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Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THECOMPANY/UNDERTAKING

Product Identifier

Perihalan Produk: Ethylene oxide solution 2.5-3.3M in Tetrahydrofuran
Product Description: Ethylene oxide solution 2.5-3.3M in Tetrahydrofuran

Cat No. : R36117

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

Company Thermo Fisher Scientific Fisher Scientific (M) Sdn Bhd

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Selangor Darul Ehsan, Malaysia. Main line: +60 3-5525 7888

Supplier

E-mail address Enquiry.my@thermofisher.com

Emergency Telephone Number Tel: +03-5525 7888

CHEMTREC Malaysia 1-800-815-308 (Malay)

CHEMTREC Malaysia (Kuala Lumpur) +(60)-327884561 (Malay)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture

Flammable liquids	Category 2 (H225)
Acute oral toxicity	Category 4 (H302)
Acute Inhalation Toxicity - Vapors	Category 3 (H331)
Skin Corrosion/Irritation	Category 1 (H314)
Serious Eye Damage/Eye Irritation	Category 1 (H318)
Germ Cell Mutagenicity	Category 1B (H340)
Carcinogenicity	Category 1B (H350)
Reproductive Toxicity	Category 1B (H360Fd)
Specific target organ toxicity - (single exposure)	Category 3 (H335) (H336)
Specific target organ toxicity - (repeated exposure)	Category 1 (H372)

Label Elements



Signal Word

Danger

Hazard Statements

- H225 Highly flammable liquid and vapor
- H302 Harmful if swallowed
- H331 Toxic if inhaled
- H314 Causes severe skin burns and eye damage
- H335 May cause respiratory irritation
- H336 May cause drowsiness or dizziness
- H340 May cause genetic defects
- H350 May cause cancer
- H360Fd May damage fertility. Suspected of damaging the unborn child
- H372 Causes damage to organs through prolonged or repeated exposure

Precautionary Statements

Prevention

- P201 Obtain special instructions before use
- P202 Do not handle until all safety precautions have been read and understood
- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
- P240 Ground and bond container and receiving equipment
- P242 Use non-sparking tools
- P243 Take action to prevent static discharges
- P264 Wash face, hands and any exposed skin thoroughly after handling
- P270 Do not eat, drink or smoke when using this product
- P271 Use only outdoors or in a well-ventilated area
- P280 Wear protective gloves/protective clothing/eye protection/face protection

Response

- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
- P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- P310 Immediately call a POISON CENTER or doctor
- P330 Rinse mouth
- P331 Do NOT induce vomiting
- P363 Wash contaminated clothing before reuse
- P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish

Storage

- P403 + P233 Store in a well-ventilated place. Keep container tightly closed
- P405 Store locked up

Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

Other Hazards

EUH019 - May form explosive peroxides

This product does not contain any known or suspected endocrine disruptors

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No	Weight %
Tetrahydrofuran	109-99-9	85-89
Ethylene oxide	75-21-8	11-15

SECTION 4: FIRST AID MEASURES

Description of first aid measures

General Advice

Show this safety data sheet to the doctor in attendance. Immediate medical attention is

required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In

the case of contact with eyes, rinse immediately with plenty of water and seek medical

advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical

attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Inhalation If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim

ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove to fresh

air. Immediate medical attention is required.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to

protect themselves and prevent spread of contamination.

Most important symptoms and effects, both acute and delayed

Causes burns by all exposure routes. Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and

vomiting. Product is a corrosive material. Use of gastric lavage or emesis is

contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of

perforation.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing media

Suitable Extinguishing Media

Water mist may be used to cool closed containers. CO₂, dry chemical, dry sand, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons

No information available.

Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products

Carbon oxides.

Advice for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental precautions

Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods and Material for Containment and Cleaning Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

Reference to Other Sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance. If peroxide formation is suspected, do not open or move container. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Conditions for Safe Storage, Including any Incompatibilities

Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. Keep away from heat, sparks and flame. Corrosives area. Keep containers tightly closed in a dry, cool and well-ventilated place.

Specific End Uses

Use in laboratories.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

<u>John of Faramotoro</u>			
Component	Malaysia	ACGIH TLV	OSHA PEL
Tetrahydrofuran		TWA: 50 ppm	(Vacated) TWA: 200 ppm
		STEL: 100 ppm	(Vacated) TWA: 590 mg/m ³
		Skin	(Vacated) STEL: 250 ppm
			(Vacated) STEL: 735 mg/m ³
			TWA: 200 ppm
			TWA: 590 mg/m ³
Ethylene oxide		TWA: 1 ppm	TWA: 1 ppm
·			STEL: 5 ppm

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Component	European Union	The United Kingdom	Germany
Tetrahydrofuran	TWA: 50 ppm (8h)	STEL: 100 ppm 15 min	TWA: 50 ppm (8 Stunden). AGW -
	TWA: 150 mg/m ³ (8h)	STEL: 300 mg/m ³ 15 min	exposure factor 2
	STEL: 100 ppm (15min)	TWA: 50 ppm 8 hr	TWA: 150 mg/m ³ (8 Stunden). AGW
	STEL: 300 mg/m ³ (15min)	TWA: 150 mg/m ³ 8 hr	- exposure factor 2
	Skin	Skin	TWA: 20 ppm (8 Stunden). MAK
			TWA: 60 mg/m³ (8 Stunden). MAK
			Höhepunkt: 40 ppm
			Höhepunkt: 120 mg/m ³
			Haut
Ethylene oxide	TWA: 1.8 mg/m ³ (8h)	STEL: 3 ppm 15 min	Haut
	TWA: 1 ppm (8h)	STEL: 5.4 mg/m ³ 15 min	
	Skin	TWA: 1 ppm 8 hr	
		TWA: 1.8 mg/m ³ 8 hr	
		Carc.	
		Skin	

Exposure Controls

Engineering Measures

Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles
Hand Protection Protective gloves
Skin and body protection Long sleeved clothing

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use

appropriate certified respirators

Recommended Filter type: Particulates filter conforming to EN 143

To protect the wearer, respiratory protective equipment must be the correct fit and be used

and maintained properly

When RPE is used a face piece Fit Test should be conducted

<u>Hygiene Measures</u> Handle in accordance with good industrial hygiene and safety practice

Environmental exposure controls No information available

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance

Physical State Liquid

Odor No information available

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Odor Threshold

Hq

No data available Not applicable

No data available **Melting Point/Range Softening Point** No data available

Boiling Point/Range Flash Point

No information available No information available

Method - No information available

No data available **Evaporation Rate** Flammability (solid,gas) Not applicable No data available

Explosion Limits

Liquid

No data available **Vapor Pressure Vapor Density** No data available

Specific Gravity / Density **Bulk Density**

No data available Not applicable

No information available

Water Solubility Solubility in other solvents

No information available

Liquid

(Air = 1.0)

Partition Coefficient (n-octanol/water)

log Pow Component Tetrahydrofuran 0.45 Ethylene oxide -0.3

Autoignition Temperature Decomposition Temperature

Viscosity

Explosive Properties Oxidizing Properties

No data available No data available No data available

No information available

Vapors may form explosive mixtures with air

SECTION 10: STABILITY AND REACTIVITY

Reactivity

None known, based on information available.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

Hazardous Polymerization Hazardous Reactions

No information available. None under normal processing.

Conditions to Avoid

Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials

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None known.

Hazardous Decomposition Products

Carbon oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Product Information

(a) acute toxicity;

Oral Category 4

Dermal Based on available data, the classification criteria are not met

Inhalation Category 3

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrahydrofuran	1650 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	180 mg/L (Rat)1 h 53.9 mg/L (Rat)4 h
Ethylene oxide	LD50 = 72 mg/kg (Rat)	-	LC50 = 800 ppm (Rat) 4 h

Component	ECHA (RAC) ATE (Oral)	ECHA (RAC) ATE (Dermal)	ECHA (RAC) ATE (Inhalation)
Ethylene oxide	ATE = 100 mg/kg bw	-	ATE = 700 ppm (gas)

ECHA (RAC) - Committee for Risk Assessment - European CHemicals Agency ATE - Acute Toxiciy Estimate; mg/kg bw - milligrams per kilogram of body weight

(b) skin corrosion/irritation; Category 1

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;

Respiratory No data available Skin No data available

Component	Test method	Test species	Study result
Tetrahydrofuran	Local Lymph Node Assay	mouse	non-sensitising
109-99-9 (85-89)	OECD Test Guideline 429		_

(e) germ cell mutagenicity; Category 1B

Component	Test method	Test species	Study result
Tetrahydrofuran	OECD Test Guideline 476	in vivo	negative
109-99-9 (85-89)	Gene cell mutation	Mammalian	_
	OECD Test Guideline 473		
	Chromosomal aberration assay	in vitro	negative
		Mammalian	_

(f) carcinogenicity; Category 2

The table below indicates whether each agency has listed any ingredient as a carcinogen

Limited evidence of a carcinogenic effect

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Component	EU	UK	Germany	IARC
Tetrahydrofuran				Group 2B
Ethylene oxide	Carc Cat. 1B		Cat. 2	Group 1

Category 1B (a) reproductive toxicity:

Component	Test method	Test species / Duration	Study result
Tetrahydrofuran	OECD Test Guideline 416	Rat	NOAEL = 3,000 ppm
109-99-9 (85-89)		2 Generation	

(h) STOT-single exposure; Category 3

Respiratory system, Central nervous system (CNS). Results / Target organs

(i) STOT-repeated exposure; Category 1

None known. **Target Organs**

No data available (j) aspiration hazard;

delayed

Symptoms / effects,both acute and Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and

danger of perforation.

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any

known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity effects

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
Tetrahydrofuran	2160 mg/l LC50 = 96 h	EC50 48 h 3485 mg/l		
	Pimephales promelas	EC50: >10000 mg/L/24h		
	Leuciscus idus: LC50:	_		
	2820 mg/L/48h			
Ethylene oxide	LC50: 73 - 96 mg/L,	LC50: 137 - 300 mg/L,		
	96h (Pimephales	48h (Daphnia magna)		
	promelas)			
	·			

No information available Persistence and degradability **Persistence** Persistence is unlikely.

Bioaccumulative potential Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Tetrahydrofuran	0.45	No data available
Ethylene oxide	-0.3	No data available

Mobility in soil No information available.

Endocrine Disruptor Information

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances
Tetrahydrofuran	Group III Chemical	

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Other adverse effects No information available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from Residues/Unused

Products

Waste is classified as hazardous Dispose of in accordance with the European Directives on

waste and hazardous waste Dispose of in accordance with local regulations

Contaminated Packaging Dispose of this container to hazardous or special waste collection point. Empty containers

retain product residue, (liquid and/or vapor), and can be dangerous Keep product and

empty container away from heat and sources of ignition

Other Information Waste codes should be assigned by the user based on the application for which the product

was used Do not flush to sewer Can be landfilled or incinerated, when in compliance with local regulations Do not empty into drains Large amounts will affect pH and harm aquatic

organisms

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

UN-No UN1992 Hazard Class 3 Subsidiary Hazard Class 6.1 Packing Group II

Proper Shipping Name FLAMMABLE LIQUID, TOXIC, N.O.S. THF/Ethylene oxide

Road and Rail Transport

UN-No UN1992 Hazard Class 3 Subsidiary Hazard Class 6.1 Packing Group II

Proper Shipping Name FLAMMABLE LIQUID, TOXIC, N.O.S. THF/Ethylene oxide

<u>IATA</u>

UN-No UN1992
Hazard Class 3
Subsidiary Hazard Class 6.1
Packing Group II

Proper Shipping Name FLAMMABLE LIQUID, TOXIC, N.O.S. THF/Ethylene oxide

Special Precautions for User No special precautions required

SECTION 15: REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories X = listed

Component	EINECS	TSCA	DSL	PICCS	ENCS	ISHL	IECSC	AICS	KECL
Tetrahydrofuran	203-726-8	Х	Х	Х	X	X	Χ	Χ	KE-33454

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200-849-9

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KE-27537

	•			
Component	Seveso III Directive	Seveso III Directive	Rotterdam Convention	Basel Convention
·	(2012/18/EC) - Qualifying	(2012/18/EC) - Qualifying	(PIC)	(Hazardous Waste)

Quantities for Major Quantities for Safety Accident Notification Report Requirements Ethylene oxide 5 tonne 50 tonne

National Regulations

Ethylene oxide

Persistent Organic Pollutant This product does not contain any known or suspected substance **Ozone Depletion Potential** This product does not contain any known or suspected substance

Co	omponent	Persistent	Organic Pollutant	Ozone Depletion Pot		otential	Pesticides	Act 1974
Eth	nylene oxide						>	(

SECTION 16: OTHER INFORMATION

Legend

CAS - Chemical Abstracts Service

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

EINECS/ELINCS - European Inventory of Existing Commercial Chemical DSL/NDSL - Canadian Domestic Substances List/Non-Domestic

Substances/EU List of Notified Chemical Substances

Substances List **ENCS** - Japanese Existing and New Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances **IECSC** - Chinese Inventory of Existing Chemical Substances

AICS - Australian Inventory of Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit

TWA - Time Weighted Average

ACGIH - American Conference of Governmental Industrial Hygienists

IARC - International Agency for Research on Cancer

RPE - Respiratory Protective Equipment

LD50 - Lethal Dose 50%

LC50 - Lethal Concentration 50% POW - Partition coefficient Octanol:Water EC50 - Effective Concentration 50%

ADR - European Agreement Concerning the International Carriage of

Dangerous Goods by Road

IMO/IMDG - International Maritime Organization/International Maritime

Transport Association

Dangerous Goods Code

MARPOL - International Convention for the Prevention of Pollution from Ships

ICAO/IATA - International Civil Aviation Organization/International Air

OECD - Organisation for Economic Co-operation and Development

BCF - Bioconcentration factor

ATE - Acute Toxicity Estimate VOC - (Volatile Organic Compound)

Key literature references and sources for data

https://echa.europa.eu/information-on-chemicals

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Prepared By Health, Safety and Environmental Department

Revision Date 01-Apr-2025

Revision Summary SDS sections updated.

In accordance with local and national regulations: Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage,

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transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet