2-Mercaptoethanol (BME)

Version 4.3 Revision Date 2020-03-09

According to Regulation (EC) No. 1907/2006, Regulation (EC) No. 2015/830

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

1.1

Product information

Product Name : 2-Mercaptoethanol (BME)
Material : 1122450, 1122449, 1017944, 1068852, 1088828, 1086429, 1104362, 1093708, 1086428, 1021562, 1024822, 1021565, 1024821, 1021564, 1028369, 1033065, 1028386, 1028385, 1033120

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
2-Mercaptoethanol	60-24-2 200-464-6	Chevron Phillips Chemicals International NV 01-2119517582-41-0000

1.2

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

Relevant Identified Uses Supported : Manufacture
Use as an intermediate
Use in polymer production – industrial

1.3

Details of the supplier of the safety data sheet

Company : Chevron Phillips Chemical Company LP
Specialty Chemicals
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

1.4

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

2.1

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

Acute toxicity, Category 3	H301: Toxic if swallowed.
Acute toxicity, Category 3	H331: Toxic if inhaled.
Acute toxicity, Category 2	H310: Fatal in contact with skin.
Skin irritation, Category 2	H315: Causes skin irritation.
Serious eye damage, Category 1	H318: Causes serious eye damage.
Skin sensitization, Category 1	H317: May cause an allergic skin reaction.
Reproductive toxicity, Category 2	H361: Suspected of damaging fertility or the unborn child.
Specific target organ toxicity - repeated exposure, Category 2	H373: May cause damage to organs through prolonged or repeated exposure.
Short-term (acute) aquatic hazard, Category 1	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, Category 2	H411: Toxic to aquatic life with long lasting effects.

2.2

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal Word	:	Danger	
Hazard Statements	:	H301 + H331	Toxic if swallowed or if inhaled.

	H310	Fatal in contact with skin.
	H315	Causes skin irritation.
	H317	May cause an allergic skin reaction.
	H318	Causes serious eye damage.
	H361	Suspected of damaging fertility or the unborn child.
	H373	May cause damage to organs through prolonged or repeated exposure.
	H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements :

Prevention:

P260	Do not breathe dust/fume/gas/mist/vapor/spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P302 + P352 + P310	IF ON SKIN: Wash with plenty of water. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.

Storage:

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

Hazardous ingredients which must be listed on the label:
- 60-24-2 2-Mercaptoethanol

SECTION 3: Composition/information on ingredients

3.1 - 3.2
Substance or Mixture

Synonyms : beta-Mercaptoethanol
BME
Thioglycol
2, Mercaptoethanol
2-Hydroxyethyl Mercaptan
2-Mercaptoethanol Pure

Molecular formula : $HSCH_2CH_2OH$

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
2-Mercaptoethanol	60-24-2 200-464-6	Acute Tox. 3; H301 Acute Tox. 3; H331 Acute Tox. 2; H310	99 - 100

		Skin Irrit. 2; H315 Eye Dam. 1; H318 Skin Sens. 1A; H317 Repr. 2; H361 STOT RE 2; H373 Aquatic Acute 1; H400 Aquatic Chronic 2; H411	

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

SECTION 4: First aid measures

4.1

Description of first-aid measures

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

If inhaled : If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of skin contact : Take victim immediately to hospital. If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Small amounts splashed into eyes can cause irreversible tissue damage and blindness. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. 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 : 68,3°C (154,9°F)
Method: Tag closed cup

Autoignition temperature : 295°C (563°F)
estimated

5.1

Extinguishing media

Suitable extinguishing media : Carbon dioxide (CO2).

Unsuitable extinguishing media : High volume water jet.

5.2

Special hazards arising from the substance or mixture

Specific hazards during fire fighting : Do not allow run-off from fire fighting to enter drains or water courses.

5.3

Advice for firefighters

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

SECTION 6: Accidental release measures

6.1

Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Use personal protective equipment.

6.2

Environmental precautions

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.

6.3

Methods and materials for containment and cleaning up

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). Keep in suitable, closed containers for disposal.

6.4

Reference to other sections

Reference to other sections	:	For personal protection see section 8. For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1

Precautions for safe handling
Handling

Advice on safe handling	:	Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. To avoid spills during handling keep bottle on a metal tray. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or

recurrent respiratory disease should not be employed in any process in which this mixture is being used.

Advice on protection against fire and explosion : Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.

7.2

Conditions for safe storage, including any incompatibilities

Storage

Requirements for storage areas and containers : Prevent unauthorized access. No smoking. Keep in a 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

RU

Компоненты	Основа	Величина	Параметры контроля	Заметка
2-меркаптоэтанол	RU OEL	ПДК разовая	1 mg/m3	2, пары и/или газы

2 2 класс - высокоопасные

LT

Komponentai	Šaltinis	Vertė	Kontrolės parametrai	Pastaba
2-Mercaptoethanol	LT OEL	IPRD	1 mg/m3	

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Long-term systemic effects
Value: 0,17 mg/m3

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Acute systemic effects
Value: 0,17 mg/m3

DNEL : End Use: Workers
Routes of exposure: Dermal
Potential health effects: Long-term systemic effects
Value: 0,05 mg/kg

DNEL : End Use: Workers
Routes of exposure: Dermal
Potential health effects: Acute systemic effects
Value: 0,05 mg/kg

PNEC : Fresh water
Value: 0,006 mg/l

PNEC : Fresh water sediment
Value: 0,024 mg/kg

PNEC : Marine water

Value: 0,001 mg/l

PNEC : Marine sediment
Value: 0,002 mg/kg

PNEC : Sewage treatment plant
Value: 60 mg/l

PNEC : Soil
Value: 0,908 mg/kg

PNEC : Air
No hazard identified

8.2

Exposure controls
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:. Full-Face Supplied-Air Respirator. 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.

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:. Flame retardant protective clothing. Personal protection through wearing a tightly closed chemical protection suit and a self-contained breathing apparatus. Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Footwear protecting against chemicals.

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.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 9: Physical and chemical properties

9.1

Information on basic physical and chemical properties

Appearance

Form	:	Liquid
Physical state	:	Liquid
Color	:	Water white
Odor	:	Repulsive

Safety data

Flash point	:	68,3°C (154,9°F) Method: Tag closed cup
Lower explosion limit	:	2,3 %(V)
Upper explosion limit	:	18 %(V)
Oxidizing properties	:	No
Autoignition temperature	:	295°C (563°F) estimated
Molecular formula	:	HSCH2CH2OH
Molecular weight	:	No data available
pH	:	Not applicable
Pour point	:	No data available
Freezing point		No data available
Boiling point/boiling range	:	155-160°C (311-320°F)
Vapor pressure	:	5,70 MMHG at 37,8°C (100,0°F)
Relative density	:	1,12 at 15,6 °C (60,1 °F)
Density	:	1,12 G/ML
Partition coefficient: n-octanol/water	:	Pow: 0,56
Viscosity, dynamic	:	3,42 cP
Relative vapor density	:	2,69

(Air = 1.0)

Evaporation rate : 1

Percent volatile : > 99 %

SECTION 10: Stability and reactivity

10.1

Reactivity : Stable under recommended storage conditions.

10.2

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

10.3

Possibility of hazardous reactions

Hazardous reactions : Hazardous reactions: Hazardous polymerization does not occur.

Further information: No decomposition if stored and applied as directed.

Hazardous reactions: Vapors may form explosive mixture with air.

10.4

Conditions to avoid : Heat, flames and sparks.

10.5

Materials to avoid : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

10.6

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1

Information on toxicological effects

Acute oral toxicity

2-Mercaptoethanol : LD50: 98 - 168 mg/kg
Species: Rat
Sex: male and female
Method: OECD Test Guideline 401

Acute inhalation toxicity

2-Mercaptoethanol	:	LC50: 625 ppm Exposure time: 4 h Test atmosphere: gas

Acute dermal toxicity

2-Mercaptoethanol	:	LD50: ca. 112 - 224 mg/kg Species: Rabbit Sex: male and female

Skin irritation

2-Mercaptoethanol	:	Skin irritation

Eye irritation

2-Mercaptoethanol	:	Irreversible effects on the eye

Sensitization

2-Mercaptoethanol	:	The product is a skin sensitizer, sub-category 1A.

Repeated dose toxicity

2-Mercaptoethanol	:	Species: Rat, Male and female Sex: Male and female Application Route: oral gavage Dose: 0. 15, 50, 75 mg/kg Exposure time: 7 wk Number of exposures: daily NOEL: 15 mg/kg Lowest observable effect level: 50 mg/kg Method: OECD Guideline 422 Target Organs: Heart, Liver

Genotoxicity in vitro

2-Mercaptoethanol	:	Test Type: Ames test Method: Mutagenicity (Escherichia coli - reverse mutation assay) Result: negative Test Type: Chromosome aberration test in vitro Method: OECD Guideline 473 Result: negative Test Type: Mouse lymphoma assay Method: OECD Guideline 476 Result: negative Test Type: Sister Chromatid Exchange Assay Result: Ambiguous

Genotoxicity in vivo

2-Mercaptoethanol	:	Test Type: Mouse micronucleus assay Method: Mutagenicity (micronucleus test)

Result: negative

Reproductive toxicity

2-Mercaptoethanol : Species: Rat
Sex: male
Application Route: oral gavage
Dose: 0. 15, 50, 75 mg/kg
Number of exposures: daily
Test period: 7 wks
Method: OECD Guideline 422
NOAEL Parent: 75 mg/kg

Species: Rat
Sex: female
Application Route: oral gavage
Dose: 0. 15, 50, 75 mg/kg
Number of exposures: daily
Test period: 7 wks
NOAEL Parent: 15 mg/kg

Developmental Toxicity

2-Mercaptoethanol : Species: Rat
Application Route: oral gavage
Dose: 5, 15, 25 mg/kg/bw/d
Exposure time: GD 6-19
Number of exposures: daily
Test period: 20 d
Method: OECD Guideline 414
NOAEL Teratogenicity: 25 mg/kg
NOAEL Maternal: 25 mg/kg
Animal testing did not show any effects on fetal development.

CMR effects

2-Mercaptoethanol : Carcinogenicity: Not available
Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

2-Mercaptoethanol (BME)
Further information : No data available.

SECTION 12: Ecological information

12.1
Toxicity

Ecotoxicity effects
Toxicity to fish

2-Mercaptoethanol	:	LC50: 37 mg/l Exposure time: 96 h Species: Leuciscus idus (Golden orfe)

Toxicity to daphnia and other aquatic invertebrates

2-Mercaptoethanol	:	EC50: 0,4 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) Method: OECD Test Guideline 202

Toxicity to algae

2-Mercaptoethanol	:	EC50: 19 mg/l Exposure time: 72 h Species: Desmodesmus subspicatus (green algae) static test Method: OECD Test Guideline 201

M-Factor

2-mercaptoethanol	:	M-Factor (Acute Aquat. Tox.) 1

Toxicity to bacteria

2-Mercaptoethanol	:	EC50: 125 mg/l Exposure time: 17 h Growth rate Species: Pseudomonas putida

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

2-Mercaptoethanol	:	NOEC: 0,0624 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) static renewal Method: OECD Test Guideline 211

12.2

Persistence and degradability

Biodegradability

2-Mercaptoethanol	:	Result: Not readily biodegradable. < 10 % Method: OECD Test Guideline 301

12.3

Bioaccumulative potential

Elimination information (persistence and degradability)

Bioaccumulation

2-Mercaptoethanol	:	This material is not expected to bioaccumulate.

12.4

Mobility in soil

Mobility : Medium: Soil
No data available

12.5

Results of PBT and vPvB assessment

Results of PBT assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6

Other adverse effects

Additional ecological information : Very toxic to aquatic life., Toxic to aquatic life with long lasting effects.

Ecotoxicology Assessment

Short-term (acute) aquatic hazard
2-Mercaptoethanol : Very toxic to aquatic life.

Long-term (chronic) aquatic hazard
2-Mercaptoethanol : Toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1

Waste treatment methods

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.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 14: Transport information

14.1 - 14.7

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)
UN2966, THIOGLYCOL, 6.1, II

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN2966, THIOGLYCOL, 6.1, II, (68,3°C), MARINE POLLUTANT, (THIOGLYCOL)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN2966, THIOGLYCOL, 6.1, II

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN2966, THIOGLYCOL, 6.1, II, (D/E), ENVIRONMENTALLY HAZARDOUS, (THIOGLYCOL)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN2966, THIOGLYCOL, 6.1, II, ENVIRONMENTALLY HAZARDOUS, (THIOGLYCOL)

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2966, THIOGLYCOL, 6.1, II, ENVIRONMENTALLY HAZARDOUS, (THIOGLYCOL)

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

SECTION 15: Regulatory information

15.1

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

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

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

15.2

Chemical Safety Assessment

Components	:	2-mercaptoethanol	A Chemical Safety Assessment has been carried out for this substance.	200-464-6

Major Accident Hazard Legislation : 96/82/EC Update: 2003
Toxic
2
Quantity 1: 50 t
Quantity 2: 200 t

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

: ZEU_SEVES3 Update:
ACUTE TOXIC
H2
Quantity 1: 50 t
Quantity 2: 200 t

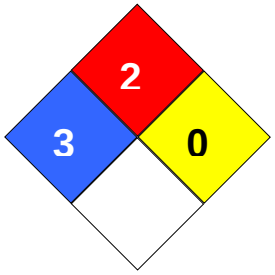
: ZEU_SEVES3 Update:
ENVIRONMENTAL HAZARDS
E1
Quantity 1: 100 t
Quantity 2: 200 t

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
Switzerland CH INV	:	On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	:	On or in compliance with the active portion of the TSCA inventory
Canada DSL	:	All components of this product are on the Canadian DSL
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	:	All substances in this product were registered, notified to be registered, or exempted from registration by CPChem through an Only Representative according to K-REACH regulations. Importation of this product is permitted if the Korean Importer of Record was included on CPChem's notifications or if the Importer of Record themselves notified the substances.
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory
Taiwan TCSI	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 3
Fire Hazard: 2
Reactivity Hazard: 0



Further information

Legacy SDS Number : 26290

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.

H301	Toxic if swallowed.
H310	Fatal in contact with skin.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H411	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 **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 **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **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

(Msafe)	:	0,108 tonnes/day

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	:	0,1 %
Emission or Release Factor: Water	:	0,006 %
Emission or Release Factor: Soil	:	0,01 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 90 %)

Remarks	:	Prevent discharge of undissolved substance to or recover from wastewater.
Remarks	:	Do not apply industrial sludge to natural soils.
Remarks	:	Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent	:	2.000 m3/d
Effectiveness (of a measure)	:	0,2 %

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	During manufacturing no waste of the substance is generated.

Conditions and measures related to external recovery of waste

Recovery Methods	:	During manufacturing no waste of the substance is generated.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics

Remarks	:	Liquid, vapour pressure < 0.5 kPa at STP

Amount used

Remarks	:	Not applicable

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks	:	Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures

Ensure operation is undertaken outdoors.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics

Remarks	:	Liquid, vapour pressure < 0.5 kPa at STP

Amount used

Remarks	:	Not applicable

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks	:	Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures

Ensure operation is undertaken outdoors.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.

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

2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b: 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

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means., Provide extraction ventilation at points where emissions occur.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training., Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

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		Air		0,0229 µg/m3	
			Fresh water		0,303 µg/L	0,758
			Freshwater sediment		0,302 µg/kg	0,926
			Marine sediment		0,0303 µg/kg	0,929
			Soil		0,0120 µg/kg	0,214
			Marine water		0,0304 µg/L	0,761

ERC1: Manufacture of substances
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,0
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,57
PROC2, CS2	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,70 ppm	0,2
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,63
PROC3, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,47 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,94
PROC8a, CS14	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	2,10 ppm	0,5
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,98
PROC8a, CS14	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	2,00 ppm	0,5
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,96
PROC8b, CS14	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,83
PROC8b, CS14	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	1,50 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,95
PROC9, CS6	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,83

PROC9, CS6	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	1,50 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,95
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	3,50 ppm	0,9
			Worker – dermal, long-term – systemic	0,07 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,99

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)
PROC2: Use in closed, continuous process with occasional controlled exposure
CS2: Process sampling
PROC3: Use in closed batch process (synthesis or formulation)
CS37: Use in contained batch processes
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS14: Bulk transfers
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS14: Bulk transfers
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS6: Drum and small package filling
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS6: Drum and small package filling
PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

Confirm that RMMs and OCs are as described or of equivalent efficiency.

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	:	**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 **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC15:** Use as laboratory reagent **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
Environmental release category	:	**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)
Further information	:	Manufacture of the substance or use as an intermediate or process chemical or extraction agent. 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)

(Msafe)	:	0,0215 tonnes/day

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	:	0,02 %
Emission or Release Factor: Water	:	0,03 %
Emission or Release Factor: Soil	:	0,1 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 80 %)
Water	:	Typical onsite wastewater treatment technology provides removal efficiency of (%): (Effectiveness: 90 %)
Remarks	:	Prevent discharge of undissolved substance to or recover from onsite wastewater.
Remarks	:	Do not apply industrial sludge to natural soils.
Remarks	:	Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	:	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	:	2.000 m3/d
Effectiveness (of a measure)	:	0,2 %

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	This substance is consumed during use and no waste of the substance is generated.

Conditions and measures related to external recovery of waste

Recovery Methods	:	This substance is consumed during use and no waste of the substance is generated.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Ensure operation is undertaken outdoors.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Ensure operation is undertaken outdoors.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic

standard of occupational hygiene is implemented.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.

2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b: 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

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means., Provide extraction ventilation at points where emissions occur.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training., Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Ensure operation is undertaken outdoors.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory

reagent

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

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		0,316 µg/L	0,789
			Marine water		0,0317 µg/L	0,792
			Freshwater sediment		0,314 µg/kg	0,964
			Marine sediment		0,0315 µg/kg	0,967
			Soil		0,0017 µg/kg	0,0298
			Air		0,0010 µg/m3	

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

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,0
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,57
PROC2, CS2	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,70 ppm	0,2
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,63
PROC3, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,47 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,94

PROC8a, CS14	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	2,10 ppm	0,5
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,98
PROC8a, CS14	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	2,00 ppm	0,5
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,96
PROC8b, CS14	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,83
PROC8b, CS14	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	1,50 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – dermal, long-term – systemic		0,95
PROC9, CS6	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,83
PROC9, CS6	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	1,50 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,95
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	3,50 ppm	0,9
			Worker – dermal, long-term – systemic	0,07 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,99

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)
PROC2: Use in closed, continuous process with occasional controlled exposure
CS2: Process sampling
PROC3: Use in closed batch process (synthesis or formulation)
CS37: Use in contained batch processes
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS14: Bulk transfers
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS14: Bulk transfers
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

CS6: Drum and small package filling
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS6: Drum and small package filling
PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.
Confirm that RMMs and OCs are as described or of equivalent efficiency.

1. Short title of Exposure Scenario: **Use in polymer production – industrial**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU 10:** Industrial Manufacturing (all), 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 **PROC5:** Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting; **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 **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC14:** Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;
Environmental release category	:	**ERC4, ERC6c:** Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of monomers for manufacture of thermoplastics
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:ERC4, ERC6c:

Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of monomers for manufacture of thermoplastics

Daily amount per site(Msafe) : 21,4 kg

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 : 0,2 %
Emission or Release Factor: Water : 0,03 %
Emission or Release Factor: Soil : 0,01 %

Technical conditions and measures / Organizational measures

Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 80 %)
Remarks : Prevent discharge of undissolved substance to or recover from onsite wastewater.
Remarks : Do not apply industrial sludge to natural soils.
Remarks : Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent : 2.000 m3/d
Effectiveness (of a measure) : 0,2 %

Conditions and measures related to external treatment of waste for disposal

Waste treatment : This substance is consumed during use and no waste of the substance is generated.

Conditions and measures related to external recovery of waste

Recovery Methods : This substance is consumed during use and no waste of the substance is generated.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics

Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used

Remarks : Not applicable

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures

Ensure operation is undertaken outdoors.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3: Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Ensure operation is undertaken outdoors.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC4, PROC14: Use in batch and other process (synthesis) where opportunity for exposure arises, Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

2.2 Contributing scenario controlling worker exposure for: PROC6: Calendering operations

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide extraction ventilation at points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

2.2 Contributing scenario controlling worker exposure for: PROC8b, PROC9: 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)

Product characteristics
Remarks : Liquid, vapour pressure < 0.5 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

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
ERC4, ERC6c	EUSES		Air		0,0077 µg/m3	
			Freshwater		0,253 µg/L	0,633
			Marine water		0,0254 µg/L	0,636
			Freshwater sediment		0,252 µg/kg	0,773
			Marine sediment		0,0253 µg/kg	0,777
			Soil		0,0048 µg/kg	0,0858

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
ERC6c: Industrial use of monomers for manufacture of thermoplastics

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,0
			Worker – dermal, long-	0,34 mg/kg/d	0,6

			term – systemic		
			Worker – long-term – systemic Combined routes		0,57
PROC2, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,70 ppm	0,2
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,63
PROC3, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2,10 ppm	0,5
			Worker – dermal, long-term – systemic	0,07 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,64
PROC4, CS65	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,83
PROC14, CS65	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,50 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,95
PROC5, CS30	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,72
PROC6, CS64	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,00 ppm	0,3
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,71
PROC8a, CS14	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2,10 ppm	0,5
			Worker – dermal, long-term – systemic	0,27 mg/kg/d	0,5
			Worker – long-term – systemic Combined routes		0,98
PROC8b, CS14	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,83
PROC9, CS7	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,05 ppm	0,3
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,6
			Worker – long-term – systemic Combined routes		0,83

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)
PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)

PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS65: Polymerization (bulk and batch)
PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;
CS65: Polymerization (bulk and batch)
PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
CS30: Mixing operations (open systems)
PROC6: Calendering operations
CS64: Calendering (including Banburys)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS14: Bulk transfers
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS7: Small package filling

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

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.
Confirm that RMMs and OCs are as described or of equivalent efficiency.