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

1.1. Product identifier

Chemical type	:	Substance
Substance name	:	Ethanol
Trade name	:	Ethanol
EC index no	:	603-002-00-5
EC no	:	200-578-6
CAS No.	:	64-17-5
REACH registration No.	:	01-2119457610-43-0107
Product code	:	996, SDS # PbR0004
Synonyms	:	Fuel Ethanol / Industrial Ethanol / Alcohol / Ehtanol Fuel Grade / Anhydrous ethyl alcohol / Bioethanol

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

1.2.1. Relevant identified uses

Use of the substance/preparation	:	Manufacture of substances Intermediate Formulation [mixing] of preparations and/or re-packaging Fuels Use as laboratory reagent.

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Petrobras International Braspetro B.V. – PIB BV
Prins Bernhardplein 200, 1097 – JB Amsterdam
The Netherlands

All communications shall be addressed exclusively to the following address:
Petrobras Europe Ltd
4th Floor, 20 North Audley Street
London W1K 6WL – United Kingdom
Fax number: +44(0) 20 7355 8750
E-mail: reach@petrobras.com.br

1.4. Emergency telephone number

Emergency number	:	For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident Call CHEMTREC Day or Night Within USA and Canada: 1-800-424-9300 Outside USA and Canada (collect calls accepted): 1-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Liq. 2 H225
Eye Irrit. 2 H319

Full text of H-phrases: see section 16.

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

F; R11
Xi; R36

Full text of R-phrases: see section 16.

Adverse physicochemical, human health and environmental effects

No data available.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS02 GHS07

Signal word (CLP) : Danger

Hazard statements (CLP) : H225 - Highly flammable liquid and vapour

H319 - Causes serious eye irritation

Precautionary statements (CLP) : P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking.
P233 - Keep container tightly closed
P280 - Wear eye protection, protective clothing, protective gloves.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337+P313 - If eye irritation persists: Get medical advice/attention
P403+P235 - Store in a cool and well-ventilated place.

2.3. Other hazards

This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.

other hazards which do not result in classification : None known.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Directive 67/548/EEC
Ethanol	(CAS No.) 64-17-5 (EC no) 200-578-6 (EC index no) 603-002-00-5	100	F; R11 Xi; R36

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Ethanol	(CAS No.) 64-17-5 (EC no) 200-578-6 (EC index no) 603-002-00-5	100	Flam. Liq. 2, H225 Eye Irrit. 2, H319

Full text of R-, H- and EUH-phrases: see section 16.

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Remove victim to fresh air and keep at rest in a position comfortable for breathing.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. In case of breathing difficulties administer oxygen. In case of irregular breathing or respiratory arrest provide artificial respiration. If medical advice is needed, have product container or label at hand.

First-aid measures after skin contact : After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water and soap. Clean contaminated surfaces with an excess of water. If medical advice is needed, have product container or label at hand.

First-aid measures after eye contact : In case of contact with eyes, rinse immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart. Subsequently consult an ophthalmologist.

First-aid measures after ingestion : Do not induce vomiting. If accidentally swallowed rinse the mouth with plenty of water (only if the person is conscious) and obtain immediate medical attention.

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

Symptoms/injuries : Symptoms may include dizziness, headache, nausea and loss of co-ordination. Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.

Symptoms/injuries after inhalation : slightly irritant but not relevant for classification. Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.

Symptoms/injuries after skin contact : Slightly irritating to skin.

Symptoms/injuries after eye contact : Conjunctival redness. Direct contact may result in corneal injury.

Symptoms/injuries after ingestion : Abdominal pain, nausea.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: : Foam. Carbon dioxide. Extinguishing powder. Water spray.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Flammable liquid. Keep away from sources of ignition - No smoking. Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode. Risk of explosion if heated under confinement. Vapours may cause fire/explosion if source of ignition is present. Exposure to fire may cause containers to rupture/explode.

Reactivity : On combustion, forms: carbon oxides (CO and CO2).

5.3. Advice for firefighters

Firefighting instructions : Cool tanks/drums with water spray/remove them into safety.

Protective equipment for firefighters : In case of fire: Wear self-contained breathing apparatus. Refer to section 8.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep away from sources of ignition. Use water spray/stream to protect personnel and to cool endangered containers. Emergency cooling must be provided for in case of fire. Remove product from area of fire.

6.1.1. For non-emergency personnel

Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. Refer to section 8.

Emergency procedures : Stop leak if safe to do so. Remove all sources of ignition.

6.1.2. For emergency responders

Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. In case of fire: Wear self-contained breathing apparatus. Refer to section 8.

Emergency procedures : Evacuate unnecessary personnel. Remove all sources of ignition. Stop leak if safe to do so. Eliminate leaks immediately.

6.2. Environmental precautions

Stop leak if safe to do so. Avoid release to the environment. Relevant water authorities should be notified of any large spillage to water course or drain.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents). Dispose of this material and its container to hazardous or special waste collection point. Do not empty into drains or the aquatic environment.

Other information : Relevant water authorities should be notified of any large spillage to water course or drain. Do not allow to enter into soil/subsoil. Eliminate all ignition sources if safe to do so. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

6.4. Reference to other sections

Refer to sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Handle in accordance with good industrial hygiene and safety procedures. Ensure the grounding of containers, apparatus, pumps and suction equipment. Use only non-sparking tools. Use only in well-ventilated areas. Use personal protective equipment as required.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures: : The floor should be leak tight, jointless and not absorbent. Provide adequate ventilation.

Incompatible materials : Oxidizing agents, strong.

Storage area : Provide for retaining containers, eg. floor pan without outflow. Keep away from open flames, hot surfaces and sources of ignition. Store in dry, cool, well-ventilated area.

7.3. Specific end use(s)

No data available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ethanol (64-17-5)		
Austria	MAK (mg/m³)	1900 mg/m³
Austria	MAK (ppm)	1000 ppm
Austria	MAK Short time value (mg/m³)	3800 mg/m³
Austria	MAK Short time value (ppm)	2000 ppm
Belgium	Limit value (mg/m³)	1907 mg/m³
Belgium	Limit value (ppm)	1000 ppm
France	VLE (mg/m³)	9500 mg/m³
France	VLE (ppm)	5000 ppm
France	VME (mg/m³)	1900 mg/m³
France	VME (ppm)	1000 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m³)	960 mg/m³
Germany	TRGS 900 Occupational exposure limit value (ppm)	500 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (mg/m³)	1884 mg/m³
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	1000 ppm

Ethanol (64-17-5)		
USA NIOSH	NIOSH REL (TWA) (mg/m3)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m3)	1900 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
Spain	VLA-ED (mg/m³)	1910 mg/m³
Spain	VLA-ED (ppm)	1000 ppm
Switzerland	VLE (mg/m³)	1920 mg/m³
Switzerland	VLE (ppm)	1000 ppm
Switzerland	VME (mg/m³)	960 mg/m³
Switzerland	VME (ppm)	500 ppm
United Kingdom	WEL TWA (mg/m³)	1920 mg/m³
United Kingdom	WEL TWA (ppm)	1000 ppm
Czech Republic	Expoziční limity (PEL) (mg/m3)	1000 mg/m³
Czech Republic	Expoziční limity (PEL) (ppm)	530 ppm
Czech Republic	Expoziční limity (NPK-P) (mg/m3)	3000 mg/m³
Czech Republic	Expoziční limity (NPK-P) (ppm)	1590 ppm
Denmark	Grænseværdie (langvarig) (mg/m3)	1900 mg/m³
Denmark	Grænseværdie (langvarig) (ppm)	1000 ppm
Denmark	Grænseværdie (kortvarig) (mg/m3)	3800 mg/m³
Denmark	Grænseværdie (kortvarig) (ppm)	2000 ppm
Finland	HTP-arvo (8h) (mg/m3)	1900 mg/m³
Finland	HTP-arvo (8h) (ppm)	1000 ppm
Finland	HTP-arvo (15 min)	2500 mg/m³
Finland	HTP-arvo (15 min) (ppm)	1300 ppm
Hungary	AK-érték	1900 mg/m³
Hungary	CK-érték	7600 mg/m³
Ireland	OEL (8 hours ref) (mg/m3)	1900 mg/m³
Ireland	OEL (8 hours ref) (ppm)	1000 ppm
Lithuania	IPRV (mg/m3)	1000 mg/m³
Lithuania	IPRV (ppm)	500 ppm
Lithuania	TPRV (mg/m3)	1900 mg/m³
Lithuania	TPRV (ppm)	1000 ppm
Lithuania	NRV (mg/m3)	1900 mg/m³
Lithuania	NRV (ppm)	1000 ppm
Norway	Gjennomsnittsverdier (AN) (mg/m3)	950 mg/m³
Norway	Gjennomsnittsverdier (AN) (ppm)	500 ppm
Poland	NDS (mg/m3)	1900 mg/m³
Slovakia	NPHV (priemerná) (mg/m3)	960 mg/m³
Slovakia	NPHV (priemerná) (ppm)	500 ppm
Slovakia	Upozornenie (SK)	krátkodobý kategória II.
Canada (Quebec)	VEMP (mg/m³)	1880 mg/m³
Canada (Quebec)	VEMP (ppm)	1000 ppm
Australia	TWA (mg/m³)	1920 mg/m³
Australia	TWA (ppm)	1000 ppm

Ethanol (64-17-5)	
DNEL/DMEL (Workers)	
Acute - systemic effects, inhalation	950 mg/m³
Long-term - systemic effects, dermal	343 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	1900 mg/m³/day
DNEL/DMEL (General population)	
Acute - systemic effects, inhalation	950 mg/m³

Ethanol (64-17-5)	
Long-term - systemic effects,oral	87 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	114 mg/m³/day
Long-term - systemic effects, dermal	206 mg/kg bodyweight/day

8.2. Exposure controls

Appropriate engineering controls : Provide adequate ventilation.

Personal protective equipment : Insufficient ventilation: wear respiratory protection. Safety glasses. Gloves.

Materials for protective clothing : neoprene/butyl rubber.

Hand protection : Wear protective gloves. PVC (Polyvinyl chloride).

Eye protection : if necessary: tightly fitting safety goggles. Wear eye protection/face protection.

Skin and body protection : Wear suitable protective clothing or Rubber apron.

Respiratory protection : Work in well ventilated zones or use proper respiratory protection. Wear appropriate breathing apparatus if air renewal not sufficient to maintain dust/vapour under TLV. In case of fire: Wear self-contained breathing apparatus.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : clear.

Colour : colourless.

Odour : organic solvents.

Odour threshold : 180 ppm

pH : 6-8

Melting point : -144 °C

Solidification point : No data available

Boiling point : 78.5 °C

Flash point : 13 °C (Closed cup)

Relat. evapor. rate comp. to butylacetate : No data available

Flammability (solid, gas) : No data available

Explosive limits : 3.3-19 vol %

Vapour pressure : 44 mmHg @ 20ºC

Relative vapour density at 20 °C : 1.59

Relative density : 0.79 g/cm³

Solubility : Water: Soluble

Log Pow : -0.31

Self ignition temperature : 423 °C

Decomposition temperature : No data available

Viscosity, kinematic : No data available

Viscosity, dynamic : 1.22 cP @ 20ºC

Explosive properties : No data available

Oxidising properties : No data available

9.2. Other information

Minimum ignition energy : 423 °C

SECTION 10: Stability and reactivity

10.1. Reactivity

On combustion, forms: carbon oxides (CO and CO2).

10.2. Chemical stability

Stable at normal conditions.

10.3. Possibility of hazardous reactions

No data available.

10.4. Conditions to avoid

Keep away from: strong oxidants and strong acids.

10.5. Incompatible materials

Store separately from oxidising agents and strongly alkaline and strongly acidic materials., amines, alcohol's and water.

10.6. Hazardous decomposition products

Hazardous decomposition products may be released during prolonged heating like smokes, carbon monoxide and dioxide, NOx.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Ethanol (64-17-5)	
LD50 oral rat	10470 mg/kg
LD50 dermal rat	15800 mg/kg
LC50 inhalation rat (mg/l)	> 51 mg/l/4h

Skin corrosion/irritation : Not classified
Not irritating
pH: 6-8

Serious eye damage/irritation : Causes serious eye irritation.
pH: 6-8

Respiratory or skin sensitisation : Not classified
Not sensitizing

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Ethanol (64-17-5)	
NOAEL (oral,rat,90 days)	> 1730 mg/kg bodyweight/day

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Slightly volatile.

Ethanol (64-17-5)	
LC50 fishes	> 11200 mg/l 24 hours
EC50 other aquatic organisms	> 8200 mg/l 18 hours- Crustacean
EC50 Daphnia	> 5012 mg/l 48 hours
NOEC (chronic)	> 79 mg/l 12 days- shrimp
ErC50 (algae)	> 275 mg/l 3 days
ErC50 (other aquatic plants)	4432 mg/l 7 days

12.2. Persistence and degradability

Ethanol (64-17-5)	
Persistence and degradability	This product has little potential to bioaccumulate in aquatic organisms, is expected to rapidly degrade, and is not expected to persist.

12.3. Bioaccumulative potential

Ethanol (64-17-5)	
Log Pow	-0.31
Bioaccumulative potential	Low bioaccumulation potential.

12.4. Mobility in soil

Ethanol (64-17-5)	
Ecology - soil	No data available.

12.5. Results of PBT and vPvB assessment

Ethanol (64-17-5)
This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6. Other adverse effects

Other adverse effects : No data available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose of this material and its container to hazardous or special waste collection point. Do not empty into drains or the aquatic environment.

SECTION 14: Transport information

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

14.1. UN number

UN-No. : 1170

14.2. UN proper shipping name

Proper shipping name : ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)

Transport document description : UN 1170 ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION), 3, III, (D/E)

14.3. Transport hazard class(es)

Class (UN) : 3

Hazard labels (UN) : 3

14.4. Packing group

Packing group (UN) : III

14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Special precautions for user

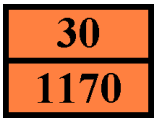
Special transport precautions : No data available.

14.6.1. Overland transport

Hazard identification number (Kemler No.) : 30

Classification code : F1

Orange plates :



Tunnel restriction code : D/E

Limited quantities (ADR) : LQ07

Excepted quantities (ADR) : E1

14.6.2. Transport by sea

No additional information available

14.6.3. Air transport

No additional information available

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

IBC code : No data available.

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

No ingredients included in the REACH Candidate list

Other regulations, restrictions and prohibition regulations : Compliance with following regulations: Regulation (EC) 1907/2006 as amended. Regulation (EC) 1272/2008 as amended. Directive 67/548/EEC as amended. Directive 1999/45/EC as amended.

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

Chemical safety assessment has been established in the attachment.

SECTION 16: Other information

Sources of Key data : PETROBRAS. MSDS.

Abbreviations and acronyms : ASTM - American Society for Testing and Materials . CLP - Classification, Labelling and Packaging. CSR - Chemical Safety Report. EC - European Community. EEC - European Economic Community. GHS - Globally Harmonised System. REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals. SDS - Safety Data Sheet.

Other information : Classification is based on Harmonized classification and self-classification based on available data.

Full text of R-, H- and EUH-phrases:

Eye Irrit. 2	Serious Eye Damage/Irritation Category 2
Flam. Liq. 2	flammable liquids Category 2
H225	Highly flammable liquid and vapour
H319	Causes serious eye irritation
R11	Highly flammable.
R36	Irritating to eyes.

SDS PETROBRAS USES

The information presented in this Safety Data Sheet is based on current knowledge and is believed to be complete and accurate. It describes the product for the purposes of health, safety and environment requirements only and shall, therefore, be used only as a guide. The data refers to a specific product and may not be valid for combined uses with other products. It is the user´s obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. Petrobras shall not be responsible for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices.

Exposure Scenarios for: Ethanol

Trade Name	:	Ethanol
CAS Number	:	64-17-5
EC Number	:	200-578-6
SDS Reference	:	PbR0004

Table of Contents:

Summary of parameters used for assessing safe use:

PNEC: In STP/ untreated wastewater: 580 mg/l
In local freshwater: 0.96 mg/l
In local soil: 0.63 mg/kg wwt
In local marine water: 0.79 mg/l

Acronyms:

CSA	:	Chemical safety assessment
DNEL	:	Derived no effect level
DU	:	Downstream user
ERC	:	Environmental release category
ES	:	Exposure scenario
PC	:	Product category
PEC	:	Predicted environmental concentration
PNEC	:	Predicted no effect concentration
PPE	:	Personal protection equipment
PROC	:	Process category
RCR	:	Risk characterisation ratio
STP	:	Sewage treatment plant
SU	:	Sector of use
WWTP	:	Wastewater treatment plant

Exposure Scenario (ES1):

Manufacture or use as an intermediate or process chemical

9.1.1. Exposure scenario addressing uses carried out by workers Manufacture or use as an intermediate or process chemical		
Use descriptors related to the life cycle stage	SU3 :	Industrial uses: Uses of substances as such or in preparations at industrial sites
	SU8 :	Manufacture of bulk, large scale chemicals (including petroleum products)
	SU9 :	Manufacture of fine chemicals
	PROC1 :	Use in closed process, no likelihood of exposure
	PROC2 :	Use in closed, continuous process with occasional controlled exposure
	PROC3 :	Use in closed batch process (synthesis or formulation)
	PROC4 :	Use in batch and other process (synthesis) where opportunity for exposure arises
	PROC8a :	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	PROC8b :	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
	PROC15 :	Use as laboratory reagent
	ERC1 :	Manufacture of substances
	ERC4 :	Industrial use of processing aids in processes and products, not becoming part of articles
	ERC6a :	Industrial use resulting in manufacture of another substance (use of intermediates)
9.1.2. Operational conditions and risk managment measures		
9.1.2.1. Control of environmental exposure		
Product characteristic		
Physical state	Liquid	
Concentration of substance in product	Up to 100%	
Amounts used		
Daily at point sources	n.a.	
Annually at point sources	400,000 t/year (maximum in worst case)	
Annually total	4,600,00 t/year total market	
Frequency and duration of use/exposure		
Pattern of release	Continuous 350 days per year	
Environment factors not influenced by risk management		
Flow rate of receiving surface water	18,000 m^3/day (default)	
Other given operational conditions affecting environmental exposure		
Processing setting (indoor/outdoor)	Indoor and/or outdoor	
Processing temperature	Ambient	

Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
Keep containers tightly closed. Store in a bounded area. Do not discharge into sewers or drains. Use appropriate emission abatement equipment from LEV systems if required by local legislation. Waste product and empty containers should be disposed of as hazardous waste in accordance with all local and national regulations	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Efficacy >70% (for ethanol)
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Efficacy >87% (for ethanol)
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	>= 2000 m^3/day
Degradation efficacy	90% (for ethanol)
Sludge treatment	Disposal or recovery
Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.1.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week (all PROCs)
Frequency of exposure (annual)	240 Days/year (all PROCs)
Duration of exposure	> 4 Hours/day (all PROCs)
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands, face side only (automated processes/ PROC 1,2) Two hands (transfer, filling, etc./PROC8a,b)
Exposed skin surface	480 cm^2 (automated processes/PROC1, 2,3,4) 960 cm^2 (transfer, filling, etc./PROC8a,b)
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Outdoor
Technical conditions and measures at process level (source) to prevent release	
No specific technical prevention measures required for process in high integrity contained systems with little potential for exposure or with only occasional minor exposure through e.g. maintenance and sampling.	
Technical conditions and measures to control dispersion from source towards the worker	

Ventilation	None required
Efficiency rate	95 %

Organisational measures to prevent /limit releases, dispersion and exposure

Handle substances within a predominantly closed system. Ensure material transfers are under containment or extract ventilation. No specific organizational measures required for processes in high integrity contained systems with little potential for exposure or with only occasional minor exposure through e.g. maintenance and sampling. Provide extract ventilation to points where emissions occur.

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

1. PPE: Respiratory Protection - not required for normal operations.
2. PPE: Eye Protection –suitable eye protection should be worn when handling product if there is a risk of splashing.
3. PPE: Wear suitable gloves tested to EN374 during the activities where skin contact is possible.

9.1.3. Exposure information and reference to its source

9.1.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is calculated with EUSES 2.0 model. Ethanol is fully soluble in water, readily biodegradable, not bioaccumulative, does not accumulate in the sediments or soil and is assumed to degrade by 90% in the local and/or municipal STP under evaluated conditions.

Release times per year (day/year)	350
Fraction used at main local source	0.086
Amount used locally (kg/day)	0
Local release to air (kg/day)	226.0
Local release to waste (kg/day)	11.3
Local release to soil (kg/day)	0

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	5.65	0.0000264	0.00119	0.00000224

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.1.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2.. Below given exposure estimates and RCR values are based on the PROC with the highest exposure levels in this scenario (PROC8a).

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	96.04	950 (OEL)	PROC 8a results in the highest exposure in this exposure scenario
Dermal (mg/kg/day)	13.71	343	
Combined (mg/kg/day)	27.43	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 8a	0.10	0.09	0.18

9.1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using EUSES v2.0 and Ecetoc TRA integrated tool version 2 respectively.

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

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 local freshwater PEC = 0,0000264* (your local emission [kg/day] / 350) * (2000 / your local WWTP flow rate [m3/day]) * (18000 /your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)

9.1.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES2):

Distribution of ethanol

9.2.1. Exposure scenario addressing uses carried out by workers **Distribution of ethanol**	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites SU8 : Manufacture of bulk, large scale chemicals (including petroleum products) SU9 : Manufacture of fine chemicals 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) ERC2 : Formulation of preparations
9.2.2. Operational conditions and risk managment measures	
9.2.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	75,000 t/year (maximum in worst case)
Annually total	3,800,00 t/year total market
Frequency and duration of use/exposure	
Pattern of release	300 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Outdoor
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
Keep containers tightly closed. Store in a bounded area. Do not discharge into sewers or drains. Waste product and empty containers should be disposed of as hazardous waste in accordance with all local and national regulations.	
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	

Size of STP	> 2000 m^3/day
Degradation efficacy	> 90% (for ethanol)
Sludge treatment	Disposal or recovery
Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.2.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week (all PROCs)
Frequency of exposure (annual)	240 Days/year (all PROCs)
Duration of exposure	> 4 Hours/day (all PROCs)
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Outdoor or in ventilated (open) spaces.
Technical conditions and measures at process level (source) to prevent release	
No specific technical prevention measures required.	
Technical conditions and measures to control dispersion from source towards the worker	
Outdoors	No specific measures identified.
If indoors	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Ensure material transfers are under containment or extract ventilation. Provide good ventilation to points where emissions occur.
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
1. PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing. 2. PPE: Wear suitable gloves tested to EN374 during the activities where skin contact is possible.	
9.2.3. Exposure information and reference to its source	
9.2.3.1. Prediction of environmental exposure resulting from the conditions described above	
Environmental exposure estimation is based on Ecetoc TRA model v2 including the data from TGD A&B tables (MC-Ib, IC-2, UC-48, fraction main source 0,1) and based on the worst-case scenario with point-source production volume of 15,000 tpa. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.	

Release times per year (day/year)	300
Fraction used at main local source	0.1
Amount used locally (kg/day)	5000
Local release to air (kg/day)	50
Local release to waste (kg/day)	15
Local release to soil (kg/day)	1

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	4.66	0.52	0.007	0.515

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.2.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2.. Below given exposure estimates and RCR values are based on the PROC with the highest exposure levels in this scenario (PROC8a).

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	96.04	950 (OEL)	PROC 8a results in the highest exposure in this exposure scenario
Dermal (mg/kg/day)	13.71	343	
Combined (mg/kg/day)	27.43	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 8a	0.10	0.09	0.18

9.2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,104 * (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)

9.2.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES3):

Industrial formulation and (re)packing of ethanol and its mixtures

9.3.1. Exposure scenario addressing uses carried out by workers Industrial formulation and (re)packing of ethanol and its mixtures	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites SU10 : Formulation [mixing] of preparations and/or re-packaging (excluding alloys) PROC3 : Use in closed batch process (synthesis or formulation) PROC5 : Mixing or blending in batch processes for formulation of preparations and articles (multistate 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) PROC14 : Production of preparations or articles by tabletting, compression, extrusion, pelletisation ERC2 : Formulation of preparations
9.3.2. Operational conditions and risk managment measures	
9.3.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	280,000 t/year (maximum in worst case)
Annually total	3,800,00 t/year total market
Frequency and duration of use/exposure	
Pattern of release	Continuous 300 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoor
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
Keep containers tightly closed. Store in a bounded area. Do not discharge into sewers or drains. Waste product	

and empty containers should be disposed of as hazardous waste in accordance with all local and national regulations. Formulation activity is assumed to be a predominantly enclosed process.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Apply technical measures aiming at reduction and cleaning of waste water (WWTP/local STP (e.g. biological treatment))	Efficiency >90%
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day
Degradation efficacy	90% (for ethanol)
Sludge treatment	Disposal or recovery
Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.3.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week (all PROCs)
Frequency of exposure (annual)	240 Days/year (all PROCs)
Duration of exposure	> 4 Hours/day (all PROCs)
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands, face side only (automated processes/ PROC3) Two hands (transfer, filling, etc./PROC8a,b)
Exposed skin surface	480 cm^2 (automated processes/PROC3) 960 cm^2 (transfer, filling, etc./PROC8a,b)
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoors
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical conditions and measures to control dispersion from source towards the worker	
Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Ensure material transfers are under containment or extract ventilation. Provide good ventilation to points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
1. PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of	

splashing.
2. PPE: Wear suitable gloves tested to EN374 during the activities where skin contact is possible.

9.3.3. Exposure information and reference to its source

9.3.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 including the data from TGD A&B tables (MC-Ib, IC-2, UC-48, fraction main source 0,1) and based on the worst-case scenario.
Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.

Release times per year (day/year)	300
Fraction used at main local source	0.1
Amount used locally (kg/day)	93.33
Local release to air (kg/day)	469
Local release to waste (kg/day)	28
Local release to soil (kg/day)	9

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	1.73	0.182	0.0117	0.0186

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.3.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2.. Below given exposure estimates and RCR values are based on the PROC with the highest exposure levels in this scenario (PROC8a).

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	96.04	950 (OEL)	PROC 8a results in the highest exposure in this exposure scenario
Dermal (mg/kg/day)	13.71	343	
Combined (mg/kg/day)	27.43	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 8a	0.10	0.09	0.18

9.3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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 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)

9.3.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES4):

Industrial (end) use of ethanol as such or in preparations in non-spray application

9.4.1. Exposure scenario addressing uses carried out by workers Industrial (end) use of ethanol as such or in preparations in non-spray application	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites PROC10 : Roller application or brushing PROC13 : Treatment of articles by dipping and pouring ERC4 : Industrial use of processing aids in processes and products, not becoming part of articles
9.4.2. Operational conditions and risk managment measures	
9.4.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	2,750 t/year
Annually total	27,500 t/year total market
Frequency and duration of use/exposure	
Pattern of release	300 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoors and outdoors
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
Do not discharge into sewers or drains. Waste product and empty containers should be disposed of as hazardous waste in accordance with all local and national regulations.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Apply technical measures aiming at reduction and cleaning of waste water (WWTP/local STP (e.g. biological treatment))	Efficiency >70%
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day
Degradation efficacy	90% (for ethanol)

Sludge treatment	Disposal or recovery
Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.4.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week (all PROCs)
Frequency of exposure (annual)	240 Days/year (all PROCs)
Duration of exposure	> 4 Hours/day (all PROCs)
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands, face side only (PROC13) Two hands (PROC10)
Exposed skin surface	480 cm^2 (PROC13) 960 cm^2 (PROC10)
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoors and outdoors
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical conditions and measures to control dispersion from source towards the worker	
Outdoors	No specific measures identified.
If indoors	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Ensure material transfers are under containment or extract ventilation. Provide good ventilation to points where emissions occur.
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
1. PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing. 2. PPE: Wear suitable gloves tested to EN374 during the activities where skin contact is possible.	
9.4.3. Exposure information and reference to its source	
9.4.3.1. Prediction of environmental exposure resulting from the conditions described above	
Environmental exposure estimation is based on Ecetoc TRA model v2 including the data from TGD A&B tables (MC-Ib, IC-2, UC-48, fraction main source 0,1 using local STP). Below values are those related to processes with the highest risk characterization ratio (related to industrial use of coatings, inks and adhesives). All other activities covered in this exposure scenario result in lower environmental exposure estimates. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated	

conditions.	
Release times per year (day/year)	300
Fraction used at main local source	0.1
Amount used locally (kg/day)	458
Local release to air (kg/day)	367
Local release to waste (kg/day)	5
Local release to soil (kg/day)	1

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.285	0.038	0.0091	0.0039

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.4.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2.. Below given exposure estimates and RCR values are based on the PROC with the highest exposure levels in this scenario (PROC10).

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	96.04	950 (OEL)	PROC 10 results in the highest exposure in this exposure scenario
Dermal (mg/kg/day)	27.43	343	
Combined (mg/kg/day)	41.15	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 10	0.10	0.18	0.27

9.4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,039 * (your local emission [kg/day] / 5) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)

9.4.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES5):

Industrial (end) use of ethanol as such or in preparations by spraying

9.5.1. Exposure scenario addressing uses carried out by workers Industrial (end) use of ethanol as such or in preparations by spraying	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites PROC7 : Industrial spraying ERC4 : Industrial use of processing aids in processes and products, not becoming part of articles
9.5.2. Operational conditions and risk managment measures	
9.5.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 25%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	2,750 t/year (maximum in worst case)
Annually total	27,500 t/year total market
Frequency and duration of use/exposure	
Pattern of release	Continuous 300 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoors and outdoors
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
Do not discharge into sewers or drains. Waste product and empty containers should be disposed of as hazardous waste in accordance with all local and national regulations.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Apply technical measures aiming at reduction and cleaning of waste water (WWTP/local STP (e.g. biological treatment))	Efficiency >70%
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day
Degradation efficacy	90% (for ethanol)
Sludge treatment	Disposal or recovery

Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.5.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 25%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week (all PROCs)
Frequency of exposure (annual)	240 Days/year (all PROCs)
Duration of exposure	> 4 Hours/day (all PROCs)
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands and forearms
Exposed skin surface	1500 cm^2
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoors
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical conditions and measures to control dispersion from source towards the worker	
Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Ensure material transfers are under containment or extract ventilation. Provide good ventilation to points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
Avoid excessive and frequent skin contact as much as possible. 1. PPE: Wear suitable gloves tested to EN374 during the activities where excessive or frequent skin contact is possible. 2. PPE: Wear a respirator conforming to EN140 with Type A filter or better if vented booth with laminar flow is not available.	
9.5.3. Exposure information and reference to its source	
9.5.3.1. Prediction of environmental exposure resulting from the conditions described above	
Environmental exposure estimation is based on Ecetoc TRA model v2 including the data from TGD A&B tables (MC-Ib, IC-2, UC-48, fraction main source 0,1 using local STP). Below values are those related to processes with the highest risk characterization ratio (related to industrial use of coatings, inks and adhesives). All other activities covered in this exposure scenario result in lower environmental exposure estimates. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.	
Release times per year (day/year)	300
Fraction used at main local source	0.1
Amount used locally (kg/day)	458

Local release to air (kg/day)	367
Local release to waste (kg/day)	5
Local release to soil (kg/day)	1

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.285	0.038	0.0091	0.0039

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.5.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2..

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	480.21	950	Exposure estimates and RCRs given here are calculated for conditions without LEV (worst case scenario).
Dermal (mg/kg/day)	42.86	343	
Combined (mg/kg/day)	111.46	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 7	0.5	0.28	0.72

9.5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,039 * (your local emission [kg/day] / 5) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)

9.5.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES6a):

Industrial use of ethanol as a fuel source

9.6.1. Exposure scenario addressing uses carried out by workers Industrial use of ethanol as a fuel source		
Use descriptors related to the life cycle stage	SU3 : PROC16 : ERC7 :	Industrial uses: Uses of substances as such or in preparations at industrial sites Using material as fuel sources, limited exposure to unburned product to be expected Industrial use of substances in closed systems
9.6.2. Operational conditions and risk managment measures		
9.6.2.1. Control of environmental exposure		
Product characteristic		
Physical state	Liquid	
Concentration of substance in product	Up to 100%	
Amounts used		
Daily at point sources	n.a.	
Annually at point sources	30,000 t/year (maximum in worst case)	
Annually total	300,000 t/year total market	
Frequency and duration of use/exposure		
Pattern of release	Continuous 300 days per year	
Environment factors not influenced by risk management		
Flow rate of receiving surface water	18,000 m^3/day (default)	
Other given operational conditions affecting environmental exposure		
Processing setting (indoor/outdoor)	Indoors and outdoors	
Processing temperature	Ambient	
Processing pressure	Ambient	
Technical conditions and measures at process level (source) to prevent release		
Do not discharge into sewers or drains. Waste product and empty containers should be disposed of as hazardous waste in accordance with all local and national regulations.		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Apply technical measures aiming at reduction and cleaning of waste water (WWTP/local STP (e.g. biological treatment))	Efficiency >70%	
Organizational measures to prevent/limit release from site		
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.		
Conditions and measures related to municipal sewage treatment plant		
Size of STP	> 2000 m^3/day	
Degradation efficacy	90% (for ethanol)	
Sludge treatment	Disposal or recovery	

Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.6.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week (all PROCs)
Frequency of exposure (annual)	240 Days/year (all PROCs)
Duration of exposure	> 4 Hours/day (all PROCs)
Human factors not influenced by risk management	
Potentially exposed body parts	One hand, face side only
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoors
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical conditions and measures to control dispersion from source towards the worker	
No specific measures identified.	
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
No specific PPE measures identified.	
9.6.3. Exposure information and reference to its source	
9.6.3.1. Prediction of environmental exposure resulting from the conditions described above	
Environmental exposure estimation is based on Ecetoc TRA model v2 including the data from TGD A&B tables (MC-Ib, IC-2, UC-48, fraction main source 0,1 using local STP, 350 emission days per year). Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.	
Release times per year (day/year)	350
Fraction used at main local source	0.02
Amount used locally (kg/day)	1714
Local release to air (kg/day)	9
Local release to waste (kg/day)	2
Local release to soil (kg/day)	1
For PNEC values, please refer to Page 1.	

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.053	0.0152	0.0006	0.0016

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.6.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2..

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	9.6	950	-
Dermal (mg/kg/day)	0.3	343	
Combined (mg/kg/day)	1.7	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 16	0.01	0.002	0.01

9.6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,0152 * (your local emission [kg/day] / 5) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)

9.6.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES6b):

Professional use of ethanol as a fuel source

9.7.1. Exposure scenario addressing uses carried out by workers **Professional use of ethanol as a fuel source**	
Use descriptors related to the life cycle stage	SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen) PROC16 : Using material as fuel sources, limited exposure to unburned product to be expected ERC9a : Wide dispersive indoor use of substances in closed systems ERC9b : Wide dispersive outdoor use of substances in closed systems
9.7.2. Operational conditions and risk managment measures	
9.7.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	380,000 t/year (maximum in worst case)
Annually total	3,800,000 t/year total market (industrial, professional, and consumer use)
Frequency and duration of use/exposure	
Pattern of release	Continuous wide dispersive: 365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoors and outdoors
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
Do not discharge into sewers or drains.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Do not discharge directly into environment. Use in predominantly enclosed systems	
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day
Degradation efficacy	90% (for ethanol)
Sludge treatment	Disposal or recovery

Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.7.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week
Frequency of exposure (annual)	240 Days/year
Duration of exposure	> 4 Hours/day
Human factors not influenced by risk management	
Potentially exposed body parts	One hand, face side only
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoors
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical conditions and measures to control dispersion from source towards the worker	
No specific measures identified.	
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
No specific PPE measures identified.	
9.7.3. Exposure information and reference to its source	
9.7.3.1. Prediction of environmental exposure resulting from the conditions described above	
Environmental exposure estimation is based on Ecetoc TRA model ERC9a, and TGD-A&B table (MC-IV, IC-6, UC-27). Below values are those related to TGD A&B table calculation. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.	
Release times per year (day/year)	365
Fraction used at main local source	0.002
Amount used locally (kg/day)	2082
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive
For PNEC values, please refer to Page 1.	

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.065	0.0240	0.0273	0.0034

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.7.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2..

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	9.6	950	-
Dermal (mg/kg/day)	0.3	343	
Combined (mg/kg/day)	1.7	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 16	0.02	0.002	0.02

9.7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,0240 * (your local emission [kg/day] / 5) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)

9.7.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES7):

Professional (end) use of ethanol as such or in preparations in non-spray application

9.8.1. Exposure scenario addressing uses carried out by workers **Professional (end) use of ethanol as such or in preparations in non-spray application**	
Use descriptors related to the life cycle stage	SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen) PROC10 : Roller application or brushing PROC13 : Treatment of articles by dipping and pouring PROC14 : Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC19 : Hand-mixing with intimate contact and only PPE available ERC8a : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive outdoor use of processing aids in open systems
9.8.2. Operational conditions and risk managment measures	
9.8.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	380,000 t/year (maximum in worst case)
Annually total	3,800,000 t/year total market (industrial, professional, and consumer use)
Frequency and duration of use/exposure	
Pattern of release	Continuous 365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoors and outdoors
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
Do not discharge into sewers or drains.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Do not discharge directly into environment. Use in predominantly enclosed systems	
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment.	

Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day
Degradation efficacy	90% (for ethanol)
Sludge treatment	Disposal or recovery
Conditions and measures related to treatment of waste	
Hazardous waste incineration or dispose for use in recycled fuels	
9.8.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week (all PROCs)
Frequency of exposure (annual)	240 Days/year (all PROCs)
Duration of exposure	> 4 Hours/day (all PROCs)
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands, face side only (PROC13, 14) Two hands (PROC10) Two hands and forearms (PROC19
Exposed skin surface	480 cm2 (PROC13, 14) 960 cm2 (PROC10) 1980 cm2 (PROC19)
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoors and outdoors
Technical conditions and measures at process level (source) to prevent release	
If >4 hours/day (PROC19)	Limit the substance concentration in the product to 25%
Technical conditions and measures to control dispersion from source towards the worker	
Provide a good standard of general or controlled ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan.	
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
If PROC 19 and concentration >25%	1. PPE: Wear suitable gloves tested to EN374 and avoid skin contact 2. PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing
9.8.3. Exposure information and reference to its source	
9.8.3.1. Prediction of environmental exposure resulting from the conditions described above	

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC 8 a, d and TGD A&B table (MC-Ic, IC-6, UC-9). Below values are estimates based on the ERC approach calculation resulting in more conservative values.

Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.

Release times per year (day/year)	365
Fraction used at main local source	0.01
Amount used locally (kg/day)	5.5
Local release to air (kg/day)	5
Local release to waste (kg/day)	5
Local release to soil (kg/day)	1

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.34	0.045	0.0003	0.0044

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.8.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2.. Below given exposure estimates and RCR values are based on the PROC with the highest exposure levels in this scenario (PROC19).

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	115.25	950	PROC 19 results in the highest exposure in this exposure scenario
Dermal (mg/kg/day)	84.86	343	
Combined (mg/kg/day)	101.32	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 19	0.12	0.55	0.65

9.8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,045 * (your local emission [kg/day] / 5) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)
9.8.5. Additional good practice advice beyond the REACH CSA Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES8):

Professional application of paints, coatings, adhesives, cleaners and other mixtures/products containing ethanol by spraying

9.9.1. Exposure scenario addressing uses carried out by workers **Professional application of paints, coatings, adhesives, cleaners and other mixtures/products containing ethanol by spraying**	
Use descriptors related to the life cycle stage	SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen) PROC11 : Non industrial spraying ERC8a : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive outdoor use of processing aids in open systems
9.9.2. Operational conditions and risk managment measures	
9.9.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid (sprayed)
Concentration of substance in product	5-25%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	n.a. (wide dispersive use)
Annually total	10,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	Continuous 365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoors and outdoors
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No specific measures identified.	
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day
Degradation efficacy	90%
Sludge treatment	Disposal or recovery

Conditions and measures related to treatment of waste	
Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	
9.9.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid (spray aerosol)
Concentration of substance in product	5-25%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week
Frequency of exposure (annual)	300 Days/year
Duration of exposure	Variable
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands and forearms
Exposed skin surface	1500 cm^2
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoors and/or outdoors
Technical conditions and measures at process level (source) to prevent release	
If >4 hours/day	Limit the substance concentration in the product to 5%
If 1-4 hours/day	Limit the substance concentration in the product to 25%
If <1 hour/day	No specific measures identified.
Technical conditions and measures to control dispersion from source towards the worker	
Substance content in the product > 25%	Provide enhanced general ventilation by mechanical means. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)
Substance content in the product 5- 25%	Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan.
Substance content in the product < 5%	No specific measures identified.
Organisational measures to prevent /limit releases, dispersion and exposure	
Do not carry out operation for more than 1 hour when substance content in the product exceeds 25% and no enhanced mechanical ventilation (minimum efficiency 70%) is available.	
Conditions and measures related to personal protection, hygiene and health evaluation	
If no enhanced ventilation available and concentration of the substance in the product > 25%	1. PPE: Respiratory Protection with at least 90% reduction in inhaled concentration of the substance
If concentration of the substance in the product > 5%	1. PPE: Wear suitable gloves (chemically resistant gloves tested to EN374) during the activities where excessive skin contact is possible.
9.9.3. Exposure information and reference to its source	

9.9.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC8a default settings and TGD A&B table (MC-Ic, IC-6, UC-9). Below values are estimates based on the ERC approach calculation resulting in more conservative values.

Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.

Release times per year (day/year)	365
Fraction used at main local source	0.1
Amount used locally (kg/day)	5.5
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.34	0.045	0.0003	0.0044

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.9.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2..

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	672.29	950	-
Dermal (mg/kg/day)	21.43	343	
Combined (mg/kg/day)	117.47	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 8a	0.71	0.14	0.76

9.9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,045 * (your local emission [kg/day] / 5) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)
9.9.5. Additional good practice advice beyond the REACH CSA Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES9a):

Consumer use of Ethanol as automotive fuel

9.10.1. Exposure Scenario for Consumer use of Ethanol as automotive fuel	
Use descriptors related to the life cycle stage	SU 21 : Consumer uses: Private households (= general public = consumers) PC 13 : Fuels ERC 9a : Wide dispersive indoor use of substances in closed systems ERC9b : Wide dispersive outdoor use of substances in closed systems
9.10.2. Operational conditions and risk management measures	
9.10.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Can be > 25%
Amounts used	
Daily at point source	n.a.
Annually at point source	n.a. (wide dispersive use)
Annually total	3,800,000 t/year total market (industrial, professional and consumer use)
Frequency and duration of use/exposure	
Pattern of release	365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Outdoor
Processing temperature	Ambient
Processing pressure	Ambient
Conditions and measures related to municipal sewage treatment plant	
No release into the wastewaters or sewage is expected from this use. Only environmental release form the consumer use of ethanol as fuel is evaporation during filling (<0,01 %, assuming that less than 10 gram of ethanol evaporates during the filling of 75 litre tank during 2-5 minutes).	
Conditions and measures related to external treatment of waste for disposal	
No waste expected from this use.	
Conditions and measures related to external recovery of waste	
n.a.	
9.10.2.2. Control of consumer exposure	
Substance content in the product	Can be >25%
Amounts of product used / applied per event	Up to 100 litre
Exposure/release fraction	0,001 (only to vapour and minor spills during the filling of the tank)

Frequency and duration of use/exposure	Frequency of use: weekly
	Duration of exposure: <5 minutes (only during the filling of the tank)
Setting and external conditions during use	Outdoors
Technical (product related) use conditions	No specific measures required.
Organisational consumer protection measures (e.g. recommendation and/or use instruction information for consumer; e.g. product labelling)	No specific measures required.

9.10.3. Exposure information and reference to its source

9.10.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC8d customized settings and total use of 3,800,000 tpa.

Release times per year (day/year)	365
Fraction used at main local source	0.002
Amount used locally (kg/day)	n.a.
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.065	0.024	0.0273	0.0034

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.10.3.2. Prediction of consumer exposure resulting from the conditions described above

Consumer exposure estimation provided below is only indicative for one particular PC. The estimates are calculated with the industry model (draft version MasterCSA_8April2010) CSA (PC13, Automotive, refuelling at 100% concentration).

For PNEC values, please refer to Page 1.

Consumers exposure	Exposure estimates	DNEL	Comment
Dermal (mg/kg/day)	35	LTS 206	-
Oral (mg/kg/day)	0	LTS 87	-
Inhalation (mg/m^3 for 24hr day)	1.54	LTS 144	-
All routes systematic	-	-	-

Risk characterization:

RCR (dermal)	RCR (oral)	RCR (dermal)	RCR (all routes)
0.170	0	0.014	0.184

9.10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

9.10.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES9b):

Consumer use of domestic fuel products containing ethanol

9.11.1. Exposure scenario for Consumer use of domestic fuel products containing ethanol	
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC13 : Fuels ERC8 : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive outdoor use of processing aids in open systems
9.11.2. Operational conditions and risk management measures	
9.11.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Can be > 25%
Amounts used	
Daily at point source	n.a.
Annually at point source	n.a. (wide dispersive use)
Annually total	10,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoor and/or outdoor
Processing temperature	Ambient
Processing pressure	Ambient
Conditions and measures related to municipal sewage treatment plant	
No release into the wastewaters or sewage is expected from this use. Only environmental release form the consumer use of ethanol as domestic fuel is evaporation during filling of the burner device.	
Conditions and measures related to external treatment of waste for disposal	
No waste expected from this use.	
Conditions and measures related to external recovery of waste	
n.a.	
9.11.2.2. Control of consumer exposure	
Substance content in the product	Can be >25%
Amounts of product used / applied per event	Up to 1 litre
Potentially exposed body parts	Inside one hand: 210cm^2
Frequency and duration of use/exposure	Frequency of use: weekly
	Duration of exposure: 5 minutes (only during filling of the device)

Setting and external conditions during use	Indoors and/or outdoors
Technical (product related) use conditions	No specific measures required.
Organisational consumer protection measures (e.g. recommendation and/or use instruction information for consumer; e.g. product labelling)	PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing.

9.11.3. Exposure information and reference to its source

9.11.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC8a and d settings and total use of 10.000 tpa.
Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade by >90% in the STP under evaluated conditions.

Release times per year (day/year)	365
Fraction used at main local source	0.002
Amount used locally (kg/day)	n.a.
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

For PNEC values, please refer to Page 1.

Environmental exposure	**In STP/ untreated wastewater (mg/l)**	**In local freshwater (mg/l)**	**In local soil (mg/kg)**	**In local marine water (mg/l)**
PEC	0.340	0.0447	0.0003	0.0044

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.11.3.2. Prediction of consumer exposure resulting from the conditions described above

Consumer exposure estimation provided below is only indicative for one particular PC. The estimates are calculated with the industry model (draft version MasterCSA_8April2010) CSA (PC13, Garden equipment-liquid-refuelling at concentration 100%).

Consumers exposure	**Exposure estimates**	**DNEL**	**Comment**
Dermal (mg/kg/day)	70	LTS 206	-
Oral (mg/kg/day)	0	LTS 87	-
Inhalation (mg/m^3 for 24hr day)	0.81	LTS 144	-
All routes systematic	-	-	-

Risk characterization:

RCR (dermal)	RCR (oral)	RCR (dermal)	RCR (all routes)
0.34	0	0.007	0.347

9.11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

9.11.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES9c):

Consumer use of products containing <50g ethanol

9.12.1. Exposure scenario of Consumer use of products containing <50g ethanol	
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC1 : Adhesivces, sealants PC3 : Air care prodcuts PC8 : Biocidal products (e.g. disinfectants, pest contro) PC12 : Fertilizers PC14 : Metal surface treatment products, including galvanic and electroplating products PC15 : Non-metal surface treatment products PC18 : Ink and toners PC23 : Leather tanning, dye, finishing, impregnation and care products PC24 : Lubricants, greases, release products PC27 : Plant protection products PC28 : Perfumes, fragrances PC30 : Photo-chemicals PC31 : Polishes and wax blends PC34 : Textile dyes, finishing and impregnating products ; including bleaches and other processing aids PC39 : Welding and soldering products (with flux coatings or flux cores), flux products ERC8a : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive outdoor use of processing aids in open systems
9.12.2. Operational conditions and risk management measures	
9.12.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Can be > 25%
Amounts used	
Daily at point source	n.a.
Annually at point source	n.a. (wide dispersive use)
Annually total	10,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoor and/or outdoor
Processing temperature	Ambient

Processing pressure	Ambient			
Conditions and measures related to municipal sewage treatment plant				
No release into the wastewaters or sewage is expected from this use. Only environmental release form the consumer use of ethanol as domestic fuel is evaporation during filling of the burner device.				
Conditions and measures related to external treatment of waste for disposal				
No waste expected from this use.				
Conditions and measures related to external recovery of waste				
n.a.				
9.12.2.2. Control of consumer exposure				
Substance content in the product	**<1%**	**1-5%**	**5-25%**	**>25%**
Product characteristic (including package design affecting exposure)	PC24, PC31	PC5, PC10, PC22, PC23, PC27, PC30, PC34	PC1, PC8, PC14, PC15, PC18	PC3, PC28
Amounts of product used / applied per event	< 50 g	< 50 g	< 50 g	< 10 g
Frequency and duration of use/exposure	Frequency of use: up to daily			
	Duration of exposure: up to 4 hours			
Setting and external conditions during use	Indoors (minimum room volume 20m^3) or outdoors			
Technical (product related) use conditions	n.a.	n.a.	n.a.	Controlled spray or release device.
Organisational consumer protection measures (e.g. recommendation and/or use instruction information for consumer; e.g. product labelling)	No specific measures required.	No specific measures required.	No specific measures required.	Do not spray empty in small, enclosed areas. Avoid inhalation and skin contact.
9.12.3. Exposure information and reference to its source				
9.12.3.1. Prediction of environmental exposure resulting from the conditions described above				
Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC8a and ERC8d default settings. Below presented estimates are based on ERC8d with total use of 10,000 tpa. This volume excludes cosmetics and toiletries use, where a 200,000 tpa total market is assumed – all emissions from this sector are assumed to be emissions to air. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade by >90% in the STP under evaluated conditions.				
Release times per year (day/year)	365			
Fraction used at main local source	0.002			
Amount used locally (kg/day)	n.a.			
Local release to air (kg/day)	n.a. wide dispersive			

Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.340	0.0447	0.0003	0.0044

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.12.3.2. Prediction of consumer exposure resulting from the conditions described above

Consumer exposure estimation provided below is only indicative for one particular PC. The estimates are calculated with the industry model (draft version MasterCSA_8April2010) CSA (PC31 Polishes and wax blends for floor, furniture, shoes).

Consumers exposure	Exposure estimates	DNEL	Comment
Dermal (mg/kg/day)	2.87	LTS 206	-
Oral (mg/kg/day)	0	LTS 87	-
Inhalation (mg/m^3 for 24hr day)	10.31	LTS 144	-
All routes systematic	-	-	-

Risk characterization:

RCR (dermal)	RCR (oral)	RCR (dermal)	RCR (all routes)
0.01	0	0.09	0.10

9.12.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

9.12.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES9d):

Consumer use of ethanol in enclosed systems

9.13.1. Exposure scenario of Consumer use of ethanol in enclosed systems	
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC16 : Heat transfer fluids PC17 : Hydraulic fluids ERC9a : Wide dispersive indoor use of substances in closed systems ERC9b : Wide dispersive outdoor use of substances in closed systems
9.13.2. Operational conditions and risk management measures	
9.13.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Can be > 25%
Amounts used	
Daily at point source	n.a.
Annually at point source	n.a. (wide dispersive use in closed systems)
Annually total	10,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoor
Processing temperature	Ambient
Processing pressure	Ambient
Conditions and measures related to municipal sewage treatment plant	
No release into the wastewaters or sewage is expected from this use. Substance is used in enclosed system during its service life.	
Conditions and measures related to external treatment of waste for disposal	
No waste expected from this use.	
Conditions and measures related to external recovery of waste	
n.a.	
9.13.2.2. Control of consumer exposure	
Substance content in the product	Can be >25%
Product characteristic (including package design affecting exposure)	Substance is enclosed in the system and there is no consumer exposure possible under normal and reasonably foreseeable conditions of use.
Amounts of product used / applied per event	n.a. substance in enclosed system

Frequency and duration of use/exposure	Frequency of use: 1-5 times per year
	Duration of exposure: divers
Setting and external conditions during use	n.a. substance in enclosed system
Technical (product related) use conditions	n.a. substance in enclosed system
Organisational consumer protection measures (e.g. recommendation and/or use instruction information for consumer; e.g. product labelling)	Do not open, break or dismantle the container during use. Do not open, break or dismantle the container before disposal. Dispose off as chemical waste. PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing

9.13.3. Exposure information and reference to its source

9.13.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC9a and b default settings and total use of 10.000 tpa.

Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade by >90% in the STP under evaluated conditions.

Release times per year (day/year)	365
Fraction used at main local source	0.002
Amount used locally (kg/day)	n.a.
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.017	0.0155	0.00013	0.00145

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.13.3.2. Prediction of consumer exposure resulting from the conditions described above

Consumer exposure estimation provided below is only indicative for one particular PC. The estimates are calculated with the industry model (draft version MasterCSA_8April2010) CSA (Heat transfer fluid category).

Consumers exposure	Exposure estimates	DNEL	Comment
Dermal (mg/kg/day)	0.85	LTS 206	-
Oral (mg/kg/day)	0	LTS 87	-
Inhalation (mg/m^3 for 24hr day)	0.04	LTS 144	-
All routes systematic	-	-	-

Risk characterization:

RCR (dermal)	RCR (oral)	RCR (dermal)	RCR (all routes)
0.004	0	< 0.001	0.004

9.13.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

9.13.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES9e):

Consumer use of ethanol in coatings and paint products

9.14.1. Exposure scenario of Consumer use of ethanol in coatings and paint products	
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC9a : Coatings, paints, thinners, removers PC9c : Finger paints ERC8a : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive outdoor use of processing aids in open systems
9.14.2. Operational conditions and risk management measures	
9.14.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	1-15%
Amounts used	
Daily at point source	n.a.
Annually at point source	n.a. (wide dispersive use)
Annually total	10,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoor and/or outdoor
Processing temperature	Ambient
Processing pressure	Ambient
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000m^3/day
Degradation efficiency	90%
Sludge treatment (disposal or recovery)	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	
No specific measures required.	
Conditions and measures related to external recovery of waste	
n.a.	
9.14.2.2. Control of consumer exposure	
Substance content in the product	1-15%
Amounts of product used/applied per event	50-250 gram
Exposed skin area	480 cm^2 (inside hands or one hand)
Frequency and duration of use/exposure	Frequency of use: 1-5 times per year

	Duration of exposure: 20-60 minutes
Setting and external conditions during use	Indoors (room volume minimum 20m^3) Outdoors
Technical (product related) use conditions	Limit the ethanol content in the product to 15%.
Organisational consumer protection measures (e.g. recommendation and/or use instruction information for consumer; e.g. product labelling)	Do not use in small, closed and not ventilated areas. Keep the doors and windows open during use indoors.

9.14.3. Exposure information and reference to its source

9.14.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC9a and b default settings and total use of 10.000 tpa.
Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade by >90% in the STP under evaluated conditions.

Release times per year (day/year)	365
Fraction used at main local source	0.002
Amount used locally (kg/day)	n.a.
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

For PNEC values, please refer to Page 1.

Environmental exposure	**In STP/ untreated wastewater (mg/l)**	**In local freshwater (mg/l)**	**In local soil (mg/kg)**	**In local marine water (mg/l)**
PEC	0.017	0.0155	0.00013	0.00145

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.14.3.2. Prediction of consumer exposure resulting from the conditions described above

Consumer exposure estimation provided below is only indicative for one particular PC. The estimates are calculated with the industry model (draft version MasterCSA_8April2010) CSA (category waterborne latex wall paint at 15% concentration).

Consumers exposure	Exposure estimates	DNEL	Comment
Dermal (mg/kg/day) (on day of application)	21.44	n/a	**-**
Dermal (mg/kg/day) (chronic)	0.30	LTS 206	
Oral (mg/kg/day)	0	LTS 87	-
Inhalation (mg/m^3, mean event)	~375	950	-
Inhalation (mg/m^3, chronic)	0.50	LTS 144	
All routes systematic	-	-	-

Risk characterization:

RCR (dermal)	RCR (oral)	RCR (dermal)	RCR (all routes)
0.001	0	0.004 – 0.395	0.005

9.14.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

9.14.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES9f):

Consumer use of ethanol in antifreeze, deicing and screenwash products

9.15.1. Exposure scenario of Consumer use of ethanol in antifreeze, deicing and screenwash products	
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC4 : Anti-freeze and de-icing products ERC8d : Wide dispersive outdoor use of processing aids in open systems
9.15.2. Operational conditions and risk management measures	
9.15.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Can be > 25%
Amounts used	
Daily at point source	n.a.
Annually at point source	n.a. (wide dispersive use)
Annually total	125,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	365 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoor
Processing temperature	Ambient
Processing pressure	Ambient
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000m^3/day
Degradation efficiency	90%
Sludge treatment (disposal or recovery)	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	
No specific measures required.	
Conditions and measures related to external recovery of waste	
n.a.	
9.15.2.2. Control of consumer exposure	
Substance content in the product	>25%
Amounts of product used/applied per event	1-50 gram
Exposed skin area	214 cm^2
Frequency and duration of use/exposure	Frequency of use: weekly (up to 50 days per year)
	Duration of exposure: <5 minutes
Setting and external conditions during use	Indoors and/or outdoors

Technical (product related) use conditions	Controlled spray or dosing delivery device.
Organisational consumer protection measures (e.g. recommendation and/or use instruction information for consumer; e.g. product labelling)	PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing.

9.15.3. Exposure information and reference to its source

9.15.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC8d and TGD A&B table (MC-IV, IC-6, UC-5) settings.
Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade by >90% in the STP under evaluated conditions.

Release times per year (day/year)	365
Fraction used at main local source	0.002
Amount used locally (kg/day)	n.a.
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

For PNEC values, please refer to Page 1.

Environmental exposure	**In STP/ untreated wastewater (mg/l)**	**In local freshwater (mg/l)**	**In local soil (mg/kg)**	**In local marine water (mg/l)**
PEC	0.0011	0.014	0.00013	0.0013

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.15.3.2. Prediction of consumer exposure resulting from the conditions described above

Consumer exposure estimation provided below is only indicative for one particular PC. The estimates are calculated with the industry model (draft version MasterCSA_8April2010) CSA (PC24 Lock- de-icer with conc 50%).

Consumers exposure	**Exposure estimates**	**DNEL**	**Comment**
Dermal (mg/kg/day)	17.87	LTS 206	**-**
Oral (mg/kg/day)	0	LTS 87	-
Inhalation (mg/m^3 for 24hr day)	0.51	LTS 144	-
All routes systematic	-	-	-

Risk characterization:

RCR (dermal)	**RCR (oral)**	**RCR (dermal)**	**RCR (all routes)**
0.09	0	0.004	0.094

9.15.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES
9.15.5. Additional good practice advice beyond the REACH CSA
Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES9g):

Consumer use of ethanol in washing and cleaning products

9.16.1. Exposure scenario of Consumer use of ethanol in washing and cleaning products		
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC35 : Washing and cleaning products (including solvent based products) ERC8a : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive outdoor use of processing aids in open systems	
9.16.2. Operational conditions and risk management measures		
9.16.2.1. Control of environmental exposure		
Product characteristic		
Physical state	Liquid	
Concentration of substance in product	Up to 25%	
Amounts used		
Daily at point source	n.a.	
Annually at point source	n.a. (wide dispersive use)	
Annually total	40,000 t/year total market	
Frequency and duration of use/exposure		
Pattern of release	365 days per year	
Environment factors not influenced by risk management		
Flow rate of receiving surface water	18,000 m^3/day (default)	
Other given operational conditions affecting environmental exposure		
Processing setting (indoor/outdoor)	Indoor	
Processing temperature	Ambient	
Processing pressure	Ambient	
Conditions and measures related to municipal sewage treatment plant		
Size of STP	> 2000m^3/day	
Degradation efficiency	90%	
Sludge treatment (disposal or recovery)	Disposal or recovery	
Conditions and measures related to external treatment of waste for disposal		
No specific measures required.		
Conditions and measures related to external recovery of waste		
n.a.		
9.16.2.2. Control of consumer exposure		
Substance content in the product	**<5%**	**5-25%**
Product characteristic (including package design affecting exposure)	Laundry liquid detergents and softeners All purpose cleaners Floor and carpet cleaners	All purpose toilet and bathroom cleaners Glass cleaners Special surfaces

		cleaners Dish washing liquids
Amounts of product used/applied per event	< 250 gram per event	< 250 gram per event
Frequency and duration of use/exposure	Frequency: daily use	Frequency: daily use
	Duration of exposure: 15 minutes – 1 hour	Duration of exposure: 15 minutes – 1 hour
Setting and external conditions during use	Indoors or outdoors	Indoors or outdoors
Technical (product related) use conditions	When spray application: Controlled spray or delivery device.	When spray application: Controlled spray or delivery device.
Organisational consumer protection measures (e.g. recommendation and/or use instruction information for consumer; e.g. product labelling)	No specific measures required.	Do not spray empty in small, enclosed areas.

9.16.3. Exposure information and reference to its source

9.16.3.1. Prediction of environmental exposure resulting from the conditions described above

Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC8a and total volume of 40.000 tpa.
Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade by >90% in the STP under evaluated conditions.

Release times per year (day/year)	365
Fraction used at main local source	0.002
Amount used locally (kg/day)	n.a.
Local release to air (kg/day)	n.a. wide dispersive
Local release to waste (kg/day)	n.a. wide dispersive
Local release to soil (kg/day)	n.a. wide dispersive

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.681	0.0818	0.000451	0.00808

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.16.3.2. Prediction of consumer exposure resulting from the conditions described above

Consumer exposure estimation provided below is only indicative for one particular PC. The estimates are calculated with the industry model (draft version MasterCSA_8April2010) CSA (for category all-purpose liquid cleaners with concentration of the substance at 15%)

Consumers exposure	Exposure estimates	DNEL	Comment
Dermal (mg/kg/day)	10.7	LTS 206	Daily use
Oral (mg/kg/day)	0	LTS 87	
Inhalation (mg/m^3 for 24hr day)	1.73	LTS 144	
All routes systematic	-	-	

Risk characterization:

RCR (dermal)	RCR (oral)	RCR (dermal)	RCR (all routes)
0.05	0	0.015	0.055

9.16.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

9.16.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES10):

Industrial and Professional use of Ethanol as laboratory agent

9.17.1. Exposure scenario addressing uses carried out by workers Industrial and Professional use of Ethanol as laboratory agent	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen) PROC15 : Use as laboratory agent ERC2 : Formulation of preparations ERC4 : Industrial use of processing aids in processes and products, not becoming of articles ERC8a : Wide dispersive indoor use of processing aids in open systems
9.17.2. Operational conditions and risk managment measures	
9.17.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	500 t/year
Annually total	5,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	Continuous 300 days per year
Environment factors not influenced by risk management	
Flow rate of receiving surface water	18,000 m^3/day (default)
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoor
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No specific measures identified.	
Organizational measures to prevent/limit release from site	
Do not release wastewater directly into environment. Wastewater release into local or municipal STP.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day

Degradation efficacy	90%
Sludge treatment	Disposal or recovery
Conditions and measures related to treatment of waste	
Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	
9.17.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	> 4 Days/week
Frequency of exposure (annual)	240 Days/year
Duration of exposure	1-4 Hours/day
Human factors not influenced by risk management	
Potentially exposed body parts	One hand, face side only
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoor
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified.	
Technical conditions and measures to control dispersion from source towards the worker	
No specific measures identified.	
Organisational measures to prevent /limit releases, dispersion and exposure	
No specific measures identified.	
Conditions and measures related to personal protection, hygiene and health evaluation	
1. PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing.	
9.17.3. Exposure information and reference to its source	
9.17.3.1. Prediction of environmental exposure resulting from the conditions described above	
Environmental exposure estimation is based on Ecetoc TRA model v2 based on ERC 8a for professional use and TGD A&B table (MC-Ic, IC- 15, UC-48) for industrial use. Below values are estimates based on the ERC8a approach calculation resulting in more conservative values. All other settings result in lower exposure estimation values. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.	
Release times per year (day/year)	365
Fraction used at main local source	0.1
Amount used locally (kg/day)	2,47
Local release to air (kg/day)	3

Local release to waste (kg/day)	3
Local release to soil (kg/day)	1

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	0.170	0.027	0.0002	0.0027

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.17.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2.

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	19.21	950	-
Dermal (mg/kg/day)	0.34	343	
Combined (mg/kg/day)	3.09	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 15	0.02	0.002	0.02

9.17.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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 = 0,027 * (your local emission [kg/day] / 5) * (2000 / your local WWTP flow rate [m3/day]) * (18000 / your local river flow rate [m3/day]) * ((1 – your local WWTP efficiency)/0.1)

9.17.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

Exposure Scenario (ES11):

Industrial and professional (end) use of ethanol as a heat transfer fluid

9.18.1. Exposure scenario addressing uses carried out by workers Industrial and professional (end) use of ethanol as a heat transfer fluid	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen) PROC20 : Heat and pressure transfer fluids in dispersive, professional use but closed systems ERC7 : Industrial use of substances in closed systems ERC9a : Wide dispersive indoor use of substances in closed systems ERC9b : Wide dispersive outdoor use of substances in closed systems
9.18.2. Operational conditions and risk managment measures	
9.18.2.1. Control of environmental exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Amounts used	
Daily at point sources	n.a.
Annually at point sources	1000 t/year
Annually total	10,000 t/year total market
Frequency and duration of use/exposure	
Pattern of release	No release into environment (closed system)
Environment factors not influenced by risk management	
Flow rate of receiving surface water	n.a.
Other given operational conditions affecting environmental exposure	
Processing setting (indoor/outdoor)	Indoors and outdoors
Processing temperature	Ambient
Processing pressure	Ambient
Technical conditions and measures at process level (source) to prevent release	
No specific measures identified. Handle substance within a closed system.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No specific measures identified. Store substance within a closed system.	
Organizational measures to prevent/limit release from site	
Use in closed system; no intended release into environment.	
Conditions and measures related to municipal sewage treatment plant	
Size of STP	> 2000 m^3/day

Degradation efficacy	90%
Sludge treatment	Disposal or recovery
Conditions and measures related to treatment of waste	
All waste products are assumed to be collected and returned for re-processing or re-use. Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	
9.18.2.2. Control of worker exposure	
Product characteristic	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	5,73 kPa
Amounts used	
n.a. in tier1 TRA model	
Frequency and duration of use/exposure	
Frequency of exposure (weekly)	n.a.
Frequency of exposure (annual)	n.a.
Duration of exposure	n.a.
Human factors not influenced by risk management	
Potentially exposed body parts	Two hands, face side only
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented.	
Setting (indoor/outdoor)	Indoor and outdoor
Technical conditions and measures at process level (source) to prevent release	
Handle substance within a closed system.	
Technical conditions and measures to control dispersion from source towards the worker	
Store substance within a closed system.	
Organisational measures to prevent /limit releases, dispersion and exposure	
Substance in a closed system. No intended exposure to the substance.	
Conditions and measures related to personal protection, hygiene and health evaluation	
1. PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing.	
9.18.3. Exposure information and reference to its source	
9.18.3.1. Prediction of environmental exposure resulting from the conditions described above	
Environmental exposure estimation is based on Ecetoc TRA model v2. Below values are estimates based on the ERC9a approach calculation. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade for 90% in the local and/or municipal STP under evaluated conditions.	
Release times per year (day/year)	365
Fraction used at main local source	0.1
Amount used locally (kg/day)	5,5
Local release to air (kg/day)	~ 0 (negligible)
Local release to waste (kg/day)	~ 0 (negligible)

Local release to soil (kg/day)	~ 0 (negligible)

For PNEC values, please refer to Page 1.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg)	In local marine water (mg/l)
PEC	~ 0 (negligible)	0.0170	0.0002	0.0010

Total daily intake via local environment: Negligible compared to daily dietary intake and endogenous formation.

9.18.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model v2.

Workers exposure	Exposure estimates	DNEL	Comment
Inhalation (mg/m^3)	38.42	950	-
Dermal (mg/kg/day)	1.71	343	
Combined (mg/kg/day)	7.20	343	

Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 20	0.04	0.01	0.05

9.18.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2.

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

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)

9.18.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.