SAFETY DATA SHEET

Revision: 24 March 2023 Version: 005

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

ETHANOL V4005

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

1.1 Product identifier

Product name	ETHANOL
Product description	V4005-BIO ETHANOLE-ETHANOL
Trade Name	BIO ETHANOLE
Product code	C9
CAS No.	64-17-5
EC No.	200-578-6
REACH Registration No.	01-2119457610-43-xxxx

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

Identified use(s)

No	Exposure Scenario	Page:
1	Industrial Distribution of Ethanol	**10**
2	Industrial Formulation and (re)packing of ethanol and other fuels (including mixtures)	**13**

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
Eye Irrit. 2; H319

2.2 Label elements

According to Regulation (EC) No. 1272/2008 (CLP)
Product description: V4004- ANHYDROUS ETHANOL-ETHANOL

Hazard Pictogram(s)

Signal Word(s): DANGER

Hazard Statement(s):
H225: Highly flammable liquid and vapour.
H319: Causes serious eye irritation.

Precautionary Statement(s):
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353: IF ON SKIN or hair: Take off immediately all contaminated clothing. Rinse skin with water.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
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.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

SUBSTANCE	CAS No.	EC No.	%W/W
Ethanol	64-17-5	200-578-6	100

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Self-protection of the first aider: If it is suspected that fumes are still present, the responder should wear an appropriate mask or self-contained breathing apparatus.

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): Wash affected skin with plenty of water. Wash contaminated clothing before reuse. 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 into the lungs. Obtain medical attention if symptoms appear or if large quantities have been ingested.

4.2 Most important symptoms and effects, both acute and delayed

Ingestion may cause irritation of the gastrointestinal tract. Causes eye irritation.

4.3 Indication of any immediate medical attention and special treatment needed

Unlikely to be required but if necessary treat symptomatically.

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

Flammable liquid and vapour. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. Prevent liquid entering sewers, basements and any watercourses. Decomposes in a fire giving off toxic fumes: Oxides of carbon.

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. 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 inhalation and contact with eyes or skin. Use personal protective equipment as required. See Section: 8. Keep good industrial hygiene. Wash hands thoroughly after handling. Contaminated clothing should be thoroughly cleaned.
7.2	**Conditions for safe storage, including any incompatibilities**	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, Stainless steel, Titanium, Bronze.
	Incompatible materials	Rubber, PVC, Zinc, Brass, Aluminium.
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

SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m³)	STEL (ppm)	STEL (mg/m³)	Note
Ethanol	64-17-5	1000	1920	-	-	WEL

Source: WEL: Workplace Exposure Limit (UK HSE EH40)

SUBSTANCE	CAS No.	Occupational Exposure Limit Value (8-hour reference period)		Occupational Exposure Limit Value (15-minute reference period)		Notes
		ppm	mg/m³	ppm	mg/m³	
Ethanol	64-17-5	-	-	1000	-	-

Source: 2021 Code of Practice for Safety, Health and Welfare at Work (Chemical Agents) Regulation (2001 – 2021) and the Safety, Health and Welfare at Work (Carcinogens) Regulations (2001 – 2019); Health and Safety Authority

8.1.2 Biological limit value Not established

8.1.3 PNECs and DNELs

DNEL MTBE	Oral (mg/kg bw/day)	Inhalation (mg/m³)	Dermal (mg/kg bw/day)

Industry- Long Term - Systemic effects	-	950	343
Industry- Short term - Local effects	-	1900	-
Consumer - Long Term - Systemic effects	84	114	206
Consumer - Long Term - Local effects	-	950	-

PNEC	**MTBE**
Aquatic Compartment	PNEC aquatic, freshwater 0.96 mg/L PNEC aquatic, marine water 0.79 mg/L PNEC aquatic, intermittent release 2.75 mg/L PNEC STP 580 mg/L PNEC freshwater sediment 3.6 mg/kg sediment dw PNEC sediment, marine water 2.9 mg/kg sediment dw
Terrestrial Compartment	PNEC soil 0.63 mg/kg soil dw
Hazard for predators	PNEC Oral 0.72 g/kg

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

Good hygiene practices and housekeeping measures.

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: Wear work clothes with long sleeves.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment. In the unlikely event of formation of particularly high levels of vapour a self contained breathing apparatus may be appropriate.

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	Alcohol-like
Melting point/freezing point	- 114 °C
Boiling point or initial boiling point and boiling range	78 °C
Flammability	Highly flammable liquid and vapour.
Lower and upper explosion limit	Not established
Flash point	12-13 °C
Auto-ignition temperature	363 - 425 °C
Decomposition temperature	Not established
pH	Not established

	Kinematic viscosity	1.17 mPa•s at 40 °C
	Solubility	789,000 mg/L at 20 °C - Completely miscible with water.
	Partition coefficient: n-octanol/water (log value)	- 0.35 log P at 20 °C
	Vapour pressure	5.9 kPa at 20°C
	Density and/or relative density	0.79 g/cm³ at 20 °C
	Relative vapour density	1.59
	Particle characteristics	Not established
9.2	**Other information**	Vapour may create explosive atmosphere.
	Upper/lower flammability or explosive limits	Flammable Limits (Upper) (%v/v): 19 Flammable Limits (Lower) (%v/v): 3.3

SECTION 10: STABILITY AND REACTIVITY

10.1	**Reactivity**	Stable under normal conditions. Reacts with - Strong oxidising agents, Mineral acids.
10.2	**Chemical stability**	Stable under normal conditions.
10.3	**Possibility of hazardous reactions**	None known
10.4	**Conditions to avoid**	Elevated temperature. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
10.5	**Incompatible materials**	Acids. Keep away from oxidising agents.
10.6	**Hazardous decomposition products**	Oxides of carbon

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. LC50 > 50 mg/l (rat) (OECD 403)
	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 (rabbit) (OECD 404) Mean edema score: 0 (rabbit) (OECD 404)
	Serious eye damage/irritation	Eye Irrit. 2; Causes eye irritation. Positive (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: No evidence of mutagenic effects. Bacteria (OECD 471) In vivo: No evidence of mutagenic effects. (Mouse) (OECD 478)
	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	Based upon the available data, the classification criteria are not met.
	STOT - Repeated Exposure	Based upon the available data, the classification criteria are not met. Oral: NOAEL =1730 mg/kg bw/day (rat) (OECD 408) Inhalation: No data available Skin contact: No data available
	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. LC50 > 100 MG/L (Daphnia magna) (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 has high mobility in soil. Completely miscible with 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*, 18 01 06*, 18 02 05*.
	Waste classification according to Directive 2008/98/EC (Waste Framework Directive)	HP3, HP5

SECTION 14: TRANSPORT INFORMATION

		ADR/RID	**IMDG/ADN**
14.1	**UN number or ID number**	UN 1170	UN 1170
14.2	**UN proper shipping name**	ETHANOL (ETHYL ALCOHOL)	ETHANOL (ETHYL ALCOHOL)
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**	Special Provisions: 144, 601 HIN: 30 Tunnel Code: 3 (D/E) Limited Quantity: 1L	EmS: F-E, S-D Limited Quantity: 1L

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: 50000 tonnes Lower Tier: 5000 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).
Harmonised Classification(s) for Ethanol (CAS No. 64-17-5).
Existing ECHA registration(s) for Ethanol (CAS No. 64-17-5) 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
ADN	ADN: European Agreement on the International Transport of Dangerous Goods by Inland Waterways
CAS	Chemical Abstracts Service
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
DNEL	Derived no effect level
EC	European Community
ECHA	European Chemicals Agency
EU	European Union
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
LTEL	Long term exposure limit
NOAEL	No Observed Adverse Effect Level
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
STEL	Short term exposure limit
UN	United Nations
vPvB	vPvB: very Persistent and very Bioaccumulative

Hazard classification / Classification code:	**Hazard Statement(s)**
Flam. Liq. 2; Flammable liquid, Category 2	H225: Highly flammable liquid and vapour.
Eye Irrit. 2; Eye Irritation, Category 2	H319: Causes serious eye irritation.

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
Information contained in this publication or as otherwise supplied to Users is believed to be accurate and is given in good faith, but it is for the Users to satisfy themselves of the suitability of the product for their own particular purpose. Vitol SA gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that exclusion is prevented by law. Vitol SA accepts no liability for loss or damage (other than that arising from death or personal injury caused by defective product, if proved), resulting from reliance on this information. Freedom under Patents, Copyright and Designs cannot be assumed.

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

Ethanol

CAS No. 64-17-5
EC No. 200-578-6

Summary of Parameters

Physical Parameters			
Vapour pressure (hPa)			5726
Partition Coefficient (log K_{OW})			-0.35 at 20 °C
Aqueous solubility (mg/l)			789,000 mg/L at 20 °C
Molecular weight			46.07
Biodegradability			Readily biodegradable.
Human Health (DNEL)			
Workers	Short term	Inhalation (mg/m³)	None
		Dermal (mg/kg bw/day)	None
	Long Term	Inhalation (mg/m³)	950
		Dermal (mg/kg bw/day)	343
Consumer		Inhalation (mg/m³)	114
		Dermal (mg/kg bw/day)	206
		Oral (mg/kg bw/day)	87

Environmental Parameters (PNECs)	
freshwater (mg/l)	0.96
marine water (mg/l)	0.79
freshwater sediment (mg/kg dry weight)	3.6
marine sediment (mg/kg dry weight)	Not applicable
soil (mg/kg dry weight)	0.63
STP (mg/l)	580
Secondary Poisoning	0.38 g/kg food

Contents

Contributing Scenarios

PROC Codes
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15 Use as laboratory reagent

Exposure Scenario 1 – Industrial Distribution of Ethanol

1.0 Contributing Scenarios	
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC2 Formulation of preparations ESVOC SpERC 1.1b.v1 (modified)
Specific Environmental Release Categories SPERC	Not applicable

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid (Vapour pressure 0.5-10kPa)	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
None		
Frequency and duration of use		
Exposure duration per day	Covers daily exposures up to 8 hours (unless stated differently). Continuous process.	
Exposure duration per year	300 days per year	
Other operational conditions affecting worker exposure		
Area of use	All PROC's	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).		
Technical conditions of use		
All PROC's	Indoor use - Handle substance within a closed system. Keep container tightly closed.	
Organisational measures		
All PROC's	Avoid splashing.	
Contributing Scenarios		
All PROC's: General measures (eye irritants)	Use suitable eye protection. Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Skin protection: none.	
PROC1 Use in closed process, no likelihood of exposure	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined	
PROC2 Use in closed, continuous process with occasional controlled exposure	Continuous release. Emission days (days/year): 300. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined	
PROC3 Use in closed batch process (synthesis or formulation)	Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100%	

	Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. Equipment cleaning and maintenance.	Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC15 Use as laboratory reagent	Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined

2.2 Control of environmental exposure

Amounts used	
Total supply chain	400000 tpa
Fraction of EU tonnage used in region:	0.1
Fraction of Regional tonnage used locally:	0.5
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	18,000
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	300
Release fraction to air from process (initial release prior to RMM):	0.0001
Release fraction to wastewater from process (initial release prior to RMM):	0.00001
Release fraction to soil from process (initial release prior to RMM):	0
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 (%):	$\geq$ 87 If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Treat soil emission to provide a typical removal efficiency of (%):	0
Organisational measures to prevent/limit release from site	
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.	
Conditions and measures related to municipal sewage treatment plant	

Size of municipal sewage system/treatment plant (m³/d)	2000
Degradation effectiveness (%)	≥ 87
Conditions and measures related to external treatment of waste for disposal	
Estimated amount entering waste treatment no greater than (%): 2. Suitable waste treatment: Incineration, Removal efficiency (total): 99.98%. Cement fuels, Removal efficiency (total): 99.98%. To be disposed of as hazardous waste. Dispose of waste product or used containers according to local regulations. 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 V3.0

	Inhalation		Dermal		Overall
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	0.019	<0.001	0.03	<0.001	<0.001
PROC2	9.6	0.01	1.4	0.004	0.0141
PROC3	19	0.02	0.69	0.002	0.0222
PROC4	38	0.04	6.9	0.02	0.0603
PROC5	96	0.101	14	0.04	0.141
PROC8a	96	0.101	14	0.04	0.141
PROC8b	48	0.05	14	0.04	0.0904
PROC9	96	0.101	6.9	0.02	0.121
PROC15	19	0.02	0.34	<0.001	0.0212

Note: Available hazard data do not enable the derivation of a DNEL for eye irritant effects. Msafe: 66700 te/day.

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA V3.0 ESVOC SpERC 1.1b.v1 (modified)

environmental exposure	**STP**	**freshwater**	**marine water**	**soil**	**freshwater sediment**	**marine sediment**
Predicted Environmental Exposure	0.421 mg/l	≤ 0.00654mg/l	≤ 0.000789 mg/l	≤ 0.00189 mg/kg dw	0.0251 mg/kg dw	0.00303 mg/kg dw
Risk characterisation ratio (RCR)	7.26E-05	≤ 6.81E-03	≤ 9.99E-04	≤ 1.11E-02	6.82E-03	1.00E-03

Indirect exposure to humans via the environment: Negligible

4. Evaluation guidance to downstream user

For scaling see		If the local environmental emission conditions deviate significantly from the used default values, please use the algorithm below to estimate the correct local emissions and RCRs: PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction) Example for calculating your local freshwater PEC: Corrected freshwater PEC = 0.52 * (your local emission [kg/day] / 15) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)
Exposure assessment instrument/tool/method	Workers	ECETOC TRA V3.0
	environmental exposure	ECETOC TRA V3.0

Exposure Scenario 2 – Industrial Formulation and (re)packing of ethanol and other fuels (including mixtures)

1.0 Contributing Scenarios	
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC2 Formulation of preparations ESVOC SpERC 2.2.v1 (modified).
Specific Environmental Release Categories SPERC	Not applicable

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid (Vapour pressure 0.5-10kPa)	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
None		
Frequency and duration of use		
Exposure duration per day	Covers daily exposures up to 8 hours (unless stated differently). Continuous process.	
Exposure duration per year	300 days per year	
Other operational conditions affecting worker exposure		
Area of use	All PROC's	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).		
Technical conditions of use		
All PROC's	Indoor use - Handle substance within a closed system. Keep container tightly closed.	
Organisational measures		
All PROC's	Avoid splashing.	
Contributing Scenarios		
All PROC's: General measures (eye irritants)	Use suitable eye protection. Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Skin protection: none.	
PROC1 Use in closed process, no likelihood of exposure	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined	
PROC2 Use in closed, continuous process with occasional controlled exposure	Continuous release. Emission days (days/year): 300. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined	
PROC3 Use in closed batch process (synthesis or formulation)	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100%	

	Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined
PROC15 Use as laboratory reagent	Continuous process. Indoor use. Duration: > 4 hours. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Concentration: 25-100% Risk Management Measures: None Local Exhaust Ventilation: None General ventilation: Not defined

2.2 Control of environmental exposure	
Amounts used	
Total supply chain	400000 tpa
Fraction of EU tonnage used in region:	1
Fraction of Regional tonnage used locally:	0.075
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	18,000
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	300
Release fraction to air from process (initial release prior to RMM):	0.025
Release fraction to wastewater from process (initial release prior to RMM):	0.001
Release fraction to soil from process (initial release prior to RMM):	0.0001
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 (%):	$\geq$ 87 If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Treat soil emission to provide a typical removal efficiency of (%):	0
Organisational measures to prevent/limit release from site	
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.	
Conditions and measures related to municipal sewage treatment plant	

Do not allow to enter drains, sewers or water courses.
Conditions and measures related to external treatment of waste for disposal
Estimated amount entering waste treatment no greater than: 5%. Suitable waste treatment: Incineration, Removal efficiency (total): 99.98%. Cement fuels, Removal efficiency (total): 99.98%. To be disposed of as hazardous waste. Dispose of waste product or used containers according to local regulations. 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 model (v3) ESVOC SpERC 2.2.v1 (modified).

	Inhalation		Dermal		Overall
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	0.019	<0.001	0.03	<0.001	<0.001
PROC2	9.6	0.01	1.4	0.004	0.0141
PROC3	19	0.02	0.69	0.002	0.0222
PROC4	38	0.04	6.9	0.02	0.0603
PROC5	96	0.101	14	0.04	0.141
PROC8a	96	0.101	14	0.04	0.141
PROC8b	48	0.05	14	0.04	0.0904
PROC9	96	0.101	6.9	0.02	0.121
PROC15	19	0.02	0.34	<0.001	0.0212

Note: Available hazard data do not enable the derivation of a DNEL for eye irritant effects. Msafe: 1240 te/day.

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA model (v3) ESVOC SpERC 2.2.v1 (modified).

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure	6.32 mg/l	0.577 mg/l	0.0635 mg/l	< 0.0883 mg/kgdw	2.21 mg/kgdw	0.244 mg/kgdw
Risk characterisation ratio (RCR)	1.09E-02	6.01E-01	8.04E-02	< 5.19E-01	6.01E-01	8.05E-02

Indirect exposure to humans via the environment: Negligible

4. Evaluation guidance to downstream user

For scaling see	If the local environmental emission conditions deviate significantly from the used default values, please use the algorithm below to estimate the correct local emissions and RCRs: PECcorrected = PECcalculated * (local emission fraction) * (local WWTP flow rate fraction) * (local river flow rate fraction) * (local STP efficiency fraction) <u>Example for calculating your local freshwater PEC:</u> Corrected local freshwater PEC = 0,185 * (your local emission [kg/day] / 28) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)	
Exposure assessment instrument/tool/method	Workers	ECETOC TRA model. (v3).
	environmental exposure	ECETOC TRA model (v3)