SAFETY DATA SHEET

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

1.1. Product identifier

Name of the substance	Vacuum gas oil
Identification number	649-009-00-7
Registration number	01-2119487294-29-0009
Synonyms	None.
SDS number	2030
Issue date	17-December-2013
Version number	01
Revision date	-
Supersedes date	-

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

Identified uses	Distribution of a substance. Formulation & (re) packaging of substances and mixtures. Manufacture of substance. Use as a Fuel.
Uses advised against	None known.

1.3. Details of the supplier of the safety data sheet

Supplier

Company name	Valero Energy Ltd
Address	1 Westferry Circus Canary Wharf London E14 4HA UK
Telephone	01/210 345 4593 (General information; US)
e-mail	CorpHSE@valero.com
Contact person	Industrial Hygienist

1.4. Emergency telephone number 0044/(0)18 65 407333

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Directive 67/548/EEC or 1999/45/EC as amended

Classification Carc. Cat. 1;R45, Repr. Cat. 3;R63, Xn;R20-48/21, R66, N;R50/53

The full text for all R-phrases is displayed in section 16.

Classification according to Regulation (EC) No 1272/2008 as amended

Health hazards

Acute toxicity, inhalation	Category 4	H332 - Harmful if inhaled.
Carcinogenicity	Category 1B	H350 - May cause cancer.
Reproductive toxicity	Category 2	H361d - Suspected of damaging the unborn child.
Specific target organ toxicity - repeated exposure	Category 2 (blood, thymus, liver)	H373 - May cause damage to organs (blood, thymus, liver) through prolonged or repeated exposure.
Aspiration hazard	Category 1	H304 - May be fatal if swallowed and enters airways.

Environmental hazards

Hazardous to the aquatic environment, long-term aquatic hazard	Category 1	H410 - Very toxic to aquatic life with long lasting effects.

Hazard summary

Physical hazards	Not classified for physical hazards.

Health hazards May cause cancer. Harmful by inhalation. Harmful: danger of serious damage to health by prolonged exposure in contact with skin. Possible risk of harm to the unborn child. Repeated exposure may cause skin dryness or cracking.

Environmental hazards Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Specific hazards Breathing of high vapour concentrations may cause dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne. Components of the product may be absorbed into the body through the skin.

Main symptoms In high concentrations, vapours are narcotic and may cause headache, fatigue, dizziness and nausea. Defatting of the skin. Dermatitis. Ingestion may cause irritation and malaise.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Contains: Gas oils (petroleum), heavy vacuum

Identification number 649-009-00-7

Hazard pictograms

Signal word Danger

Hazard statements
H350 - May cause cancer.
H361d - Suspected of damaging the unborn child.
H332 - Harmful if inhaled.
H410 - Very toxic to aquatic life with long lasting effects.
H304 - May be fatal if swallowed and enters airways.
H373 - May cause damage to organs (blood, thymus, liver) through prolonged or repeated exposure.

Precautionary statements

Prevention
P201 - Obtain special instructions before use.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P260 - Do not breathe dust/fume/gas/mist/vapors/spray.

Response
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
P331 - Do NOT induce vomiting.

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

Disposal P501 - Dispose of contents/container in accordance with local/regional/national/international regulations.

Supplemental label information Repeated exposure may cause skin dryness or cracking.

2.3. Other hazards

Not a PBT or vPvB substance or mixture. Hydrogen sulfide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations. Static accumulator - Static accumulating flammable materials can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite material and vapor may cause flash fire (or explosion).

SECTION 3: Composition/information on ingredients

3.1. Substances

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	INDEX No.	Notes
Gas oils (petroleum), heavy vacuum	100	64741-57-7 265-058-3	01-2119487294-29-0009	649-009-00-7	

Classification: **DSD:** Carc. Cat. 1;R45, Repr. Cat. 3;R63, Xn;R20-48/21, R66, N;R50/53

CLP: Asp. Tox. 1;H304, Acute Tox. 4;H332, Carc. 1B;H350, Repr. 2;H361d, STOT RE 2;H373, Aquatic Chronic 1;H410

DSD: Directive 67/548/EEC.
CLP: Regulation No. 1272/2008.

Composition comments This product is registered under the REACH Regulation 1907/2006 as a UVCB. The full text for all R- and H-phrases is displayed in section 16. All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

4.1. Description of first aid measures

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

If there is any suspicion of inhalation of H2S:
Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures.
Remove casualty to fresh air as quickly as possible.
Immediately begin artificial respiration if breathing has ceased.
Provision of oxygen may help.
Obtain medical advice for further treatment.

Skin contact

Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.

Eye contact

Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyelids wide apart. Get medical attention if irritation develops or persists.

Ingestion

Immediately rinse mouth and drink plenty of water or milk. Keep person under observation. Do not induce vomiting. If vomiting occurs, keep head low. Transport immediately to hospital and take these instructions.

4.2. Most important symptoms and effects, both acute and delayed

Defatting of the skin. May cause eye irritation on direct contact. In high concentrations, vapours are narcotic and may cause headache, fatigue, dizziness and nausea. May cause damage to organs through prolonged or repeated exposure.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically. Symptoms may be delayed.

SECTION 5: Firefighting measures

General fire hazards

The product is combustible, and heating may generate vapours which may form explosive vapour/air mixtures. Material will float and can be re-ignited on surface of water.

5.1. Extinguishing media

Suitable extinguishing media

Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition may produce smoke, oxides of carbon and lower molecular weight organic compounds whose composition have not been characterised. Sulfur Oxides (SOx). Nitrogen Oxides (NOx).

5.3. Advice for firefighters

Special protective equipment for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Special fire fighting procedures

Move containers from fire area if you can do it without risk. Use water spray to cool unopened containers. Cool containers with flooding quantities of water until well after fire is out.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained.

For emergency responders

Keep unnecessary personnel away. Wear protective clothing as described in Section 8 of this safety data sheet.

6.2. Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Fire and Explosion Hazard Data before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g., by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies.

6.3. Methods and material for containment and cleaning up

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Use non-sparking tools and explosion-proof equipment. Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas.

Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste.

Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment.

6.4. Reference to other sections

For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Before entering storage tanks and commencing any operation in a confined area check the atmosphere for oxygen content and flammability. (Subject to applicability) If sulfur compounds are suspected to be present in the product, check the atmosphere for H2S content. Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid inhalation of vapors and contact with skin, eyes and clothing. Avoid release to the environment. Wear appropriate personal protective equipment. Immediately change contaminated clothes. Do not eat, drink or smoke when using the product. Be aware of potential for surfaces to become slippery. Observe good industrial hygiene practices.

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry place with adequate ventilation. Keep away from incompatible materials, open flames and high temperatures. Keep away from food, drink and animal feeding stuffs.

7.3. Specific end use(s)

Distribution of a substance. Formulation & (re) packaging of substances and mixtures. Manufacture of substance. Use as a Fuel.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

No exposure limits noted for ingredient(s).

Biological limit values

No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures

Follow standard monitoring procedures.

Derived no-effect level (DNEL)

Material	Type	Route	Value	Form
Gas oils (petroleum), heavy vacuum (CAS 64741-57-7)	Consumer	Oral	0,015 mg/kg/24h	Long term exposure systemic effects
	Workers	Dermal	0,065 mg/kg/8h	Long term exposure systemic effects
		Inhalation	4700 mg/m³/15min	Aerosol, Acute exposure systemic effects
		Inhalation	0,12 mg/m³/8h	Aerosol, Long term exposure systemic effects

Predicted no effect concentrations (PNECs)

Not available.

8.2. Exposure controls

Appropriate engineering controls

Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

General information

Use personal protective equipment as required. Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. Keep working clothes separately. Launder contaminated clothing before reuse.

Eye/face protection

Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

Skin protection

- Hand protection

Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Viton, Polyurethane, Nitrile rubber. Suitable gloves can be recommended by the glove supplier. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Wear suitable gloves tested to EN374.

- Other	Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of oil mist, suitable respiratory equipment with combination filter (type A2/P2) can be used. Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
Hygiene measures	When using, do not eat, drink or smoke. Wash hands after handling. Launder contaminated clothing before reuse. Private clothes and working clothes should be kept separately. Handle in accordance with good industrial hygiene and safety practices. Follow up on any medical surveillance requirements.
Environmental exposure controls	Contain spills and prevent releases and observe national regulations on emissions.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Black liquid.
Physical state	Liquid.
Form	Liquid.
Colour	Black.
Odour	Hydrocarbon.
Odour threshold	Not available.
pH	Not applicable.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	230 - 600 °C (446 - 1112 °F)
Flash point	< 100,0 °C (< 212,0 °F)
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non flammable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapour pressure	Not applicable.
Vapour density	Not applicable.
Relative density	0,9 - 0,92 g/cm³ (15°C)
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not applicable.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	10 - 12 mm²/s (80°C)
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
9.2. Other information	No relevant additional information available.

SECTION 10: Stability and reactivity

10.1. Reactivity	The product is stable and non reactive under normal conditions of use, storage and transport.
10.2. Chemical stability	Stable under normal temperature conditions and recommended use.
10.3. Possibility of hazardous reactions	Hazardous polymerisation does not occur.
10.4. Conditions to avoid	Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
10.5. Incompatible materials	Strong acids. Strong oxidizers such as nitrates, chlorates, peroxides.

10.6. Hazardous decomposition products	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours.

SECTION 11: Toxicological information

General information	Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Ingestion	Ingestion may cause irritation and malaise.
Inhalation	Harmful if inhaled. In high concentrations, vapours and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact	Repeated exposure may cause skin dryness or cracking. May be absorbed through the skin.
Eye contact	Direct contact with eyes may cause temporary irritation.
Symptoms	Skin irritation. Defatting of the skin. Rash. May cause eye irritation on direct contact. In high concentrations, vapours and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea.

11.1. Information on toxicological effects

Acute toxicity	Harmful if inhaled.
Skin corrosion/irritation	Based on available data, the classification criteria are not met.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory sensitisation	Based on available data, the classification criteria are not met.
Skin sensitisation	Based on available data, the classification criteria are not met.
Germ cell mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Gas oils (petroleum), heavy vacuum (CAS 64741-57-7) 2B Possibly carcinogenic to humans.

Reproductive toxicity	Suspected of damaging fertility or the unborn child.
Specific target organ toxicity - single exposure	Based on available data, the classification criteria are not met.
Specific target organ toxicity - repeated exposure	May cause damage to organs through prolonged or repeated exposure: Blood. Thymus. Liver.
Aspiration hazard	May be fatal if swallowed and enters airways.
Mixture versus substance information	Not available.
Other information	Symptoms may be delayed.

SECTION 12: Ecological information

12.1. Toxicity	Oil spills are generally hazardous to the environment.
12.2. Persistence and degradability	The degradability of the product has not been stated.
12.3. Bioaccumulative potential	No data available on bioaccumulation.
Partition coefficient n-octanol/water (log Kow)	Not available.
Bioconcentration factor (BCF)	Not available.
12.4. Mobility in soil	Not available.
Mobility in general	The product is insoluble in water. It will spread on the water surface while some of the components will eventually sediment in water systems. The volatile components of the product will spread in the atmosphere.
12.5. Results of PBT and vPvB assessment	Not a PBT or vPvB substance or mixture.
12.6. Other adverse effects	Very toxic to aquatic life with long lasting effects. Oil spills are generally hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste	Dispose of in accordance with local regulations.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied.

EU waste code	13 07 03* The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal methods/information	Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. Do not discharge into drains, water courses or onto the ground.

SECTION 14: Transport information

ADR

14.1. UN number	UN3082
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (Gas oils (petroleum), heavy vacuum)
14.3. Transport hazard class(es)	9
Subsidiary class(es)	-
14.4. Packing group	III
14.5. Environmental hazards	Yes
Tunnel restriction code	E
Labels required	9
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

RID

14.1. UN number	UN3082
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (Gas oils (petroleum), heavy vacuumYes)
14.3. Transport hazard class(es)	9
Subsidiary class(es)	-
14.4. Packing group	III
14.5. Environmental hazards	Yes
Labels required	9
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

ADN

14.1. UN number	UN3082
14.2. UN proper shipping name	Environmentally Hazardous Liquid, N.o.s. (Gas oils (petroleum), heavy vacuum)
14.3. Transport hazard class(es)	9
Subsidiary class(es)	-
14.4. Packing group	III
14.5. Environmental hazards	Yes
Labels required	9
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

14.1. UN number	UN3082
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (Gas oils (petroleum), heavy vacuum)
14.3. Transport hazard class(es)	9
Subsidiary class(es)	-
14.4. Packing group	III
14.5. Environmental hazards	Yes
Labels required	9
ERG code	9L
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

14.1. UN number	UN3082
14.2. UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Gas oils (petroleum), heavy vacuum)
14.3. Transport hazard class(es)	9
Subsidiary class(es)	-
14.4. Packing group	III

14.5. Environmental hazards

Marine pollutant	Yes
Labels required	9
EmS	F-A, S-F
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.

SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I

Not listed.

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1 as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2 as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3 as amended

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(1) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Gas oils (petroleum), heavy vacuum (CAS 64741-57-7)

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work

Not regulated.

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breastfeeding

Gas oils (petroleum), heavy vacuum (CAS 64741-57-7)

Other EU regulations

Directive 96/82/EC (Seveso II) on the control of major-accident hazards involving dangerous substances

Not regulated.

Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

Gas oils (petroleum), heavy vacuum (CAS 64741-57-7)

Directive 94/33/EC on the protection of young people at work

Gas oils (petroleum), heavy vacuum (CAS 64741-57-7)

Other regulations	The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended and respective national laws implementing EC directives. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006. 96/82/EC (Seveso II) Directive; Part 2 (Classified Substances) - Extremely Flammable
National regulations	Young people under 18 years old are not allow to work with this product according to the EU Directive 94/33/EC on the protection of young people at work. Pregnant women should not work with the product, if there is the least risk of exposure.
15.2. Chemical safety assessment	For this substance a chemical safety assessment has been carried out.

SECTION 16: Other information

List of abbreviations	DSD: Directive 67/548/EEC. CLP: Regulation No. 1272/2008. DNEL: Derived No-Effect Level. PNEC: Predicted No-Effect Concentration. PBT: Persistent, bioaccumulative and toxic. vPvB: Very Persistent and very Bioaccumulative.
References	Chemical safety report. CLP files – http://concawe.org/
Information on evaluation method leading to the classification of mixture	The mixture is classified based on test data for physical hazards. The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available. For details, refer to Sections 9, 11 and 12.
Full text of any statements or R-phrases and H-statements under Sections 2 to 15	R20 Harmful by inhalation. R45 May cause cancer. R48/21 Harmful: danger of serious damage to health by prolonged exposure in contact with skin. R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R63 Possible risk of harm to the unborn child. R66 Repeated exposure may cause skin dryness or cracking. H304 May be fatal if swallowed and enters airways. H332 Harmful if inhaled. H350 May cause cancer. H361d Suspected of damaging the unborn child. H373 May cause damage to organs (<@1>) through prolonged or repeated exposure. H410 Very toxic to aquatic life with long lasting effects.
This SDS contains revisions in the following section(s):	This safety data sheet contains revisions in the following section(s): 2, 3, 5, 7, 11, 12.
Training information	Follow training instructions when handling this material.
Disclaimer	This material Safety Data Sheet (SDS) was prepared in accordance with EC No 1272/2008 by Valero Energy Ltd. Valero Energy Ltd. does not assume any liability arising out of product use by others. The information, recommendations, and suggestions presented in this SDS are based upon test results and data believed to be reliable. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use, the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all the scientific and study information in the format of this document, plus additional information may be necessary under exceptional conditions of use, or because of applicable laws or government regulations.

Annex to the extended Safety Data Sheet (eSDS)

1 - Exposure Scenario Worker

1. Distribution of substance

List of use descriptors

Sector(s) of Use	SU3: Industrial uses
Product categories [PC]:	Not available.
Name of contributing environmental scenario and corresponding ERC	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles. ERC5: Industrial use resulting in inclusion into or onto a matrix. ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates). ERC6b: Industrial use of reactive processing aids. ERC6c: Industrial use of monomers for manufacture of thermoplastics. ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers. Specific Environmental Release Category: ESVOC SpERC 1.1b.v1
List of names of contributing worker scenarios and corresponding PROCs	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.

Further explanations

Other Process or activity	Bulk loading (including marine vessel/barge, rail/road car and IBC loading) of substance within closed or contained systems, including incidental exposures during its sampling, storage, unloading, maintenance and associated laboratory activities.

2.1. Contributing exposure scenario controlling environmental exposure for Industrial use of processing aids in processes and products, not becoming part of articles.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently). Substance is complex UVCB. Predominantly hydrophobic.
Physical state	Liquid
Viscosity	
Kinematic viscosity	1,6 mm²/s 40 °C
Dynamic viscosity	Not available.

Amounts used

Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tons/year):	1,1 e7
Fraction of Regional tonnage used locally:	0,002
Annual site tonnage (tons/year):	2,3 e4
Maximum daily site tonnage (kg/day):	7,7 e4

Frequency and duration of use

Batch process	Not available.
Continuous process	Emission days (days/year): 300

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0,0001	0,00001	0,0000001	

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emission to provide a typical removal efficiency of (%): 90
Soil	Not available.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not available.
Remarks	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). No wastewater treatment required.
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal STP
Discharge rate	2000
Treatment effectiveness	88,8
Sludge treatment technique	Not available.
Measures to limit air emissions	Not available.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): 3,8e5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	Not available.
Disposal methods	Not available.
Treatment effectiveness	Not available.
Remarks	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Treatment effectiveness	Not available.
Remarks	Not available.
Additional good practice advice beyond the REACH CSA	Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in the PETRORISK file.

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

Process categories beyond the REACH CSA	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.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently).
Physical form of the product	Liquid

Vapour pressure	Liquid, vapour pressure 0,5 - 10 kPa at STP.
Process temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.; Assumes a good basic standard of occupational hygiene is implemented.

Amounts used

Not available.

Frequency and duration of use

Duration	Frequency of use	Remarks
8	1 day	Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Exposed skin areas	Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Other given operational conditions affecting workers exposure

Not available.

Other relevant operational conditions

Not available.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Process sampling, Outdoor; Sample via a closed loop or other system to avoid exposure. General exposures (closed systems); Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Bulk product storage; Store substance within a closed system. Product sampling; Sample via a closed loop or other system to avoid exposure. marine vessel/barge (un)loading; Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Equipment cleaning and maintenance; Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities; Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens); Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Conditions and measures related to personal protection, hygiene and health evaluations	Process sampling, Outdoor; Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. General exposures (closed systems); Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Bulk product storage; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Product sampling; Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Laboratory activities; Wear suitable gloves tested to EN374. marine vessel/barge (un)loading; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Road tanker/rail car loading; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Equipment cleaning and maintenance; Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Avoid carrying out activities involving exposure for more than 4 hours.

3. Exposure Estimation

Environment

See PETRORISK file in IUCLID Section 13 - "LocalCSR" worksheet.

Health

	Exposure level	RCR	Method	Remarks
General exposures (closed systems)	0,01 mg/m³	0.058	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.625	**	All routes
General exposures (closed systems) + Process sampling + Outdoor	0,5 mg/m³	0.292	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.858	**	All routes
General exposures (closed systems)	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Bulk product storage	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Product sampling	0,5 mg/m³	0.292	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.858	**	All routes
Laboratory activities	0,5 mg/m³	0.417	**	Inhalation Exposure
	0,03 mg/kg bw/day	0.1	**	Dermal Exposure
		0.517	**	All routes
marine vessel/barge (un)loading	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Road tanker/rail car loading	0,17 mg/m³	0.283	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.850	**	All routes
Equipment cleaning and maintenance	0,0024 mg/m³	0.020	**	Inhalation Exposure
	0,2 mg/kg bw/day	0.833	**	Dermal Exposure
		0.853	**	All routes

** - The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.

2 - Exposure Scenario Worker

1. Formulation & (re)packing of substances and mixtures

List of use descriptors

Sector(s) of Use	SU3: Industrial uses
Product categories [PC]:	Not available.
Name of contributing environmental scenario and corresponding ERC	ERC2: Formulation of preparations. Specific Environmental Release Category: ESVOC SpERC 2.2.v1
List of names of contributing worker scenarios and corresponding PROCs	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.
Further explanations	
Other Process or activity	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 exposure scenario controlling environmental exposure for Formulation of preparations.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently). Substance is complex UVCB. Predominantly hydrophobic.
Physical state	Liquid
Viscosity	
Kinematic viscosity	1,6 mm²/s 40 °C
Dynamic viscosity	Not available.

Amounts used

Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tons/year):	1,1 e7
Fraction of Regional tonnage used locally:	0,0026
Annual site tonnage (tons/year):	3 e4
Maximum daily site tonnage (kg/day):	1 e5

Frequency and duration of use

Batch process	Not available.
Continuous process	Emission days (days/year): 300

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0,0022	0,0001	0,000005	

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emission to provide a typical removal efficiency of (%): 0

Soil	Not available.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 54,0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not available.
Remarks	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater.
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal STP
Discharge rate	2000
Treatment effectiveness	88,8
Sludge treatment technique	Not available.
Measures to limit air emissions	Not available.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): 1,1e5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	Not available.
Disposal methods	Not available.
Treatment effectiveness	Not available.
Remarks	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Treatment effectiveness	Not available.
Remarks	Not available.
Additional good practice advice beyond the REACH CSA	Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in the PETRORISK file.

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

Process categories beyond the REACH CSA	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.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently).
Physical form of the product	Liquid
Vapour pressure	Liquid, vapour pressure 0,5 - 10 kPa at STP.
Process temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.; Assumes a good basic standard of occupational hygiene is implemented.

Amounts used

Not available.

Frequency and duration of use

Duration	Frequency of use	Remarks
8	1 day	Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Exposed skin areas Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Other given operational conditions affecting workers exposure

Not available.

Other relevant operational conditions

Not available.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

General exposures (closed systems), Process sampling;
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.

General exposures (closed systems);
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.

Bulk product storage;
Store substance within a closed system.

Product sampling;
Sample via a closed loop or other system to avoid exposure.

marine vessel/barge (un)loading;
Transfer via enclosed lines.
Clear transfer lines prior to de-coupling.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Equipment cleaning and maintenance;
Drain down and flush system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Technical conditions and measures to control dispersion from source towards the worker

Laboratory activities;
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Road tanker/rail car loading;
Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers;
Ensure material transfers are under containment or extract ventilation.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)., or
Ensure operation is undertaken outdoors.

Organizational measures to prevent/limit releases, dispersion and exposure

General measures (carcinogens);
Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Conditions and measures related to personal protection, hygiene and health evaluations	General exposures (closed systems), Process sampling; Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. General exposures (closed systems); Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Bulk product storage; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Product sampling; Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Laboratory activities; Wear suitable gloves tested to EN374. marine vessel/barge (un)loading; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Road tanker/rail car loading; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Drum/batch transfers; Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Equipment cleaning and maintenance; Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

3. Exposure Estimation

Environment

EUSES version 2.1. has been used to estimate environmental emissions unless otherwise indicated.
When the recommended risk management measures and operational conditions are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.

Health

	Exposure level	RCR	Method	Remarks
General exposures (closed systems)	0,01 mg/m³	0.058	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.625	**	All routes
General exposures (closed system) + Process sampling	0,5 mg/m³	0.292	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.858	**	All routes
General exposures (closed systems)	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Bulk product storage	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Product sampling	0,5 mg/m³	0.292	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.858	**	All routes
Laboratory activities	0,5 mg/m³	0.417	**	Inhalation Exposure
	0,03 mg/kg bw/day	0.1	**	Dermal Exposure
		0.517	**	All routes
marine vessel/barge (un)loading	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Road tanker/rail car loading	0,17 mg/m³	0.283	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.850	**	All routes

Drum/batch transfers	5 mg/m³	0.175	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.742	**	All routes
Equipment cleaning and maintenance	0,0024 mg/m³	0.020	**	Inhalation Exposure
	0,2 mg/kg bw/day	0.833	**	Dermal Exposure
		0.853	**	All routes

** - The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

Health
Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

3 - Exposure Scenario Worker

1. Manufacture of substances

List of use descriptors

Sector(s) of Use	SU3: Industrial uses SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Product categories [PC]:	Not available.
Name of contributing environmental scenario and corresponding ERC	ERC1: Manufacture of substances. Specific Environmental Release Category: ESVOC SpERC 1.1.v1
List of names of contributing worker scenarios and corresponding PROCs	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.

Further explanations

Other Process or activity	Manufacture of the substance or use as a process chemical or extraction agent within closed or contained systems. Includes incidental exposures during 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 exposure scenario controlling environmental exposure for Manufacture of substances.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently). Substance is complex UVCB. Predominantly hydrophobic.
Physical state	Liquid
Viscosity	
Kinematic viscosity	1,6 mm²/s 40 °C
Dynamic viscosity	Not available.

Amounts used

Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tons/year):	1,1 e7
Fraction of Regional tonnage used locally:	0,052
Annual site tonnage (tons/year):	6 e5
Maximum daily site tonnage (kg/day):	2 e6

Frequency and duration of use

Batch process	Not available.
Continuous process	Emission days (days/year): 300

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0,0001	0,0001	0,000003	

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emission to provide a typical removal efficiency of (%): 90
Soil	Not available.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 85,9. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not available.
Remarks	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). Onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater.
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal STP
Discharge rate	10000
Treatment effectiveness	88,8
Sludge treatment technique	Not available.
Measures to limit air emissions	Not available.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): 2,6e5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	Not available.
Disposal methods	Not available.
Treatment effectiveness	Not available.
Remarks	During manufacturing no waste of the substance is generated to treat.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	During manufacturing no waste of the substance is generated to recover.
Treatment effectiveness	Not available.
Remarks	Not available.
Additional good practice advice beyond the REACH CSA	Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in the PETRORISK file.

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

Process categories beyond the REACH CSA	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.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently).
Physical form of the product	Liquid
Vapour pressure	Liquid, vapour pressure 0,5 - 10 kPa at STP.
Process temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.; Assumes a good basic standard of occupational hygiene is implemented.

Amounts used

Not available.

Frequency and duration of use

Duration	Frequency of use	Remarks
8	1 day	Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Exposed skin areas Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Other given operational conditions affecting workers exposure

Not available.

Other relevant operational conditions

Not available.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

General exposures (closed systems);
Handle substance within a closed system.

Process sampling, Outdoor;
Sample via a closed loop or other system to avoid exposure.

Bulk product storage;
Store substance within a closed system.

marine vessel/barge (un)loading;
Transfer via enclosed lines.
Clear transfer lines prior to de-coupling.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Equipment cleaning and maintenance;
Drain down and flush system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Technical conditions and measures to control dispersion from source towards the worker

Laboratory activities;
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Road tanker/rail car loading;
Ensure material transfers are under containment or extract ventilation.

Organizational measures to prevent/limit releases, dispersion and exposure

General measures (carcinogens);
Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Conditions and measures related to personal protection, hygiene and health evaluations	General exposures (closed systems); Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Process sampling, Outdoor; Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Bulk product storage; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Laboratory activities; Wear suitable gloves tested to EN374. marine vessel/barge (un)loading; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Road tanker/rail car loading; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Equipment cleaning and maintenance; Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

3. Exposure Estimation

Environment

See PETRORISK file in IUCLID Section 13 - "LocalCSR" worksheet.

Health

	Exposure level	RCR	Method	Remarks
General exposures (closed systems)	0,01 mg/m³	0.058	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.625	**	All routes
General exposures (closed systems) + Process sampling + Outdoor	0,5 mg/m³	0.292	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.858	**	All routes
General exposures (closed systems)	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Bulk product storage	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Laboratory activities	0,5 mg/m³	0.417	**	Inhalation Exposure
	0,03 mg/kg bw/day	0.1	**	Dermal Exposure
		0.517	**	All routes
marine vessel/barge (un)loading	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Road tanker/rail car loading	0,17 mg/m³	0.283	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.340	**	Dermal Exposure
		0.623	**	All routes
Equipment cleaning and maintenance	0,0024 mg/m³	0.020	**	Inhalation Exposure
	0,2 mg/kg bw/day	0.750	**	Dermal Exposure
		0.853	**	All routes

** - The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file in IUCLID section 13 - "Site-Specific Production" worksheet. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Consequently a Tier 2 assessment was performed in an attempt to refine conservative exposure assumptions and improve risk estimates. The Tier 2 analysis demonstrates that no refineries have RCRs > 1 (see Appendix 4 and PETRORISK file en IUCLID section 13 - "Tier 2 Site Specific Production worksheet"):

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.

4 - Exposure Scenario Worker

1. Use as a fuel

List of use descriptors

Sector(s) of Use	SU3: Industrial uses
Product categories [PC]:	Not available.
Name of contributing environmental scenario and corresponding ERC	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles. ERC5: Industrial use resulting in inclusion into or onto a matrix. ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates). ERC6b: Industrial use of reactive processing aids. ERC6c: Industrial use of monomers for manufacture of thermoplastics. ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers. Specific Environmental Release Category: ESVOC SpERC 1.1b.v1
List of names of contributing worker scenarios and corresponding PROCs	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.
Further explanations	
Other Process or activity	Bulk loading (including marine vessel/barge, rail/road car and IBC loading) of substance within closed or contained systems, including incidental exposures during its sampling, storage, unloading, maintenance and associated laboratory activities.

2.1. Contributing exposure scenario controlling environmental exposure for Industrial use of processing aids in processes and products, not becoming part of articles.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently). Substance is complex UVCB. Predominantly hydrophobic.
Physical state	Liquid
Viscosity	
Kinematic viscosity	1,6 mm²/s 40 °C
Dynamic viscosity	Not available.

Amounts used

Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tons/year):	1,1 e7
Fraction of Regional tonnage used locally:	0,14
Annual site tonnage (tons/year):	1,5 e6
Maximum daily site tonnage (kg/day):	5 e6

Frequency and duration of use

Batch process	Not available.
Continuous process	Emission days (days/year): 300

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0,0007	0	0,00000044	

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emission to provide a typical removal efficiency of (%): 95
Soil	Not available.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87,7. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not available.
Remarks	Risk from environmental exposure is driven by freshwater sediment. Onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater.

Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal STP
Discharge rate	2000
Treatment effectiveness	88,8
Sludge treatment technique	Not available.
Measures to limit air emissions	Not available.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): 5,2e6
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	Not available.
Disposal methods	Not available.
Treatment effectiveness	Not available.
Remarks	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	This substance is consumed during use and no waste of the substance is generated.
Treatment effectiveness	Not available.
Remarks	Not available.

Additional good practice advice beyond the REACH CSA	Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in the PETRORISK file.

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

Process categories beyond the REACH CSA	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.

Product characteristics

Concentration of the substance in a mixture	Covers percentage substance in the product up to 100 % (unless stated differently).
Physical form of the product	Liquid
Vapour pressure	Liquid, vapour pressure 0,5 - 10 kPa at STP.

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

Amounts used

Not available.

Frequency and duration of use

Duration	Frequency of use	Remarks
8	1 day	Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Exposed skin areas	Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Other given operational conditions affecting workers exposure

Not available.

Other relevant operational conditions

Not available.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems); Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Bulk closed unloading, Outdoor; Transfer via enclosed lines. Bulk product storage; Handle substance within a closed system. Equipment cleaning and maintenance; Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Technical conditions and measures to control dispersion from source towards the worker	General exposures (closed systems) and Product sampling; Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Drum/batch transfers; Ensure material transfers are under containment or extract ventilation. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Operation of solids filtering equipment; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Bulk product storage; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens); Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Conditions and measures related to personal protection, hygiene and health evaluations	General exposures (closed systems); Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. General exposures (closed systems) and Product sampling; Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Bulk closed unloading, Outdoor; Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Drum/batch transfers; Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Operation of solids filtering equipment; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Bulk product storage; Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Use as a fuel, (closed systems); Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Equipment cleaning and maintenance; Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

3. Exposure Estimation

Environment

See PETRORISK file in IUCLID Section 13 - "LocalCSR" worksheet.

Health

	Exposure level	RCR	Method	Remarks
General exposures (closed systems)	0,01 mg/m³	0.058	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.625	**	All routes
General exposures (closed system) + Process sampling	0,5 mg/m³	0.250	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.817	**	All routes
General exposures (closed systems)	0,064 mg/m³	0.250	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Bulk closed unloading + Outdoor	0,064 mg/m³	0.283	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Drum/batch transfers	0,17 mg/m³	0.283	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.850	**	All routes
Operation of solids filtering equipment	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
Bulk product storage	0,064 mg/m³	0.320	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.887	**	All routes
(closed systems)	0,01 mg/m³	0.083	**	Inhalation Exposure
	0,34 mg/kg bw/day	0.567	**	Dermal Exposure
		0.650	**	All routes
Equipment cleaning and maintenance	0,0024 mg/m³	0.020	**	Inhalation Exposure
	0,2 mg/kg bw/day	0.833	**	Dermal Exposure
		0.853	**	All routes

** - The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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Environment

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