COMET CHEMICAL COMPANY LTD.

Comet Chemical Company Ltd.
3463 Thomas Street
Innisfill, ON, Canada, L9S 3W4
Telephone: (705) 436 5580

SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product identifier used on the label
: **Tetrahydrofuran**

Other means of identification : 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 of the supplier:

Comet Chemical Company Ltd.
3463 Thomas Street
Innisfill,ON, Canada L9S 3W4
Supplier's Telephone # : 705-436-5580

Name, address, and telephone number of the manufacturer:
Refer to supplier

24 Hr. Emergency Tel # : GFL Environmental - 1-888-772-2543

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Clear, colorless liquid. Ether like odour.

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
Eye Irritant - Category 2A
Carcinogenicity- Category 2
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.
Suspected of causing cancer.
May cause respiratory irritation.
May cause drowsiness or dizziness.

SAFETY DATA SHEET

Precautionary statement(s)

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No Smoking
Keep container tightly closed.
Ground and bond container and receiving equipment.
Use explosion-proof electrical and ventilating equipment.
Use non-sparking tools.
Take action to prevent static discharges.
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/clothing and eye/face protection.

IF exposed or concerned: Get medical advice/attention.
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 to extinguish.

Store locked up.
Store in a well-ventilated place. Keep cool.

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 #	Concentration (% by weight)
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.

SAFETY DATA SHEET

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.

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 must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. A full-body encapsulating chemical protective suit with positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

Special fire-fighting procedures

: 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

SAFETY DATA SHEET

: 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

: 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 Canada: For 24-hour emergency assistance, call: 1-613-996-6666 (CANUTEC). 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	ACGIH TLV		OSHA PEL	
	TWA	STEL	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.

SAFETY DATA SHEET

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	:	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

Physical State	:	Liquid
Colour	:	Clear, colorless.
Odour	:	Ether like odour.
Odour threshold	:	~3.5 ppm
pH	:	None.
Melting Point/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	:	Not applicable.
Lower explosion or flammability limit (% by vol.)	:	1.8%
Upper explosion or flammability limit (% by vol.)	:	11.8%
Oxidizing properties	:	None known.
Explosive properties	:	Not explosive
Vapour pressure	:	132 mmHg
Relative 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.
Particle characteristics	:	Not applicable.
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.

SAFETY DATA SHEET

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.

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 : See Section 7 (Handling and Storage) for further details.

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 : Suspected of causing cancer.
Tetrahydrofuran is classified as a confirmed animal carcinogen, with unknown relevance to humans by the ACGIH (Category A3).

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 : May cause respiratory irritation.
May cause drowsiness or dizziness.

Not classified as specific target organ toxicity-repeated exposure.

SAFETY DATA SHEET

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.

Chemical name	LC_{50}(4hr) inh, rat	LD_{50} (Oral, rat)	LD_{50} (Rabbit, dermal)
Tetrahydrofuran	53.67 mg/L	1900 - -2900 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:

Ingredients	CAS #	Toxicity to Fish		
		LC50 / 96h	NOEC / 21 day	M Factor
Tetrahydrofuran	109-99-9	2160mg/L (Fathead minnow)	N/Av	none

Ingredients	CAS #	Toxicity to Daphnia		
		EC50 / 48h	NOEC / 21 day	M Factor
Tetrahydrofuran	109-99-9	3485ppm Water flea	N/Av	none

Ingredients	CAS #	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 coefficient n-octanol/water (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.

SAFETY DATA SHEET

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.

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. TRANSPORT INFORMATION

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

Special precautions for user : Appropriate advice on safety must accompany the package. Keep away from heat, sparks and open flame - No smoking.
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Environmental hazards : See ECOLOGICAL INFORMATION, Section 12.
.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

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

SAFETY DATA SHEET

Ingredients	CAS #	TSCA Inventory	CERCLA Reportable Quantity(RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	
					Toxic Chemical	de Minimis Concentration
Tetrahydrofuran	109-99-9	Yes	1000 lb/ 454 kg	N/Av	No	No

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Physical hazards (Flammable)Health hazards (Acute toxicity ;Specific target organ toxicity, repeated exposure;Carcinogenicity ;Eye irritation). Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds or 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 #	California 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:

Ingredients	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
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

SAFETY DATA SHEET

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
N/Ap: Not Applicable
N/Av: Not Available
NIOSH: National Institute of Occupational Safety and Health
NOEC: No observable effect concentration
NTP: National Toxicology Program
OECD: Organisation for Economic Co-operation and Development
OSHA: Occupational Safety and Health Administration
PEL: Permissible exposure limit
PICCS: Philippine Inventory of Chemicals and Chemical Substances
RCRA: Resource Conservation and Recovery Act
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

References : 1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices
2. ECHA - European Chemical Agency
3. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases
4. Safety Data Sheets from manufacturer.
5. US EPA Title III List of Lists
6. California Proposition 65 List
7. OECD - The Global Portal to Information on Chemical Substances - eChemPortal

Preparation Date (mm/dd/yyyy) : 03/21/2019

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Revision No. : 3

Revision Information : Updated SDS to comply with new 2023 WHMIS format.

Other special considerations for handling : Provide adequate information, instruction and training for operators.

SAFETY DATA SHEET

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	COMET COMET CHEMICAL COMPANY LTD.
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