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

1.1 Product identifier

Product name	2-ethoxy-2-methylpropane / ETHYL TERT-BUTYL ETHER
Product description	V4020-ETBE-2-ethoxy-2-methylpropane / ETHYL TERT-BUTYL ETHER
Trade Name	ETBE
Product code	V4020, ETBE
CAS No.	637-92-3
EC No.	211-309-7
REACH Registration No.	01-2119452785-29-xxxx

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

Identified use(s)

No	Exposure Scenario	Page:
1	Transport and Distribution	**10**
2	Formulation	**13**
3	Use as a fuel (Industrial)	**16**
4	Use as a fuel (Professional)	**19**
5	Use as a fuel (Consumer)	**22**

Uses advised against: Anything other than the above.

1.3 Details of the supplier of the safety data sheet

Company Identification:
Vitol SA
Place des Bergues 3
1201 Geneva
Switzerland

Telephone: +31 10 498 7200
Fax: +31 10 452 9545
E-mail (competent person): xreach@vitol.com

1.4 Emergency Telephone Number

Emergency Phone No.: +44 (0) 1235 239 670, 24/7
Language(s) spoken: All official European languages.

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Regulation (EC) No. 1272/2008 (CLP)

Flam. Liq. 2; H225
STOT SE 3; H366 (Central nervous system, Inhalation)

2.2 Label elements

According to Regulation (EC) No. 1272/2008 (CLP)
Product description: V4020-ETBE-2-ethoxy-2-methylpropane / ETHYL TERT-BUTYL ETHER

Hazard Pictogram(s)

Signal Word(s): DANGER

Hazard Statement(s):
H225: Highly flammable liquid and vapour.
H336: May cause drowsiness or dizziness. Central nervous system, Inhalation

Precautionary Statement(s):
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P243: Take precautionary measures against static discharge.

P261: Avoid breathing vapours.
P271: Use only outdoors or in a well-ventilated area.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P403+P233: Store in a well-ventilated place. Keep container tightly closed.

2.3 Other hazards

May form explosive mixture with air. The vapour is heavier than air; beware of pits and confined spaces. Releases flammable vapors below normal ambient temperatures.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

SUBSTANCE	CAS No.	EC No.	%W/W
Tert-Butyl Methyl Ether	1634-04-4	216-653-1	100

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Self-protection of the first aider: The vapour is heavier than air; beware of pits and confined spaces. If it is suspected that fumes are still present, the responder should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Avoid all contact. Do not ingest. If swallowed then seek immediate medical assistance.

Inhalation: IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical advice/attention if you feel unwell.

Skin contact: IF ON SKIN (or hair): Remove contaminated clothing immediately and wash affected skin with plenty of water or soap and water. If irritation (redness, rash, blistering) develops, get medical attention.

Eye contact: IF IN EYES: Flush eyes with water for at least 15 minutes while holding eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

Ingestion: IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Do not give anything by mouth to an unconscious person. Get medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

Irritation of the respiratory tract. Coughing, Wheezing. Causes skin irritation. Ingestion may cause irritation of the gastrointestinal tract.

4.3 Indication of any immediate medical attention and special treatment needed

IF SWALLOWED: Do NOT induce vomiting, if vomiting does occur, have victim lean forward to reduce risk of aspiration. Treat symptomatically.

Notes to a physician: In case of ingestion the stomach should be emptied by gastric lavage under qualified medical supervision. At high doses, effects on the CNS are possible.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Extinguish with sand or dry chemical. Foam, Carbon dioxide, Water fog or dry powder.

Unsuitable extinguishing media: Do not use water jet. Direct water jet may spread the fire.

5.2 Special hazards arising from the substance or mixture

Releases flammable vapors below normal ambient temperatures. Prevent liquid entering sewers, basements and any watercourses. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback.

5.3	**Advice for firefighters**	Fight fire with normal precautions from a reasonable distance. Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. Avoid release to the environment. Dike fire control water for later disposal.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1	**Personal precautions, protective equipment and emergency procedures**	Caution - spillages may be slippery. Eliminate sources of ignition. No open flames, no sparks and no smoking. Stop leak if safe to do so. Ensure suitable personal protection during removal of spillages. Avoid all contact. Keep upwind. The vapour is heavier than air; beware of pits and confined spaces.
6.2	**Environmental precautions**	Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body.
6.3	**Methods and material for containment and cleaning up**	Highly flammable. Adsorb spillages onto sand, earth or any suitable adsorbent material. Use non-sparking equipment when picking up flammable spill. Ensure that the equipment is adequately grounded. Sweep up and shovel into waste drums or plastic bags. Transfer to a lidded container for disposal or recovery.
6.4	**Reference to other sections**	See Section: 8,13

SECTION 7: HANDLING AND STORAGE

7.1	**Precautions for safe handling**	Keep away from sources of ignition. - No smoking. Use only outdoors or in a well-ventilated area. Prevent vapour build up by providing adequate ventilation during and after use. Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Take action to prevent static discharges. Use non-sparking tools. Ground/bond container and receiving equipment. The vapour is heavier than air; beware of pits and confined spaces. Avoid all contact with substance. Do not ingest. Do not breathe vapour. Use personal protective equipment as required. See Section: 8. Keep good industrial hygiene. Wash hands thoroughly after handling. Contaminated clothing should be thoroughly cleaned.
	Maintenance	Observe precautions pertaining to confined space entry. Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair.
7.2	**Conditions for safe storage, including any incompatibilities**	Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Bund storage facilities to prevent soil and water pollution in the event of spillage. Keep only in original packaging. Keep containers properly sealed when not in use. Protect from sunlight. Containers of this material may be hazardous when empty since they retain product residue. Containers must not be punctured or destroyed by burning, even when empty.
	Storage temperature	Stable at ambient temperatures.
	Storage measures	Keep only in the original container. Suitable material: Mild steel, Carbon Steel
	Incompatible materials	Keep away from oxidising agents.
7.3	**Specific end use(s)**	See Section: 1.2 and/or Exposure Scenario

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational exposure limits Not established

8.1.2 Biological limit value Not established

8.1.3 PNECs and DNELs

DNEL ETBE	Oral (mg/kg bw/day)	Inhalation (mg/m³)	Dermal (mg/kg bw/day)
Industry- Long Term - Systemic effects	-	352	6767
Industry- Short term - Systemic effects	-	2800	-

Industry- Short term - Local effects	-	105	-
Consumer - Long Term - Systemic effects	6	105	4060
Consumer - Long Term - Systemic effects	-	1680	-
Consumer - Long Term - Local effects	-	63	-

PNEC	ETBE
Aquatic Compartment	PNEC aquatic, freshwater 0.51 mg/L PNEC aquatic, marine water 0.017 mg/L PNEC aquatic, intermittent release 11 mg/L PNEC STP 12.5 mg/L PNEC sediment, freshwater 2.86 mg/kg sediment dw PNEC sediment, marine water 0.078 mg/kg sediment dw
Terrestrial Compartment	PNEC soil 0.274 mg/kg soil dw

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Ensure adequate ventilation. Guarantee that the eye flushing systems and safety showers are located close to the working place.

8.2.2 Individual protection measures, such as personal protective equipment

Fuels are typically used, transferred and transported in closed systems. If exposure is likely (i.e. during sampling) the following advice may be appropriate. Good hygiene practices and housekeeping measures.

Refer to annexes for exposure scenarios detailing use specific exposure controls.

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Eye/ face protection

Wear eye protection with side protection (EN166).

Skin protection

Hand protection: Wear impervious gloves (EN374). Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

Body protection: Fire retardant clothing is appropriate for routine occupational use.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.

High concentrations/Aerosol or mist formation. Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.

Thermal hazards

Not applicable

8.2.3 Environmental exposure controls

Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	Liquid
Colour	Colourless to yellowish liquid.
Odour	Not defined
Melting point/freezing point	- 94 °C
Boiling point or initial boiling point and boiling range	73 °C
Flammability	Highly flammable liquid and vapour.
Lower and upper explosion limit	Not established
Flash point	- 19 °C

Auto-ignition temperature	375 °C
Decomposition temperature	Not established
pH	Not established
Kinematic viscosity	0.53 mm²/s at 40 °C
Solubility	Water: 2.37 g/ 100 g at 20 °C
Partition coefficient: n-octanol/water (log value)	log P: 1.28
Vapour pressure	12.8 kPa at 20°C
Density and/or relative density	0.75 g/cm³ at 20 °C
Relative vapour density	Not established
Particle characteristics	Not established

9.2 Other information

Vapour may create explosive atmosphere.

Upper/lower flammability or explosive limits: Flammable Limits (Upper) (%v/v): 7.7; Flammable Limits (Lower) (%v/v): 1.23

SECTION 10: STABILITY AND REACTIVITY

10.1	**Reactivity**	Stable under normal conditions. Reacts with - Strong oxidising agents
10.2	**Chemical stability**	Stable under normal conditions.
10.3	**Possibility of hazardous reactions**	None known
10.4	**Conditions to avoid**	Contact with strong acids can decompose this material and create extremely flammable isobutylene.
10.5	**Incompatible materials**	Acids. Keep away from oxidising agents.
10.6	**Hazardous decomposition products**	Carbon monoxide, Carbon dioxide

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity - Ingestion	Based upon the available data, the classification criteria are not met. LD50 (oral,rat) mg/kg: >2000 (OECD 401)
Acute toxicity - Inhalation	Based upon the available data, the classification criteria are not met. Estimated LD50 Vapour > 20 mg/l
Acute toxicity - Skin contact	Based upon the available data, the classification criteria are not met. LD50 (skin,rabbit) mg/kg: >2000 (OECD 402)
Skin corrosion/irritation	Based upon the available data, the classification criteria are not met. Mean erythema score: 0.67 (rabbit) (OECD 404) Mean edema score: 0.11 (rabbit) (OECD 404)
Serious eye damage/irritation	Based upon the available data, the classification criteria are not met. Not irritating to eyes. (rabbit) (OECD 405)
Respiratory or skin sensitisation	Based upon the available data, the classification criteria are not met. Sensitisation (guinea pig) – Negative (OECD 406)
Germ cell mutagenicity	Based upon the available data, the classification criteria are not met. In vitro – Negative (OECD 476)
Carcinogenicity	Based upon the available data, the classification criteria are not met. Carcinogenicity - Negative (rat) (OECD 453)
Reproductive toxicity	Based upon the available data, the classification criteria are not met. Reproductive toxicity: Negative (rat) (OECD 416) Developmental toxicity: Negative (rat) (OECD 414)
STOT - Single Exposure	STOT SE 3; May cause drowsiness and dizziness. **(**Central nervous system, Inhalation)
STOT - Repeated Exposure	Based upon the available data, the classification criteria are not met. Negative (rat) (OECD 415)
Aspiration hazard	Based upon the available data, the classification criteria are not met.

11.2 Information on other hazards

11.2.1	Endocrine disrupting properties	This product does not contain a substance that has endocrine disrupting properties with respect to humans as no components meets the criteria.
11.2.2	Other information	None known

SECTION 12: ECOLOGICAL INFORMATION

12.1	**Toxicity**	Based upon the available data, the classification criteria are not met. NOEC: 64 mg/l freshwater (Zebra fish) OECD 212
12.2	**Persistence and degradability**	Readily biodegradable (according to OECD criteria).
12.3	**Bioaccumulative potential**	The substance has low potential for bioaccumulation.
12.4	**Mobility in soil**	The product is predicted to have moderate mobility in soil. Slightly soluble in: Water
12.5	**Results of PBT and vPvB assessment**	Not classified as PBT or vPvB. None of the substances in this product fulfil the criteria for being regarded as a PBT or vPvB substance.
12.6	**Endocrine disrupting properties**	This product does not contain a substance that has endocrine disrupting properties with respect to humans as no components meets the criteria.
12.7	**Other adverse effects**	None known

SECTION 13: DISPOSAL CONSIDERATIONS

13.1	**Waste treatment methods**	Dispose of this material and its container as hazardous waste. Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point. Disposal should be in accordance with local, state or national legislation. Containers of this material may be hazardous when empty since they retain product residue. Containers must not be punctured or destroyed by burning, even when empty. Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company. Waste code: 16 05 06, 16 05 08*
	Waste classification according to Directive 2008/98/EC (Waste Framework Directive)	HP3

SECTION 14: TRANSPORT INFORMATION

		ADR/RID	**IMDG/ADN**
14.1	**UN number or ID number**	UN 1179	UN 1179
14.2	**UN proper shipping name**	ETHYL BUTYL ETHER	ETHYL BUTYL ETHER
14.3	**Transport hazard class(es)**	3	3
14.4	**Packing group**	II	II
14.5	**Environmental hazards**	Not classified	Not classified as a Marine Pollutant.
14.6	**Special precautions for user**	See Section: 2	
14.7	**Maritime transport in bulk according to IMO instruments**	No information available.	No information available.
14.8	**Additional information**	HIN: 30 Tunnel Code: 3 (D/E) Limited Quantity: 5L	EmS: F-E, S-E Limited Quantity: 5L

SECTION 15: REGULATORY INFORMATION

15.1	**Safety, health and environmental regulations/legislation specific for the substance or mixture**	
15.1.1	**EU regulations**	
	Seveso	Upper Tier: 25000 tonnes Lower Tier: 2500 tonnes
15.1.2	**National regulations**	
	Germany	Water hazard class: 1
15.2	**Chemical Safety Assessment**	This safety data sheet contains more than one ES in an integrated form. Contents of the exposure scenarios have been included into sections 1.2, 8, 9, 12, 15 and 16 of this safety data sheet.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: New SDS Regulation 2020/878 format, all sections have been updated to include new information. Please review SDS with care.

References:
Existing Safety Data Sheet (SDS).
Existing ECHA registration(s) for ETBE (CAS No. 637-92-3) and Chemical Safety Report.

EU Classification: This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Legend

ADR	ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS	Chemical Abstracts Service
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
EC	European Community
ECHA	European Chemicals Agency
EU	European Union
DNEL	Derived no effect level
IATA	IATA: International Air Transport Association
ICAO	ICAO: International Civil Aviation Organization
IMDG	IMDG: International Maritime Dangerous Goods
LC50	Lethal Concentration at which 50% of the population is killed
LD50	Lethal Dose at which 50% of the population is killed
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Cooperation and Development
PBT	PBT: Persistent, Bioaccumulative and Toxic
PNEC	Predicted No Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	RID: Regulations concerning the international railway transport of dangerous goods
UN	United Nations
vPvB	vPvB: very Persistent and very Bioaccumulative

Hazard classification / Classification code:
Flam. Liq. 2; Flammable liquid, Category 2
STOT SE 3; Specific Target Organ Toxicity — Single Exposure, Category 3

Hazard Statement(s)
H225: Highly flammable liquid and vapour.
H336: May cause drowsiness or dizziness.

Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

Disclaimers
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Annex to the extended Safety Data Sheet (eSDS)
See below -

EINECS No. 211-309-7

Summary of Parameters

Physical Parameters			
Vapour pressure (hPa)			170 (Liquid with high volatility.)
Partition Coefficient (log K_{OW})			1.48
Aqueous solubility (mg/l)			16,400
Molecular weight			102.18
Biodegradability			Inherently biodegradable, not fulfilling criteria
Human Health (DNEL)			
Workers	Short term	Inhalation (mg/m³)	2800 (= 667 ppm)
		Dermal (mg/kg bw/day)	Non-toxic
	Long Term	Inhalation (mg/m³)	352 (Systemic effects) 105 (Local effects)
		Dermal (mg/kg bw/day)	6767
Consumer		Inhalation (mg/m³)	1680 (Acute) 105 (long-term, Systemic effects) 63 (long-term,Local effects)
		Dermal (mg/kg bw/day)	4060
		Oral (mg/kg bw/day)	12.5
Environmental Parameters			
Sewage Treatment Plant (STP) (mg/l)			12.5
freshwater (mg/l)			0.51
marine water(mg/l)			0.017
freshwater sediment (mg/kg wet weight)			28.5
marine sediment (mg/kg wet weight)			1.45
soil (mg/kg wet weight)			2.41

Contents

Contributing Scenarios

PROC Codes
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
(Storage) Bulk storage with occasional sampling from dedicated sample point
PROC3 Use in closed batch process (synthesis or formulation)
(Sampling) with sample collection
(Elevated) Operation is carried out at elevated temperature (> 20°C above ambient temperature).
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
(Maintenance) Equipment cleaning and maintenance
(Manual) Manual transfer/pouring from containers
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
(bulk closed) Bulk open loading (e.g. road/rail car top loading)
(bulk open) Bulk open loading (e.g. road/rail car top loading)
(Drum) Drum or batch transfers with dedicated equipment
(bulk) Bulk transfer in a closed system
(Refuelling) Refuelling vehicles, light aircraft or marine craft.
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15 Use as laboratory reagent
PROC16 Using material as fuel sources, limited exposure to unburned product to be expected

Exposure Scenario 1 – Transport and Distribution

1.0 Contributing Scenarios	
Sector of uses SU	3
Process category [PROC]	1, 2, 2 (Storage), 3, 3 (Sampling), 4, 8a (maintenance), 8b (bulk closed), 8b (bulk open), 8b (Drum), 9, 15
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	1, 2
Specific Environmental Release Categories SPERC	ESVOC3 SpERC

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid with low volatility.	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	PROC3 (Sampling)	Covers exposure up to 15 minutes
	PROC2 (Storage), PROC8b (bulk closed),	Covers exposure up to 1 hour
	8b (bulk open), 8a (Maintenance)	Covers exposure up to 4 hours
	All other PROC's	Covers exposure up to 8 hours
Other operational conditions affecting worker exposure		
Area of use	PROC2, PROC8b (bulk closed),	Outdoor
	All other PROC's	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes use at not more than 20°C above ambient temperature, unless stated differently. Assumes a good basic standard of occupational hygiene is implemented.		
Organisational measures		
PROC8a (Maintenance)	Drain or remove substance from equipment prior to break-in or maintenance. (Inhalation Efficiency of at least 90%)	
PROC15	Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Efficiency of at least 70%	
Technical conditions of use		
PROC3, PROC4	Sampling via closed loop systems	
PROC8b (bulk open)	Ensure material transfers are under containment or extract ventilation. Efficiency of at least 30%	
PROC8a (bulk open), PROC9	Ensure material transfers are under containment or extract ventilation. Efficiency of at least 90%	
Risk management measures related to human health		
Respiratory protection	PROC2, PROC 2 (Storage), PROC3 (Sampling), PROC8b (bulk closed), PROC8b (bulk open), PROC8a (maintenance)	If exposure duration technically not possible, Wear a respirator conforming to EN140 with Type A filter or better.
Hand and/or Skin protection	No special measures are required.	
Eye Protection	No special measures are required.	
Other operational conditions affecting worker exposure		
None.		

2.2 Control of environmental exposure	
Amounts used	
Fraction of EU tonnage used in region:	1.0
Regional use tonnage (tons/year):	9.01E+05
Fraction of Regional tonnage used locally: tons/year	0.02 (Distribution) 1 (Storage)
Annual site tonnage (tons/year):	18,020 (Distribution) 901,000 (Storage)
Maximum daily site tonnage (kg/day):	51,486 (Distribution) 2,468,493 (Storage)
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	20,000
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	350 (Continuous release.)
Release fraction to air from process (initial release prior to RMM):	1.0E-04
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emission to provide a typical removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	97 (Transport) 99 (Storage)
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	60 (Transport) 80 (Storage)
Treat soil emission to provide a typical removal efficiency of (%):	0
Note: Common practices vary across sites thus conservative process release estimates used. No wastewater treatment required.	
Organisational measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Conditions and measures related to municipal sewage treatment plant	
Size of municipal sewage system/treatment plant (m^3/d)	2,000
Degradation effectiveness (%)	92.3
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	Not defined

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA

	Inhalation		Dermal		General Comment Regarding All Proc's
Process category [PROC]	**inhalation exposure (mg/m^3)**	**Risk characterisation ratio (RCR)**	**dermal exposure(mg/kg bw/day)**	**Risk characterisation ratio (RCR)**	**Risk characterisation ratio (RCR)**
PROC1	0.04	0.00	0.34	0.00	0.00
PROC2	89	0.84	1.37	0.00	0.84
PROC2 (Storage)	42.4	0.40	1.37	0.00	0.40
PROC3	42	0.40	0.34	0.00	0.40
PROC3 (Sampling)	42.4	0.40	0.34	0.00	0.40
PROC4	42	0.40	6.86	0.00	0.40
PROC8a (Maintenance)	63.6	0.60	13.7	0.00	0.60
PROC8b (bulk closed)	89	0.84	6.86	0.00	0.84

PROC8b (bulk open)	63.6	0.60	6.86	0.00	0.60
PROC8b (Drum)	85	0.80	6.86	0.00	0.80
PROC15	64	0.60	0.34	0.00	0.34

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	EUSES v2.1

Transport

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
RCR	8.32E-04	2.88E-04	9.47E-03	2.83E-04	6.28E-05	1.34E-04
PEC	0.01	1.47E-03	1.61E-04	6.82E-04	1.79E-03	1.95E-04

Storage

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
RCR	8.48E-04	2.94E-03	n.a.	9.54E-03	2.94E-03	n.a.
PEC	0.011	1.50E-03	n.a.	0.023	1.82E-03	n.a.

Human exposure prediction

Route of Exposure	Exposure (µg kg^{-1} day^{-1})	RCR
Transport		
Oral	7.86E-03	6.29E-06
Inhalation	2.03E-04	1.13E-05
Storage		
Oral	8.08E-04	6.46E-05
Inhalation	7.84E-04	4.35E-05

4. Evaluation guidance to downstream user

For scaling see	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 support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Exposure assessment instrument/tool/method	Workers	ECETOC TRA v2.0 Worker
	environmental exposure	EUSES v2.1

Exposure Scenario 2 – Formulation

1.0 Contributing Scenarios	
Sector of uses SU	3,
Process category [PROC]	1, 2, 2 (Storage), 3, 3 (Sampling), 3 (Elevated), 8a (Maintenance), 8a (manual), 8b (bulk closed), 8b (Drum), 9, 15
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	2
Specific Environmental Release Categories SPERC	ESVOC3 SpERC

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid with high volatility.	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	PROC2 (Storage), PROC8a (Maintenance)	Covers exposure up to 1 hour
	PROC2, PROC5, PROC8a (manual)	Covers exposure up to 4 hours
	All other PROC's	Covers exposure up to 8 hours
Other operational conditions affecting worker exposure		
Area of use	PROC2	Outdoor
	All other PROC's	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes use at not more than 20°C above ambient temperature, unless stated differently. Assumes a good basic standard of occupational hygiene is implemented.		
Organisational measures		
PROC8a (Maintenance)	Drain or remove substance from equipment prior to break-in or maintenance. Inhalation Efficiency of at least 90%	
PROC15	Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Efficiency of at least 70%	
Technical conditions of use		
PROC3, PROC3 (Sampling), PROC3 (Elevated), PROC4, PROC5, PROC9	Provide extract ventilation to points where emissions occur. Efficiency of at least 90%	
PROC8b (bulk), PROC8b (Drum)	Provide extract ventilation to points where emissions occur. Efficiency of at least 97%	
PROC8a (manual)	Provide extract ventilation to points where emissions occur. Efficiency of at least 90%	
Risk management measures related to human health		
Respiratory protection	PROC2, PROC2 (Storage), PROC5, PROC8a (manual), PROC8a (Maintenance)	If exposure duration technically not possible, Wear a respirator conforming to EN140 with Type A filter or better.
Hand and/or Skin protection	No special measures are required.	
Eye Protection	No special measures are required.	
Other operational conditions affecting worker exposure		
None.		
2.2 Control of environmental exposure		
Amounts used		
Fraction of EU tonnage used in region:		
Regional use tonnage (tons/year):	901,000	
Fraction of Regional tonnage used locally: tons/year	0.05	

Annual site tonnage (tons/year):	45,050
Maximum daily site tonnage (kg/day):	150,167
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	20,000
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	300 (Continuous release.)
Release fraction to air from process (initial release prior to RMM):	1.0E-03
Release fraction to wastewater from process (initial release prior to RMM):	3.0E-04
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emission to provide a typical removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	99
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	80
Treat soil emission to provide a typical removal efficiency of (%):	0
Note: Common practices vary across sites thus conservative process release estimates used. No wastewater treatment required.	
Organisational measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Conditions and measures related to municipal sewage treatment plant	
Not applicable	
Conditions and measures related to external treatment of waste for disposal	
Not applicable	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	Not defined

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA

	Inhalation		Dermal		General Comment Regarding All Proc's
Process category [PROC]	**inhalation exposure (mg/m^3)**	**Risk characterisation ratio (RCR)**	**dermal exposure(mg/kg bw/day)**	**Risk characterisation ratio (RCR)**	**Risk characterisation ratio (RCR)**
PROC1	0.04	0.00	0.34	0.00	0.00
PROC2	89	0.84	1.37	0.00	0.84
PROC2 (Storage)	42	0.40	1.37	0.00	0.40
PROC3	42	0.40	0.34	0.00	0.40
PROC3 (Sampling)	42	0.40	0.34	0.00	0.40
PROC3 (Elevated)	42	0.40	0.34	0.00	0.40
PROC4	42	0.40	6.86	0.00	0.40
PROC5	64	0.60	13.7	0.00	0.60
PROC8a (Maintenance)	21	0.20	13.7	0.00	0.20
PROC8a (manual)	64	0.60	13.7	0.00	0.60
PROC8b (bulk closed)	19	0.18	6.86	0.00	0.18
PROC8b (Drum)	19	0.20	6.86	0.00	0.20
PROC9	85	0.80	6.86	0.00	0.80
PROC15	64	0.60	0.34	0.00	0.60

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	EUSES v2.1

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
RCR	8.8E-04	2.94E-03	9.65E-03	0.019	6.39E-05	1.37E-04
PEC	0.011	1.50E-03	1.63E-04	0.045	1.82E-03	1.99E-04

Human exposure prediction

Route of Exposure	Exposure (µg kg^{-1} day^{-1})	RCR
Oral	1.92E-04	1.54E-05
Inhalation	4.04E-04	2.24E-06

4. Evaluation guidance to downstream user

For scaling see	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 support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Exposure assessment instrument/tool/method	Workers	ECETOC TRA v2.0 Worker
	environmental exposure	EUSES v2.1

Exposure Scenario 3 – Use as a fuel (Industrial)

1.0 Contributing Scenarios	
Sector of uses SU	3
Process category [PROC]	1, 2, 2 (Storage), 3, 8a (maintenance), 8a (manual), 8b (bulk), 8b (Drum), 16
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	8b
Specific Environmental Release Categories SPERC	ESVOC3 SpERC

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid with high volatility.	
Concentration of substance in product	Covers concentrations up to 15%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	PROC8a (Maintenance), PROC8a (bulk)	Covers exposure up to 4 hours
	All other PROC's	Covers exposure up to 8 hours
Other operational conditions affecting worker exposure		
Area of use	PROC2 (Storage)	Outdoor
	All other PROC's	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes use at not more than 20°C above ambient temperature, unless stated differently. Assumes a good basic standard of occupational hygiene is implemented.		
Organisational measures		
PROC8a (Maintenance)	Drain or remove substance from equipment prior to break-in or maintenance. Inhalation Efficiency of at least 80%	
Technical conditions of use		
PROC8b (bulk)	Mandatory use of Stage 1 Vapour Recovery. Efficiency of at least 80%	
PROC2, PROC3	Provide extract ventilation to points where emissions occur. Efficiency of at least 90%	
PROC8b (Drum)	Use drum pumps. Efficiency of at least 80%	
Risk management measures related to human health		
Respiratory protection	PROC8a (bulk), PROC8a (Maintenance)	If exposure duration technically not possible, Wear a respirator conforming to EN140 with Type A filter or better.
Hand and/or Skin protection	No special measures are required.	
Eye Protection	No special measures are required.	
Other operational conditions affecting worker exposure		
None.		
2.2 Control of environmental exposure		
Amounts used		
Fraction of EU tonnage used in region:	1	
Regional use tonnage (tons/year):	901,000	
Fraction of Regional tonnage used locally: tons/year	0.02	
Annual site tonnage (tons/year):	18,020	
Maximum daily site tonnage (kg/day):	51,486	
Environment factors not influenced by risk management		
Flow rate of receiving surface water (m^3/d):	20,000	
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Operational conditions		
Emission days (days/year):	350 (Continuous release.)	

Release fraction to air from process (initial release prior to RMM):	0.25
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-04
Release fraction to soil from process (initial release prior to RMM):	1.0E-03
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emission to provide a typical removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	95
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	0
Treat soil emission to provide a typical removal efficiency of (%):	0
Note: Common practices vary across sites thus conservative process release estimates used. No wastewater treatment required.	
Organisational measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Conditions and measures related to municipal sewage treatment plant	
Not applicable	
Conditions and measures related to external treatment of waste for disposal	
Not applicable	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	Not defined

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA v2.0 Worker

	Inhalation		Dermal		General Comment Regarding All Proc's
Process category [PROC]	**inhalation exposure (mg/m³)**	**Risk characterisation ratio (RCR)**	**dermal exposure(mg/kg bw/day)**	**Risk characterisation ratio (RCR)**	**Risk characterisation ratio (RCR)**
PROC1	0.03	0.00	0.00	0.00	0.00
PROC2	13	0.12	0.82	0.00	0.12
PROC2 (Storage)	21ppm	0.84	0.82	0.00	0.84
PROC3	6ppm	0.24	0.20	0.00	0.24
PROC8a (Maintenance)	76	0.72	8.23	0.00	0.72
PROC8b (bulk)	46	0.43	4.12	0.00	0.43
PROC8b (Drum)	76	0.72	4.12	0.00	0.72
PROC16	64	0.60	0.20	0.00	0.60

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	EUSES v2.1

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
RCR	8.32E-04	2.88E-04	9.47E-03	2.83E-04	6.28E-05	1.34E-04
PEC	0.01	1.47E-04	1.61E-04	6.82E-04	1.79E-03	1.95E-04

Human exposure prediction

Route of Exposure	Exposure (µg kg^{-1} day^{-1})	RCR
Oral	1.92E-04	1.54E-05
Inhalation	4.04E-04	2.24E-06

4. Evaluation guidance to downstream user		
For scaling see	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 support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Exposure assessment instrument/tool/method	Workers	ECETOC TRA v2.0 Worker
	environmental exposure	EUSES v2.1

Exposure Scenario 4 – Use as a fuel (professional)

1.0 Contributing Scenarios	
Sector of uses SU	22
Process category [PROC]	1 (Storage), 2, 3, 8a (maintenance), 8b (bulk), 8b (Drum), 8b (refueling), 9, 16
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	8b, 8e
Specific Environmental Release Categories SPERC	ESVOC3 SpERC

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid with high volatility.	
Concentration of substance in product	Covers concentrations up to 15%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	PROC8b (Refuelling)	Covers exposure up to 1 hours
	PROC2, PROC8a (Maintenance), PROC8b (bulk), PROC9	Covers exposure up to 4 hours
	All other contributing scenarios	Covers exposure up to 8 hours
Other operational conditions affecting worker exposure		
Area of use	PROC8b (Drum), PROC16	Outdoor
	All other scenarios	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes use at not more than 20°C above ambient temperature, unless stated differently. Assumes a good basic standard of occupational hygiene is implemented.		
Organisational measures		
PROC8a (Maintenance)	Drain or remove substance from equipment prior to break-in or maintenance. Inhalation Efficiency of at least 90%	
PROC3, PROC8b (Refueling)	Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Efficiency of at least 70%	
PROC16	Use only outdoors or in a well-ventilated area. Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Efficiency of at least 70%	
Technical conditions of use		
PROC8b (bulk), PROC8b (Drum)	Mandatory use of Stage 1 Vapour Recovery. Efficiency of at least 80%	
PROC9	Use drum pumps. Efficiency of at least 80%	
Risk management measures related to human health		
Respiratory protection	PROC2, PROC8a (bulk), PROC8a (Maintenance), PROC8b (Refueling), PROC9	If exposure duration technically not possible, Wear a respirator conforming to EN140 with Type A filter or better.
Hand and/or Skin protection	No special measures are required.	
Eye Protection	No special measures are required.	
Other operational conditions affecting worker exposure		
None.		
2.2 Control of environmental exposure		
Amounts used		
Fraction of EU tonnage used in region:	Not defined	
Regional use tonnage (tons/year):	Not defined	
Fraction of Regional tonnage used locally: tons/year	Not defined	
Annual site tonnage (tons/year):	Not applicable - Dispersive use	
Maximum daily site tonnage (kg/day):	4.94	

Environment factors not influenced by risk management	
Flow rate of receiving surface water (m³/d):	20,000
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	365 (Dispersive use)
Release fraction to air from process (initial release prior to RMM):	1.0E-04
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emission to provide a typical removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	95
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	0
Treat air emission to provide a typical removal efficiency of (%):	0
Note: Common practices vary across sites thus conservative process release estimates used. No wastewater treatment required.	
Organisational measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Conditions and measures related to municipal sewage treatment plant	
Not applicable	
Conditions and measures related to external treatment of waste for disposal	
Not applicable	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	Not defined

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA v2.0 Worker

	Inhalation		Dermal		General Comment Regarding All Proc's
Process category [PROC]	**inhalation exposure (mg/m³)**	**Risk characterisation ratio (RCR)**	**dermal exposure(mg/kg bw/day)**	**Risk characterisation ratio (RCR)**	**Risk characterisation ratio (RCR)**
PROC1 (Storage)	0.25	0.00	0.2	0.00	0.00
PROC2	76	0.72	0.20	0.00	0.72
PROC3	76	0.72	8.2	0.00	0.72
PROC8a (Maintenance)	76	0.72	8.2	0.00	0.72
PROC8b (bulk)	76	0.72	4.1	0.00	0.72
PROC8b (Drum)	89	0.84	2.1	0.00	0.84
PROC8b (Refueling)	38	0.36	2.1	0.00	0.36
PROC9	76	0.72	4.1	0.00	0.72
PROC16	89	0.84	0.20	0.00	0.84

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	EUSES v2.1

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
RCR	4.16E-07	8.51E-04	3.35E-03	2.22E-05	4.78E-05	4.78E-05
PEC	5.20E-06	4.34E-04	5.70E-05	5.35E-05	5.27E-04	6.93E-05

Human exposure prediction

Route of Exposure	Exposure (µg kg^{-1} day^{-1})	RCR
Oral	2.98E-05	2.38E-06
Inhalation	1.41E-04	7.84E-06

4. Evaluation guidance to downstream user		
For scaling see	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 support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Exposure assessment instrument/tool/method	Workers	ECETOC TRA v2.0 Worker
	environmental exposure	EUSES v2.1

Exposure Scenario 5 – Use as a fuel (Consumer)

1.0 Contributing Scenarios	
Sector of uses SU	21
Process category [PROC]	not applicable
Chemical product category [PC]	PC13 (Refueling Car)
Article Categories [AC]	not applicable
Environmental release categories [ERC]	8d
Specific Environmental Release Categories SPERC	ESVOC30 SpERC

2.0 Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid with high volatility.
Concentration of substance in product	Covers concentrations up to 15%
Human factors not influenced by risk management	
Potential exposure area	Not defined
Operational conditions	
Area of use	Not defined
Characteristics of the surroundings	Not defined
Risk management measures	
Respiratory protection	No specific measures identified.
Hand/Skin protection	No specific measures identified.
Eye Protection	No specific measures identified.
2.2 Control of environmental exposure	
Amounts used	
Fraction of EU tonnage used in region:	Not defined
Regional use tonnage (tons/year):	Not defined
Fraction of Regional tonnage used locally: tons/year	Not defined
Annual site tonnage (tons/year):	Not defined
Maximum daily site tonnage (kg/day):	4.94
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	20,000
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	365 (Dispersive use)
Release fraction to air from process (initial release prior to RMM):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
Organisational measures to prevent/limit release from site	
No specific measures identified.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emission to provide the required removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	95
Estimated substance removal from wastewater via on-site sewage treatment (%):	0
Treat soil emission to provide a typical removal efficiency of (%):	0
Note: **No specific measures identified.**	
Conditions and measures related to municipal sewage treatment plant	
Size of municipal sewage system/treatment plant (m^3/d)	2,000
Degradation effectiveness (%)	95
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Substance release quantities after risk management measures	

Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	Not defined

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA

Note: Oral exposure is not expected to occur.

	Inhalation		Dermal		Overall
Process category [PROC]	**inhalation exposure (mg/m³)**	**Risk characterisation ratio (RCR)**	**dermal exposure(mg/kg bw/day)**	**Risk characterisation ratio (RCR)**	**inhalation exposure (mg/m³)**
PC13 (Refueling Car)	0.026	4.13E-04	0.0011	2.81E-06	4.16E-04

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	EUSES v2.1

environmental exposure	**STP**	**freshwater**	**marine water**	**soil**	**freshwater sediment**	**marine sediment**
RCR	4.16E-07	8.51E-04	3.35E-03	2.22E-05	4.78E-05	4.78E-05
PEC	5.2E-06	4.34E-04	5.70E-05	5.35E-05	5.27E-04	6.93E-05

Indirect exposure to humans via the environment:

Exposure route	**Exposure estimation (µg/kg/day)**	**Risk characterisation ratio (RCR)**
Oral	2.98E-05	2.38E-06
Inhalation	1.41E-04	7.84E-06

4. Evaluation guidance to downstream user

For scaling see	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 support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Exposure assessment instrument/tool/method	Workers	Measured exposure level (EU RAR of MTBE)
	environmental exposure	EUSES v2.1