Fuel Dispensing Facilities","US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards","US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

boron oxide (CAS: 1303-86-2) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.1","US - Alaska Limits for Air Contaminants","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US DOE Temporary Emergency Exposure Limits (TEELs)","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Inhalation may produce health damage*.
■ Cumulative effects may result following exposure*.
■ Vapours potentially cause drowsiness and dizziness*.
* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.