

Tetrahydrofuran

SDS Preparation Date (mm/dd/yyyy): 12/08/2015

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# SAFETY DATA SHEET

# SECTION 1. IDENTIFICATION

Product identifier used on the label

: Tetrahydrofuran

Product Code(s) : None assigned.

Recommended use of the chemical and restrictions on use

Industrial solvent.

Use pattern: Professional use only Recommended restrictions: None known.

Chemical family : Pure substance

Name, address, and telephone number Name, address, and telephone number of

of the supplier: the manufacturer:

Comet Chemical Company Ltd. Refer to supplier

3463 Thomas Street

Innisfill, ON, Canada

L9S 3W4

Supplier's Telephone # : 705-436-5580

24 Hr. Emergency Tel # : TERRRAPURE ENVIRONMENTAL : 800-567-7455

# SECTION 2. HAZARDS IDENTIFICATION

#### Classification of the chemical

Clear, colorless liquid. Ether like odour.

Most important hazards: This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Hazard classification:

Flammable Liquids - Category 2 Acute toxicity, oral - Category 4

Serious eye damage/eye irritation - Category 2A

Specific Target Organ Toxicity, Single Exposure -Category 3 (respiratory) Specific Target Organ Toxicity, Single Exposure - Category 3 narcotic effects

#### Label elements

Hazard pictogram(s)





Signal Word

## DANGER!

### Hazard statement(s)

Highly flammable liquid and vapor.

Harmful if swallowed.

Causes serious eye irritation.

May cause respiratory irritation.

May cause drowsiness or dizziness.



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### Precautionary statement(s)

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Keep container tightly closed.

Ground/Bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Avoid breathing vapour or mist.

Wear protective gloves and eye/face protection.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

If eye irritation persists: get medical advice/attention.

If inhaled: Remove person to fresh air and keep comfortable for breathing.

Call a POISON CENTER or doctor/physician if you feel unwell.

If swallowed: Call a poison center/doctor if you feel unwell.

Rinse mouth.

Do NOT induce vomiting.

In case of fire: Use water fog, dry chemical, CO2 or 'alcohol' foam for extinction.

Store locked up.

Store in a well-ventilated place. Keep cool.

Keep container tightly closed.

Dispose of contents/container in accordance with local regulation.

# Other hazards

Other hazards May be sensitive to static discharge. Take measures to prevent the build up of electrostatic charge.

Other hazards which do not result in classification:

Burning produces obnoxious and toxic fumes. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. May be an aspiration hazard. Aspiration into the lungs during swallowing or subsequent vomiting may cause chemical pneumonitis, which can be fatal.

# SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

## Pure substance

Chemical name	Common name and synonyms	CAS#	<u>Concentration</u>
Tetrahydrofuran	Butylene oxide THF	109-99-9	100.00

# SECTION 4. FIRST-AID MEASURES

# Description of first aid measures

Ingestion

: Rinse mouth. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention if symptoms persist. If vomiting occurs spontaneously, keep victim's head lowered (forward) to reduce the risk of aspiration.

Inhalation

If inhaled: Remove person to fresh air and keep comfortable for breathing. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen by qualified medical personnel only. Call a POISON CENTRE or doctor/physician if you feel

unwell.



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Skin contact

 Immediately flush with plenty of water, while removing contaminated clothing.Immediately call a POISON CENTER or doctor/physician. Wash contaminated

clothing before reuse.

Eye contact

For eye contact, flush with running water for at least 15 minutes. If eye irritation persists: get medical advice/attention.

# Most important symptoms and effects, both acute and delayed

: May cause respiratory irritation. Symptoms may include sore throat, running nose and shortness of breath. Causes serious eye irritation. Symptoms may include redness, pain, tearing and conjunctivitis. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. May cause nausea, vomiting, headache and other central nervous system effects. Aspiration hazard. Aspiration into the lungs during swallowing or subsequent vomiting may cause chemical pneumonitis, which can be fatal. May cause skin irritation. Symptoms may include redness, itching and swelling.

### Indication of any immediate medical attention and special treatment needed

: This product is a CNS depressant. Treat symptomatically.

### SECTION 5. FIRE-FIGHTING MEASURES

#### Extinguishing media

Suitable extinguishing media

: Carbon dioxide (CO2); Dry chemical; Alcohol resistant foam; Water fog. .

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.

### Special hazards arising from the substance or mixture / Conditions of flammability

: Highly flammable liquid and vapor. . Vapours may ignite explosively. Vapours are heavier than air and may spread along floors. May form explosive peroxides. Static discharge, impact, friction, and heat may ignite exposed chemical material. Empty containers may contain hazardous residues.

# Flammability classification (OSHA 29 CFR 1910.106)

: Flammable Liquids - Category 2

### **Hazardous combustion products**

Carbon dioxide and carbon monoxide. Incomplete combustion may emit component hydrocarbons.

#### Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

 Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode.

## Special fire-fighting procedures

Do not breathe fumes or vapours.Move containers from fire area if safe to do so.Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses.Dike for water control.

#### SECTION 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions, protective equipment and emergency procedures

: All persons dealing with the clean-up should wear the appropriate chemically protective equipment. Keep people away from and upwind of spill/leak. Restrict access to area until completion of clean-up. Refer to protective measures listed in sections 7 and 8.

### **Environmental precautions**

Do not allow material to contaminate ground water system. If necessary, dike well ahead of the spill to prevent runoff into drains, sewers, or any natural waterway or drinking supply.

#### Methods and material for containment and cleaning up



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: Ventilate the area. Remove all sources of ignition. Prevent further leakage or spillage if safe to do so. Use only non-sparking tools and equipment in the clean-up process. Avoid breathing mist or vapours. Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand), then place absorbent material into a container for later disposal (see Section 13).Contact the proper local authorities. Refer to Section 13 for disposal of contaminated material.

#### Special spill response procedures

In case of transportation accident, contact TERRAPURE ENVIRONMENTAL at 1-800-567-7455.

EPA/CERCLA Reportable quantity (RQ): Tetrahydrofuran (1000 lbs / 454 kg)

### SECTION 7. HANDLING AND STORAGE

#### Precautions for safe handling

: Wear protective gloves and eye/face protection. Use only in well-ventilated areas. Avoid breathing vapour or mist. Avoid contact with skin, eyes and clothing. Keep container tightly closed. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Keep away from flames and hot surfaces. - No smoking. Use only non-sparking tools. Take precautionary measures against static discharges.

Ground all equipment during handling.

Conditions for safe storage

: Keep container tightly closed. Store in cool/well-ventilated place. Store locked up. Keep cool. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking. Empty containers may contain hazardous residues.

Incompatible materials : Strong oxidizers (e.g. Chlorine, Peroxides, etc.).; Caustic alkalies ;Bromine.

# SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:				
Chemical Name	ACGI	H TLV	OSHA	PEL
	<u>TWA</u>	<u>STEL</u>	PEL	STEL
Tetrahydrofuran	50 ppm	100 ppm	200 ppm ; 590 mg/m³	N/Av

## **Exposure controls**

### Ventilation and engineering measures

: Use only in well-ventilated areas. Apply technical measures to comply with the occupational exposure limits. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. Use explosion-proof equipment. In case of insufficient ventilation wear suitable respiratory equipment.

Respiratory protection

: If airbourne concentrations are above the permissible exposure limit or are not known, use NIOSH-approved respirators. Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134) or CSA Z94.4-02. Advice should be sought from respiratory protection specialists.

Skin protection

 Wear protective gloves/clothing. Where extensive exposure to product is possible, use resistant coveralls, apron and boots to prevent contact. The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye / face protection

: Wear tight-fitting goggles or face shield.

Other protective equipment

Ensure that eyewash stations and safety showers are close to the workstation location.

Other equipment may be required depending on workplace standards.

General hygiene considerations



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: Avoid breathing mist or vapor. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Remove and wash contaminated clothing before re-use. Do not take contaminated clothing home. Handle in accordance with good industrial hygiene and safety practice.

# SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Clear colourless liquid.

Odour : Ether like odour.

Odour threshold : ~3.5 ppm
pH : None.

Melting/Freezing point : -108°C (-162.4°F)

Initial boiling point and boiling range

66°C (1508°F)

Flash point : -17°C (1.4°F)
Flashpoint (Method) : Cleveland closed cup

Evaporation rate (BuAe = 1) : No data available.

Flammability (solid, gas) : Not applicable.

Lower flammable limit (% by vol.)

1.8%

Upper flammable limit (% by vol.)

: 11.8%

Oxidizing properties : None known.

Explosive properties : Not explosive

Vapour pressure : 132 mmHg

Vapour density : 2.5

Relative density / Specific gravity

: 0.89

Solubility in water : Soluble(300 g/L)

Other solubility(ies) : Soluble in most organic solvents.

Partition coefficient: n-octanol/water or Coefficient of water/oil distribution

: 0.46

Auto-ignition temperature : 321°C / 609.8°F

**Decomposition temperature**: No information available.

Viscosity : Not available.

Volatiles (% by weight) : No information available.

Volatile organic Compounds (VOC's)

: No information available.

Absolute pressure of container

Not applicable.

Flame projection length : Not applicable.

Other physical/chemical comments

: None known or reported by the manufacturer.

## SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not normally reactive. May form explosive peroxides during prolonged exposure to air

and heat.

Chemical stability : Stable under normal conditions. .

Possibility of hazardous reactions

Hazardous polymerization does not occur.



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Conditions to avoid : Open flames, sparks, high heat, direct sunlight, and close proximity to incompatible

substances. Do not use in areas without adequate ventilation. Depletion of inhibitor.

Incompatible materials : Strong oxidizers (e.g. Chlorine, Peroxides, etc.).; Caustic alkalies ;Bromine.

Hazardous decomposition products

: See Section 5 (Fire Fighting Measures).

### SECTION 11. TOXICOLOGICAL INFORMATION

# Information on likely routes of exposure:

Routes of entry inhalation : YES

Routes of entry skin & eye : YES

Routes of entry Ingestion : YES

Routes of exposure skin absorption

: YES

#### **Potential Health Effects:**

#### Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation

May cause respiratory tract irritation. Coughing, difficulty breathing, and tightness in chest. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.

Sign and symptoms ingestion

: Harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Aspiration hazard. Aspiration into the lungs during swallowing or subsequent vomiting may cause chemical pneumonitis, which can be fatal.

Sign and symptoms skin

Causes skin irritation. Symptoms may include redness, itching and swelling.

Sign and symptoms eyes

Causes serious eye damage. Symptoms may include redness, pain, tearing and

conjunctivitis.

**Potential Chronic Health Effects** 

: Frequent or prolonged contact may dry the skin, leading to discomfort and dermatitis.

Mutagenicity

: Not expected to be mutagenic in humans.

Carcinogenicity

: No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.

Reproductive effects & Teratogenicity

: Not expected to cause reproductive effects.

Sensitization to material

: Not expected to be a skin or respiratory sensitizer.

Specific target organ effects

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products

Regulations) (WHMIS 2015). Classification:

Specific Target Organ Toxicity, Single Exposure - Category 3 narcotic effects Specific Target Organ Toxicity, Single Exposure -Category 3 (respiratory)

May cause respiratory irritation. May cause drowsiness or dizziness.

Not classified as specific target organ toxicity-repeated exposure.

Medical conditions aggravated by overexposure

Pre-existing skin, eye and respiratory disorders.

Synergistic materials : No information available.

**Toxicological data** : See below for toxicological data on the substance.



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	LCso(4hr)	LD50		
Chemical name	<u>inh, rat</u>	(Oral, rat) (Rabbit, derm		
Tetrahydrofuran	53.67 mg/L	19002900 mg/kg	>2000 mg/kg	

# Other important toxicological hazards

: None reported by the manufacturer.

# SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity** 

Do not allow material to contaminate ground water system. See the following tables for the substance's ecotoxicity data.

# Ecotoxicity data:

In averallia neta	040 N	Toxicity to Fish				
<u>Ingredients</u>	CAS No	LC50 / 96h	NOEC / 21 day	M Factor		
Tetrahydrofuran	109-99-9	2160mg/L (Fathead minnow)	N/Av	none		

<u>Ingredients</u>	CAS No	Toxicity to Daphnia				
			NOEC / 21 day	M Factor		
Tetrahydrofuran	109-99-9	3485ppm Water flea	N/Av	none		

<u>Ingredients</u>	CAS No	Toxicity to Algae					Toxicity to Algae		
		EC50 / 96h or 72h	NOEC / 96h or 72h	M Factor					
Tetrahydrofuran	109-99-9	N/Av	N/Av	none					

Persistence and degradability

: Readily biodegradable

**Bioaccumulation potential** : No information available.

Components	Partition coefficent n-octanol/ater (log Kow)	Bioconcentration factor (BCF)
Tetrahydrofuran (CAS 109-99-9)	.46	3

Mobility in soil : The product itself has not been tested.

Other Adverse Environmental effects

: None known.

# SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal : Handle in accordance with good industrial hygiene and safety practice. Refer to

protective measures listed in sections 7 and 8.

Methods of Disposal : Dispose in accordance with all applicable federal, state, provincial and local

regulations.

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**RCRA** 

: If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

#### SECTION 14. TRANSPORTATION INFORMATION Transport Regulatory Packing hazard Label **UN Number** UN proper shipping name Information Group class(es) TDG UN2056 **TETRAHYDROFURAN** 3 Ш TDG Must be a consumer-type product, in Limited Quantity size, no larger than 1 L per can. Package weight must not Additional exceed 30 kg gross. information TETRAHYDROFURAN 3 49CFR/DOT UN2056 Ш 49CFR/DOT May be shipped as a limited quantity. See 49 CFR 173.150. RQ = (1000 lbs / 454 kg) Additional information ICAO/IATA UN2056 Tetrahydrofuran 3 Ш ICAO/IATA Refer to ICAO/IATA Packing Instruction Additional information UN2056 TETRAHYDROFURAN **IMDG** 3 Ш **IMDG** May be shipped as a Limited Quantity. Consult the IMDG regulations for details. Additional information

Special precautions for user

: Appropriate advice on safety must accompany the package. Keep away from heat,

sparks and open flame. - No smoking.

**Environmental hazards** 

See ECOLOGICAL INFORMATION, Section 12.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: This information is not available.

SECTION 15 - REGULATORY INFORMATION

### **US Federal Information:**

Components listed below are present on the following U.S. Federal chemical lists:



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# **SAFETY DATA SHEET**

		TSCA	CERCLA Reportable	SARA TITLE III: Sec. 302, Extremely	SARA TITLE III: Se 372, Specific To		
<u>Ingredients</u>	CAS#	Inventory	Quantity(RQ) (40 CFR 117.302):	Hazardous Substance, 40 CFR 355:	Toxic Chemical	de minimus Concentration	
Tetrahydrofuran	109-99-9	Yes	1000 lb/ 454 kg	N/Av	No	N/Ap	

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Fire Hazard; Immediate (Acute) health hazardUnder SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

### **US State Right to Know Laws:**

The following chemicals are specifically listed by individual States:

Ingredients CAS #	CAS#	Californi	a Proposition 65	State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
Tetrahydrofuran	109-99-9	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes

### **Canadian Information:**

Canadian Environmental Protection Act (CEPA): All ingredients are present on the DSL.

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.

### International Information:

Components listed below are present on the following International Inventory list:

<u>Ingredients</u>	CAS#	European EINECs	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	NewZealand IOC
Tetrahydrofuran	109-99-9	203-726-8	Present	Present	(5)-53; (5)-3335	KE-33454	Present	HSR001224

# SECTION 16. OTHER INFORMATION

Legend

: ACGIH: American Conference of Governmental Industrial Hygienists

AICS: Australian Inventory of Chemical Substances

ATE: Acute Toxicity Estimate

CA: California

CAS: Chemical Abstract Services

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

of 1980

CFR: Code of Federal Regulations CSA: Canadian Standards Association DOT: Department of Transportation ECHA: European Chemicals Agency

ECOTOX: U.S. EPA Ecotoxicology Database

EINECS: European Inventory of Existing Commercial chemical Substances

ENCS: Existing and New Chemical Substances EPA: Environmental Protection Agency HSDB: Hazardous Substances Data Bank

IARC: International Agency for Research on Cancer



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IBC: Intermediate Bulk Container

IECSC: Inventory of Existing Chemical Substances IMDG: International Maritime Dangerous Goods

IOC: Inventory of Chemicals

IUCLID: International Uniform Chemical Information Database

KECI: Korean Existing Chemicals Inventory KECL: Korean Existing Chemicals List

LC: Lethal Concentration

LD: Lethal Dose MA: Massachusetts MN: Minnesota N/Ap: Not Applicable N/Av: Not Available

NIOSH: National Institute of Occupational Safety and Health

NJ: New Jersey

NOEC: No observable effect concentration

NTP: National Toxicology Program

OECD: Organisation for Economic Co-operation and Development

OSHA: Occupational Safety and Health Administration

PA: Pennsylvania

PEL: Permissible exposure limit

PICCS: Philippine Inventory of Chemicals and Chemical Substances

RCRA: Resource Conservation and Recovery Act

RI: Rhode Island

RTECS: Registry of Toxic Effects of Chemical Substances SARA: Superfund Amendments and Reauthorization Act SDS: Safety Data Sheet / Material Safety Data Sheet

STEL: Short Term Exposure Limit

TDG: Canadian Transportation of Dangerous Goods Act & Regulations

TLV: Threshold Limit Values TSCA: Toxic Substance Control Act TWA: Time Weighted Average

WHMIS: Workplace Hazardous Materials Identification System

: 1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents &

2. International Agency for Research on Cancer Monographs, searched 2015.

3. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2015

(Chempendium, HSDB and RTECs).

Biological Exposure Indices for 2015.

4. Material Safety Data Sheets from manufacturer.

5. US EPA Title III List of Lists 2015 Version

6. California Proposition 65 List, - 2015

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Other special considerations for handling

: Provide adequate information, instruction and training for operators.



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# Prepared for:

Comet Chemical Company Ltd. 3463 Thomas Street Innisfill, ON L9S 3W4 Information (M-F 8:00-5:00): 705-436-5580 www.cometchemical.com



## Prepared by:

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