Ethyl Mercaptan

Version 2.6 Revision Date 2018-04-02

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product information

Product Name : Ethyl Mercaptan
Material : 1118972, 1111485, 1024772, 1086422, 1086423, 1021429, 1021431, 1021426, 1021430, 1021425, 1021424, 1024773, 1024771, 1024770, 1021427, 1026776, 1021428, 1104918

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
Ethyl Mercaptan	75-08-1 200-837-3 016-022-00-9	Chevron Phillips Chemicals International NV 01-2119491286-30-0000

Relevant Identified Uses Supported : Manufacture
Distribution
Use as an intermediate
Formulation
Injection as odorant in fuels – industrial

Company : Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Local : Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vincilaan 19
1831 Diegem
Belgium

SDS Requests: (800) 852-5530
Technical Information: (832) 813-4862
Responsible Party: Product Safety Group
Email:sds@cpchem.com

Emergency telephone:

Health:

866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431

Responsible Department	:	Product Safety and Toxicology Group
E-mail address	:	SDS@CPChem.com
Website	:	www.CPChem.com

SECTION 2: Hazards identification

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable liquids, Category 1	H224: Extremely flammable liquid and vapor.
Acute toxicity, Category 4	H302: Harmful if swallowed.
Acute toxicity, Category 4	H332: Harmful if inhaled.
Skin sensitization, Sub-category 1B	H317: May cause an allergic skin reaction.
Acute aquatic toxicity, Category 1	H400: Very toxic to aquatic life.
Chronic aquatic toxicity, Category 1	H410: Very toxic to aquatic life with long lasting effects.

Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal Word : Danger

Hazard Statements	:	H224 Extremely flammable liquid and vapor.
		H302 Harmful if swallowed.
		H317 May cause an allergic skin reaction.
		H332 Harmful if inhaled.
		H410 Very toxic to aquatic life with long lasting effects.
Precautionary Statements	:	**Prevention:**
		P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
		P233 Keep container tightly closed.
		P240 Ground/bond container and receiving equipment.
		P243 Take precautionary measures against static discharge.
		P273 Avoid release to the environment.

P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:	
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER/doctor if you feel unwell.
Storage:	
P403 + P235	Store in a well-ventilated place. Keep cool.
Disposal:	
P501	Dispose of contents/ container to an approved waste disposal plant.

Hazardous ingredients which must be listed on the label:
- 75-08-1 Ethyl Mercaptan

Additional Labeling:

The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 1 %
The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: 1 %

SECTION 3: Composition/information on ingredients

Synonyms : ETSH
Ethanethiol
Ethyl Mercaptan

Molecular formula : C2H6S

Mixtures

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
Ethyl Mercaptan	75-08-1 200-837-3 016-022-00-9	Flam. Liq. 1; H224 Acute Tox. 4; H302 Acute Tox. 4; H332 Skin Sens. 1B; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	99

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

General advice : Move out of dangerous area. Consult a physician. Show this material safety data sheet to the doctor in attendance.

		Symptoms of poisoning may appear several hours later. Do not leave the victim unattended.
If inhaled	:	Call a physician or poison control center immediately. If unconscious, place in recovery position and seek medical advice.
In case of skin contact	:	If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point	:	-48 °C (-54 °F)
Autoignition temperature	:	295 °C (563 °F)
Suitable extinguishing media	:	Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.
Fire and explosion protection	:	Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate

personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

Environmental precautions : Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

Methods for cleaning up : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7: Handling and storage

Handling

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion : Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

Storage

Requirements for storage areas and containers : Prevent unauthorized access. No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

SK

Zložky	Podstata	Hodnota	Kontrolné parametre	Poznámka
Ethyl Mercaptan	SK OEL	NPEL priemerný	0,5 ppm, 1,3 mg/m3	
	SK OEL	NPEL krátkodobý	1 ppm, 2,6 mg/m3	

SI

Sestavine	Osnova	Vrednost	Parametri nadzora	Pripomba
Ethyl Mercaptan	SI OEL	MV	0,5 ppm, 1,3 mg/m3	

PT

Componentes	Bases	Valor	Parâmetros de controlo	Nota
Ethyl Mercaptan	PT OEL	VLE-MP	0,5 ppm,	irritação do TRS, afeção do SNC,

afeção do SNC afeção do sistema nervoso central
irritação do irritação do trato respiratório superior

TRS

PL

Składniki	Podstawa	Wartość	Parametry dotyczące kontroli	Uwaga
Ethyl Mercaptan	PL NDS	NDS	1 mg/m3	
	PL NDS	NDSch	2 mg/m3	

NO

Komponenter	Grunnlag	Verdi	Kontrollparametrer	Nota
Ethyl Mercaptan	FOR-2011-12-06-1358	TWA	0,5 ppm, 1 mg/m3	

LV

Sastāvdaļas	Bāze	Vērtība	Pārvaldības parametri	Piezīme
Ethyl Mercaptan	LV OEL	AER 8 st	1 mg/m3	

LT

Komponentai	Pagrindas, bazė	Vertė	Kontrolės parametrai	Pastaba
Ethyl Mercaptan	LT OEL	IPRD	1 mg/m3	O,

O patekimas per nepažeistą odą

IE

Ingredients	Basis	Value	Control parameters	Note
Ethyl Mercaptan	IE OEL	OELV - 8 hrs (TWA)	0,5 ppm, 1 mg/m3	
	IE OEL	OELV - 15 min (STEL)	2 ppm, 3 mg/m3	

HU

Komponensek	Bázis	Érték	Ellenőrzési paraméterek	Megjegyzés
Ethyl Mercaptan	HU OEL	AK-érték	1 mg/m3	i,
	HU OEL	CK-érték	1 mg/m3	i,

i Ingerlő anyag (izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat)

GR

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
Ethyl Mercaptan	GR OEL	TWA	10 ppm, 25 mg/m3	
	GR OEL	STEL	10 ppm, 25 mg/m3	

GB

Ingredients	Basis	Value	Control parameters	Note
Ethyl Mercaptan	GB EH40	TWA	0,5 ppm, 1,3 mg/m3	
	GB EH40	STEL	2 ppm, 5,2 mg/m3	

FR

Composants	Base	Valeur	Paramètres de contrôle	Note
Ethyl Mercaptan	FR VLE	VME	0,5 ppm, 1 mg/m3	normal,

normal Valeurs limites indicatives

FI

Aineosat	Peruste	Arvo	Valvontaa koskevat muuttujat	Huomautus
Ethyl Mercaptan	FI OEL	HTP-arvot 15 min	0,5 ppm, 1,3 mg/m3	

ES

Componentes	Base	Valor	Parámetros de control	Nota
Ethyl Mercaptan	ES VLA	VLA-ED	0,5 ppm, 1,3 mg/m3	

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
Ethyl Mercaptan	EE OEL	Piirnorm	0,5 ppm, 1 mg/m3	C,

C Kantserogeensed ained

DK

Komponenter	Basis	Værdi	Kontrolparametre	Note
Ethyl Mercaptan	DK OEL	GV	0,5 ppm, 1 mg/m3	

DE

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Ethyl Mercaptan	DE TRGS 900	AGW	0,5 ppm, 1,3 mg/m3	DFG,

DFG Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission)

CH

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung

Ethyl Mercaptan	CH SUVA	MAK-Wert	0,5 ppm, 1,3 mg/m3	
	CH SUVA	KZGW	1 ppm, 2,6 mg/m3	

BE

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
Ethyl Mercaptan	BE OEL	TGG 8 hr	0,5 ppm, 1,3 mg/m3	

AT

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Ethyl Mercaptan	AT OEL	MAK-KZW	0,5 ppm, 1,3 mg/m3	
	AT OEL	MAK-TMW	0,5 ppm, 1,3 mg/m3	

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 14,5 mg/m3

DNEL : End Use: Workers
Routes of exposure: Skin contact
Potential health effects: Chronic effects, Systemic effects
Value: 2,06 mg/kg

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Local effects
Value: 18,6 mg/m3

PNEC : Fresh water
Value: 0,0001 mg/l

PNEC : Marine water
Value: 0,00001 mg/l

PNEC : Fresh water sediment
Value: 0,00049 mg/kg

PNEC : Marine sediment
Value: 0,000049 mg/kg

PNEC : Soil
Value: 0,000039 mg/kg

Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this

material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection : Eye wash bottle with pure water. Tightly fitting safety goggles. Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Flame retardant protective clothing. Workers should wear antistatic footwear.

Hygiene measures : Avoid contact with skin, eyes and clothing. When using do not eat or drink. When using do not smoke. Wash hands before breaks and immediately after handling the product.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Form	:	Liquid
Physical state	:	Liquid
Color	:	Colorless
Odor	:	Repulsive

Safety data

Flash point	:	-48 °C (-54 °F)
Lower explosion limit	:	2,8 %(V)
Upper explosion limit	:	18 %(V)
Oxidizing properties	:	No
Autoignition temperature	:	295 °C (563 °F)
Molecular formula	:	C2H6S
Molecular weight	:	62,14 g/mol
pH	:	Not applicable

Pour point	:	No data available
Boiling point/boiling range	:	35 °C (95 °F)
Vapor pressure	:	16,20 PSI at 37,8 °C (100,0 °F)
Relative density	:	0,84 at 15,6 °C (60,1 °F)
Water solubility	:	Negligible
Partition coefficient: n-octanol/water	:	No data available
Viscosity, kinematic	:	No data available
Relative vapor density	:	2,1 (Air = 1.0)
Evaporation rate	:	1
Percent volatile	:	> 99 %

SECTION 10: Stability and reactivity

Chemical stability	:	This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Conditions to avoid	:	Heat, flames and sparks.
Materials to avoid	:	May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous decomposition products	:	Carbon oxides Sulfur oxides
Other data	:	No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity

Ethyl Mercaptan	:	LD50: 682 mg/kg Species: Rat Sex: male Method: Fixed Dose Method

Acute inhalation toxicity

Ethyl Mercaptan : LC50: 11 mg/l
Exposure time: 4 h
Test atmosphere: vapor
Method: Acute toxicity estimate

Ethyl Mercaptan
Skin irritation : Mild skin irritation

Ethyl Mercaptan
Eye irritation : Mild eye irritation

Sensitization

Ethyl Mercaptan : The product is a skin sensitizer, sub-category 1B.
Information given is based on data obtained from similar substances.

Repeated dose toxicity

Ethyl Mercaptan : Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0, 25, 100, 400 ppm
Exposure time: 13 wks
Number of exposures: 6 hr/d, 5 d/wk
NOEL: 100 ppm
Lowest observable effect level: 400 ppm
Method: OECD Guideline 413
Information given is based on data obtained from similar substances.

Species: Rat, Male and female
Sex: Male and female
Application Route: Oral
Dose: 0, 10, 50, 200 mg/kg
Exposure time: 42-53 days
NOEL: 50 mg/kg
Method: OECD Guideline 422
Information given is based on data obtained from similar substances.

Reproductive toxicity

Ethyl Mercaptan : Species: Rat
Sex: male and female
Application Route: Oral diet
Dose: 0, 10, 50, 200 mg/kg
Exposure time: 42-53 days
Number of exposures: once daily
Method: OECD Guideline 422
NOAEL Parent: 200 mg/kg
NOAEL F1: 50 mg/kg
Information given is based on data obtained from similar substances.

Developmental Toxicity

Ethyl Mercaptan : Species: Rat
Application Route: Inhalation
Dose: 0, 0.037, 0.28, or 0.56 mg/L
Number of exposures: 6 hrs/d
Test period: GD 6-19
Method: OECD Guideline 414
NOAEL Teratogenicity: > 0,56 mg/l
Information given is based on data obtained from similar substances.

Species: Rat
Application Route: Inhalation
Dose: 0, 10, 100, 200 ppm
Number of exposures: 6 hrs/d
Test period: GD 6-19
Method: OECD Guideline 414
NOAEL Teratogenicity: > 200 ppm
NOAEL Maternal: > 200 ppm
Information given is based on data obtained from similar substances.

Aspiration toxicity

Ethyl Mercaptan : May be harmful if swallowed and enters airways.

CMR effects

Ethyl Mercaptan : Carcinogenicity: Not available
Mutagenicity: Not mutagenic in Ames Test.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: Animal testing did not show any effects on fertility.

Ethyl Mercaptan
Further information : Solvents may degrease the skin.

SECTION 12: Ecological information

Toxicity to fish

Ethyl Mercaptan : 2,4 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

Ethyl Mercaptan : EC50: < 0,1 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
static test Method: OECD Test Guideline 202

Toxicity to algae

Ethyl Mercaptan : EC50: 3 mg/l

Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (green algae)
Method: OECD Test Guideline 201

M-Factor

ethanethiol	: M-Factor (Chron. Aquat. Tox.)	10

Elimination information (persistence and degradability)

Bioaccumulation	:	This material is not expected to bioaccumulate.
Biodegradability	:	This material is not expected to be readily biodegradable.

Ecotoxicology Assessment

Acute aquatic toxicity Ethyl Mercaptan	:	Very toxic to aquatic life.
Chronic aquatic toxicity Ethyl Mercaptan	:	Very toxic to aquatic life with long lasting effects.
Results of PBT assessment Ethyl Mercaptan	:	Non-classified PBT substance, Non-classified vPvB substance
Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

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

Product	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN2363, ETHYL MERCAPTAN, 3, I, MARINE POLLUTANT, (ETHYL MERCAPTAN)

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN2363, ETHYL MERCAPTAN, 3, I, (-48 °C), MARINE POLLUTANT, (ETHYL MERCAPTAN)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN2363, ETHYL MERCAPTAN, 3, I

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN2363, ETHYL MERCAPTAN, 3, I, (D/E), ENVIRONMENTALLY HAZARDOUS, (ETHYL MERCAPTAN)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN2363, ETHYL MERCAPTAN, 3, I, ENVIRONMENTALLY HAZARDOUS, (ETHYL MERCAPTAN)

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2363, ETHYL MERCAPTAN, 3, I, ENVIRONMENTALLY HAZARDOUS, (ETHYL MERCAPTAN)

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

SECTION 15: Regulatory information

National legislation

Chemical Safety Assessment

Ingredients	:	ethanethiol	A Chemical Safety Assessment has been carried out for this substance.	200-837-3

Major Accident Hazard Legislation : 96/82/EC Update: 2003
Highly flammable
7b
Quantity 1: 5.000 t
Quantity 2: 50.000 t

: 96/82/EC Update: 2003
Dangerous for the environment
9a
Quantity 1: 100 t
Quantity 2: 200 t

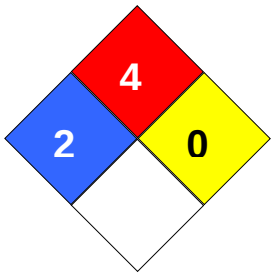
Water contaminating class (Germany) : WGK 3 highly water endangering

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	:	On the inventory, or in compliance with the inventory
Canada DSL	:	On the inventory, or in compliance with the inventory
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	On the inventory, or in compliance with the inventory
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 2
Fire Hazard: 4
Reactivity Hazard: 0



Further information

Legacy SDS Number : 10555

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

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, 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.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health

CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Full text of H-Statements referred to under sections 2 and 3.

H224	Extremely flammable liquid and vapor.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Annex

1. Short title of Exposure Scenario: **Manufacture**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU8, SU9:** Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC1, ERC4:** Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles
Further information	:	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	365
Emission or Release Factor: Water	:	0 %
Emission or Release Factor: Soil	:	0 %
Remarks	:	Emission or Release Factor: Air : < 0.001 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 99,9 %)
Remarks	:	Wastewater emission controls are not applicable as there is no direct release to wastewater.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent	:	2.000 m3/d

Remarks : Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment : External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods : External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation), Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Amount used

Remarks : Not applicable

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC1, ERC4	EUSES		Fresh water		0,0018 µg/L	0,018
			Marine water		0,0001 µg/L	0,015
			Soil		0,0013 µg/kg	0,0379
			Freshwater sediment		0,0039 µg/kg	0,0364
			Marine sediment		0,0003 µg/kg	0,0304
			Air		0,0010 µg/m3	

ERC1: Manufacture of substances

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.

1. Short title of Exposure Scenario: **Distribution**

Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use : **SU3:** Industrial Manufacturing (all)

Process category : **PROC1:** Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a: Transfer of substance or preparation

		(charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7:** Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers, Industrial use of substances in closed systems
Further information	:	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC2, ERC3, ERC4, ERC5, ERC7, ERC6a: Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use of substances in closed systems, Industrial use resulting in manufacture of another substance (use of intermediates)

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	300
Emission or Release Factor: Air	:	0,001 %
Emission or Release Factor: Soil	:	0,001 %
Remarks	:	Emission or Release Factor: Water : < 0.001 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,9 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99,9 %)
Remarks	:	Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent : 2.000 m3/d

Remarks : Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment : External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods : External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b,, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Use as laboratory reagent

Amount used

Remarks : Not applicable

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC1	EUSES		Fresh water		0,0029 µg/L	0,0287
			Marine water		0,0007 µg/L	0,0734
			Soil		0,0058 µg/kg	0,169
			Freshwater sediment		0,0062 µg/kg	0,0579
			Marine sediment		0,0016 µg/kg	0,148
			Air		0,0027 µg/m3	

ERC1: Manufacture of substances

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.

1. Short title of Exposure Scenario: **Use as an intermediate**

Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use : **SU 3, SU8, SU9:** Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of bulk, large

		scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)
Further information	:	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

2.1 Contributing scenario controlling environmental exposure for:ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	300
Emission or Release Factor: Air	:	0,01 %
Emission or Release Factor: Soil	:	0,1 %
Remarks	:	Emission or Release Factor: Water : < 0.001 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,9 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99,9 %)
Remarks	:	Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment : External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods : External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Amount used

Remarks : Not applicable

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC6a	EUSES		Freshwater		0,0039 µg/L	0,0393
			Marine water		0,0013 µg/L	0,132
			Soil		0,0116 µg/kg	0,338
			Freshwater sediment		0,0085 µg/kg	0,0794
			Marine sediment		0,0028 µg/kg	0,266
			Air		0,0055 µg/m3	

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.

1. Short title of Exposure Scenario: **Formulation**

Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use : **SU 3, SU 10:** Industrial uses: Uses of substances as such or in preparations at industrial sites, Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

Process category : **PROC1:** Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where

		opportunity for exposure arises **:** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC2:** Formulation of preparations
Further information	:	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for:ERC2: Formulation of preparations

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	365
Emission or Release Factor: Air	:	0,025 %
Emission or Release Factor: Soil	:	0 %
Remarks	:	Emission or Release Factor: Water : < 0.001 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,9 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99,9 %)
Remarks	:	Soil emission controls are not applicable as there is no direct release to soil.

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods	:	External recovery and recycling of waste should comply with

applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4,, PROC8a, PROC8b,, PROC15, PROC26: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Use as laboratory reagent, Handling of solid inorganic substances at ambient temperature

Amount used

Remarks : Not applicable

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC2	EUSES		Freshwater		0,0028 µg/L	0,0280
			Marine water		0,0007 µg/L	0,0698
			Soil		0,0124 µg/kg	0,360
			Freshwater sediment		0,0060 µg/kg	0,0566
			Marine sediment		0,0015 µg/kg	0,141
			Air		0,0076 µg/m3	

ERC2: Formulation of preparations

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.

1. Short title of Exposure Scenario: **Injection as odorant in fuels – industrial**

Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use : **SU3:** Industrial Manufacturing (all)

Process category : **PROC1:** Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at

non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC15: Use as laboratory reagent
PROC16: Using material as fuel sources, limited exposure to unburned product to be expected

Environmental release category : **ERC7:** Industrial use of substances in closed systems

Further information :

Covers injection as odourant in fuel and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

2.1 Contributing scenario controlling environmental exposure for:ERC7: Industrial use of substances in closed systems

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	365
Emission or Release Factor: Air	:	0,025 %
Emission or Release Factor: Soil	:	0 %
Remarks	:	Emission or Release Factor: Water : < 0.001 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,9 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99,9 %)
Remarks	:	Soil emission controls are not applicable as there is no direct release to soil.

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods	:	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities,

Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Amount used
Remarks : Not applicable

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC7	EUSES		Fresh water		0,0028 µg/L	0,0280
			Marine water		0,0007 µg/L	0,0698
			Soil		0,0124 µg/kg	0,360
			Freshwater sediment		0,0060 µg/kg	0,0566
			Marine sediment		0,0015 µg/kg	0,141
			Air		0,0076 µg/m3	

ERC7: Industrial use of substances in closed systems

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.