SAFETY DATA SHEET
According to EC No 1907/2006 as amended as at the date of this SDS

Toluene

Version	Revision Date:	SDS Number:	Date of last issue: 31.10.2024
4.3	17.02.2025	800001033904	Print Date 24.02.2025

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

1.1 Product identifier

Trade name	:	Toluene
Product code	:	Q9131, Q9138, Q9250, Q9300, Q9308, T1402, X211H
Registration number EU	:	01-2119471310-51-0000, 01-2119471310-51-0002, 01-2119471310-51-0003, 01-2119471310-51-0005, 01-2119471310-51-0027
CAS-No.	:	108-88-3

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

Use of the Substance/Mixture	:	Solvent., Raw material for use in the chemical industry. Please refer to section 16 and/or the annexes for the registered uses under REACH.
Uses advised against	:	This product must not be used in applications other than the above without first seeking the advice of the supplier. This product must not be used in applications other than those listed in Section 1 without first seeking the advice of the supplier.

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier	:	**Shell Chemicals Europe B.V.** PO Box 2334 3000 CH Rotterdam Netherlands
Telephone	:	+31 (0)10 441 5137 / +31 (0)10 441 5191
Telefax	:	+31 (0)20 716 8316 / +31 (0)20 713 9230
Contact for Safety Data Sheet	:	sccmsds@shell.com

1.4 Emergency telephone number

+44 (0) 1235 239 670 (This telephone number is available 24 hours per day, 7 days per week)
Poison Centre: (+41) 145

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquids, Category 2	H225: Highly flammable liquid and vapour.
Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters air-

	ways.
Skin irritation, Category 2	H315: Causes skin irritation.
Specific target organ toxicity - single exposure, Category 3, Narcotic effects	H336: May cause drowsiness or dizziness.
Reproductive toxicity, Category 2	H361d: Suspected of damaging the unborn child.
Specific target organ toxicity - repeated exposure, Category 2, Inhalation, Central nervous system	H373: May cause damage to organs through prolonged or repeated exposure.
Long-term (chronic) aquatic hazard, Category 3	H412: Harmful to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Danger

Hazard statements :

PHYSICAL HAZARDS:
H225 Highly flammable liquid and vapour.
HEALTH HAZARDS:
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H361d Suspected of damaging the unborn child.
H373 May cause damage to organs (Central nervous system) through prolonged or repeated exposure if inhaled.
ENVIRONMENTAL HAZARDS:
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements :

Prevention:

P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

P331 Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

May form flammable/explosive vapour-air mixture.
This material is a static accumulator.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.

SECTION 3: Composition/information on ingredients

3.1 Substances

Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
Toluene	108-88-3 203-625-9	>= 99,5 - <= 100

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : Not expected to be a health hazard when used under normal

conditions.

Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

If inhaled : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

In case of skin contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

In case of eye contact : Flush eye with copious quantities of water.
Remove contact lenses, if present and easy to do. Continue rinsing.
If persistent irritation occurs, obtain medical attention.

If swallowed : Call emergency number for your location / facility.
If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.
If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, lightheadedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.
Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.
No specific hazards under normal use conditions.
Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.
If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.
The onset of respiratory symptoms may be delayed for several hours after exposure.
If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.
Auditory system effects may include temporary hearing loss and/or ringing in the ears.
Visual system disturbances may be evidenced by decreases

in the ability to discriminate between colours.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment	:	Call a doctor or poison control center for guidance. Potential for chemical pneumonitis. Potential for cardiac sensitisation, particularly in abuse situations. Hypoxia or negative inotropes may enhance these effects. Consider: oxygen therapy. Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	:	Do not use water in a jet.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting	:	Clear fire area of all non-emergency personnel. Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water.

5.3 Advice for firefighters

Special protective equipment for firefighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).
Specific extinguishing methods	:	Standard procedure for chemical fires.
Further information	:	Keep adjacent containers cool by spraying with water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions :

Observe all relevant local and international regulations.
Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.
Local authorities should be advised if significant spillages cannot be contained.
6.1.1 For non emergency personnel:
Avoid contact with skin, eyes and clothing.
Isolate hazard area and deny entry to unnecessary or unprotected personnel.
Do not breathe fumes, vapour.
Do not operate electrical equipment.
6.1.2 For emergency responders:
Avoid contact with skin, eyes and clothing.
Isolate hazard area and deny entry to unnecessary or unprotected personnel.
Do not breathe fumes, vapour.
Do not operate electrical equipment.

6.2 Environmental precautions

Environmental precautions : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Monitor area with combustible gas indicator.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely

Ventilate contaminated area thoroughly.
If contamination of site occurs remediation may require specialist advice.

6.4 Reference to other sections

For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet., For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Technical measures	:	Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Ensure that all local regulations regarding handling and storage facilities are followed.
Advice on safe handling	:	Avoid inhaling vapour and/or mists. Avoid contact with skin, eyes and clothing. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Bulk storage tanks should be diked (bunded). When using do not eat or drink. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Product Transfer	:	Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Refer to guidance under Handling section.
Hygiene measures	:	Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use. Do not

ingest. If swallowed, then seek immediate medical assistance.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

Further information on storage stability : Storage Temperature:
Ambient.

Bulk storage tanks should be diked (bunded).
Locate tanks away from heat and other sources of ignition.
Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions.
Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat.
Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.
Electrostatic charges will be generated during pumping.
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.

Packaging material : Suitable material: For containers, or container linings use mild steel, stainless steel., For container paints, use epoxy paint, zinc silicate paint.
Unsuitable material: Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice : Do not cut, drill, grind, weld or perform similar operations on or near containers.

7.3 Specific end use(s)

Specific use(s) : Please refer to section 16 and/or the annexes for the registered uses under REACH.

See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
IEC/TS 60079-32-1: Electrostatic hazards, guidance

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Toluene	108-88-3	STEL	200 ppm 760 mg/m3	CH SUVA
	Further information: noise amplifying ototoxicity, Probably reprotoxic substance, Toxic by skin resorption possible; Substances, which are easily absored through the skin, can give by additional skin resoption a substancial higher risk compared to only inhalation by the airways., National Institute for Occupational Safety and Health, German Research Foundation, National Institute of Research and Safety for the prevention of work accidents and occupational diseases, Health and Safety Executive (Occupational Medicine and Hygiene Laboratory), Harm to the unborn child is not to be expected when the OEL-value is respected			
Toluene		TWA	50 ppm 190 mg/m3	CH SUVA
	Further information: noise amplifying ototoxicity, Probably reprotoxic substance, Toxic by skin resorption possible; Substances, which are easily absored through the skin, can give by additional skin resoption a substancial higher risk compared to only inhalation by the airways., National Institute for Occupational Safety and Health, German Research Foundation, National Institute of Research and Safety for the prevention of work accidents and occupational diseases, Health and Safety Executive (Occupational Medicine and Hygiene Laboratory), Harm to the unborn child is not to be expected when the OEL-value is respected			

Biological occupational exposure limits

Substance name	CAS-No.	Control parameters	Sampling time	Basis
Toluene	108-88-3	hippuric acid: 2 g/g creatinine (Urine)	Immediately after exposure or after working hours, In case of long-term exposure: after more than one shift	CH BAT
		o-cresol: 0,5 mg/l (Urine)	Immediately after exposure or after working hours, In case of long-term exposure: after more than one shift	CH BAT
		toluol: 6.48 micromol per litre (Blood)	Immediately after exposure or after working hours	CH BAT
		toluol: 75 µg/l (Urine)	Immediately after exposure or after working hours	CH BAT
		o-cresol: 4.62 mi-	Immediately after	CH BAT

		cromol per litre (Urine)	exposure or after working hours, In case of long-term exposure: after more than one shift	
		toluol: 600 µg/l (Blood)	Immediately after exposure or after working hours	CH BAT
		hippuric acid: 1.26 mmol/mmol creatinine (Urine)	Immediately after exposure or after working hours, In case of long-term exposure: after more than one shift	CH BAT

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
Toluene	Workers	Inhalation	Acute systemic effects	384 mg/m3
Toluene	Workers	Inhalation	Long-term systemic effects	192 mg/m3
Toluene	Workers	Dermal	Long-term systemic effects	180 mg/kg bw/day
Toluene	Consumers	Inhalation	Acute systemic effects	226 mg/m3
Toluene	Consumers	Inhalation	Long-term systemic effects	56,5 mg/m3
Toluene	Consumers	Dermal	Long-term systemic effects	226 mg/kg bw/day
Toluene	Consumers	Oral	Long-term systemic effects	8,13 mg/kg bw/day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Toluene, 108-88-3	Fresh water	0,68 mg/l
Toluene, 108-88-3	Sediment	16,39 mg/kg
Toluene, 108-88-3	Soil	2,89 mg/kg
Toluene, 108-88-3	Sewage treatment plant	13,61 mg/l

8.2 Exposure controls

Engineering measures

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.
Use sealed systems as far as possible.
Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
Local exhaust ventilation is recommended.
Firewater monitors and deluge systems are recommended.
Eye washes and showers for emergency use.
Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:

General Information
Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.
Define procedures for safe handling and maintenance of controls.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or subsequent recycle.

Personal protective equipment

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex. The provided information is made in consideration of the PPE directive (Council Directive 89/686/EEC) and the CEN European Committee for Standardisation (CEN) standards.

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Eye protection	:	If material is handled such that it could be splashed into eyes, protective eyewear is recommended. Approved to EU Standard EN166.
Hand protection		
Remarks	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Nitrile rubber gloves. Incidental contact/Splash protection: PVC or neoprene rubber gloves. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contami-

nated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Skin and body protection : Wear chemical resistant gloves/gauntlets and boots. Where risk of splashing, also wear an apron.
Protective clothing approved to EU Standard EN14605.
Wear antistatic and flame-retardant clothing, if a local risk assessment deems it so.

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers.
Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
If air-filtering respirators are suitable for conditions of use:
Select a filter suitable for organic gases and vapours [Type A boiling point > 65°C (149°F)] meeting EN14387.

Thermal hazards : Not applicable

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state : Liquid.

Colour : colourless

Odour : aromatic

Odour Threshold : 1,74 ppm

Melting point/freezing point : Typical -95 °C

Boiling point/boiling range : Typical 110 - 111 °C

Flammability

Flammability (solid, gas) : Not applicable

Lower explosion limit and upper explosion limit / flammability limit

Upper explosion limit / Upper flammability limit	:	7,1 %(V)
Lower explosion limit / Lower flammability limit	:	1,2 %(V)
Flash point	:	4 °C
Auto-ignition temperature	:	> 480 °C
Decomposition temperature		
Decomposition temperature	:	Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).
pH	:	Data not available
Viscosity		
Viscosity, dynamic	:	Data not available
Viscosity, kinematic	:	0,63 mm2/s (25 °C) Method: ASTM D445
Solubility(ies)		
Water solubility	:	0,515 kg/m3
Partition coefficient: n-octanol/water	:	log Pow: 2,73 Method: Literature data.
Vapour pressure	:	Typical 3,5 kPa (20 °C)
Relative density	:	0,87 Method: ASTM D4052
Density	:	Typical 871 kg/m3 (15 °C) Method: ASTM D4052
Relative vapour density	:	3,1
Particle characteristics		
Particle size	:	Data not available

9.2 Other information

Explosive properties	:	Not applicable
Oxidizing properties	:	Data not available
Evaporation rate	:	Data not available
Conductivity	:	Low conductivity: < 100 pS/m
		The conductivity of this material makes it a static accumula-

tor., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid

Surface tension	:	Data not available
Molecular weight	:	92 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity

The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.

10.2 Chemical stability

No hazardous reaction is expected when handled and stored according to provisions
Stable under normal conditions of use.

10.3 Possibility of hazardous reactions

Hazardous reactions	:	Reacts with strong oxidising agents.

10.4 Conditions to avoid

Conditions to avoid	:	Avoid heat, sparks, open flames and other ignition sources. In certain circumstances product can ignite due to static electricity.

10.5 Incompatible materials

Materials to avoid	:	Strong oxidising agents.

10.6 Hazardous decomposition products

Hazardous decomposition products are not expected to form during normal storage.
Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11: Toxicological information

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

Information on likely routes of exposure	:	Inhalation is the primary route of exposure although absorption may occur through skin contact or following accidental ingestion.

Acute toxicity

Components:

Toluene:

Acute oral toxicity	:	LD 50 (Rat, male): > 5.000 mg/kg Method: Test(s) equivalent or similar to OECD Test Guideline 401 Remarks: Based on available data, the classification criteria are not met.
Acute inhalation toxicity	:	LC 50 (Rat, male and female): > 20 mg/l Exposure time: 4 h Test atmosphere: vapour Method: Test(s) equivalent or similar to OECD Test Guideline 403 Remarks: Based on available data, the classification criteria are not met. High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea.
Acute dermal toxicity	:	LD 50 (Rabbit, male): > 5.000 mg/kg Method: Literature data Remarks: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Components:

Toluene:

Species	:	Rabbit
Method	:	Test(s) equivalent or similar to OECD Test Guideline 404
Remarks	:	Causes skin irritation.

Serious eye damage/eye irritation

Components:

Toluene:

Species	:	Rabbit
Method	:	OECD Test Guideline 405
Remarks	:	Slightly irritating. Insufficient to classify.

Respiratory or skin sensitisation

Components:

Toluene:

Species	:	Guinea pig
Method	:	Test(s) equivalent or similar to OECD Test Guideline 406
Remarks	:	Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Components:

Toluene:

Genotoxicity in vitro	:	Method: Test(s) equivalent or similar to OECD Guideline 471 Remarks: Based on available data, the classification criteria are not met. Method: Test(s) equivalent or similar to OECD Test Guideline 476 Remarks: Based on available data, the classification criteria are not met.
Genotoxicity in vivo	:	Species: Rat Method: Acceptable non-standard method. Remarks: Based on available data, the classification criteria are not met.
Germ cell mutagenicity- Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

Carcinogenicity

Components:

Toluene:

Species	:	Rat, male and female
Application Route	:	Inhalation
Method	:	OECD Test Guideline 453
Remarks	:	Based on available data, the classification criteria are not met.
Carcinogenicity - Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

Material	GHS/CLP Carcinogenicity Classification
Toluene	No carcinogenicity classification.

Material	Other Carcinogenicity Classification
Toluene	IARC: Group 3: Not classifiable as to its carcinogenicity to humans

Reproductive toxicity

Components:

Toluene:

Effects on fertility	:	Species: Rat Sex: male and female Application Route: Inhalation Method: OECD Test Guideline 416 Remarks: Based on available data, the classification criteria are not met.
Reproductive toxicity - Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

STOT - single exposure

Components:

Toluene:

Exposure routes	:	Inhalation
Target Organs	:	Central nervous system
Remarks	:	May cause drowsiness or dizziness. Vapours may cause drowsiness and dizziness. Inhalation of vapours or mists may cause irritation to the respiratory system.

STOT - repeated exposure

Components:

Toluene:

Exposure routes	:	Inhalation
Target Organs	:	Central nervous system
Remarks	:	May cause damage to organs or organ systems through prolonged or repeated exposure. May cause damage to central nervous system, respiratory system, visual system, and auditory system through prolonged or repeated exposure. Effects were seen at high doses only. Visual system: may cause decreased color perception. These subtle changes have not been found to lead to functional colour vision deficits. Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss. Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest. Abuse of vapours has been associated with organ damage

and death.

Repeated dose toxicity

Components:

Toluene:

Species	:	Rat, male and female
Application Route	:	Oral
Method	:	Test(s) equivalent or similar to Directive 67/548/EEC, Annex V, B.26
Target Organs	:	No specific target organs noted

Species	:	Rat, male and female
Application Route	:	Inhalation
Test atmosphere	:	vapour
Method	:	Test(s) equivalent or similar to OECD Test Guideline 453
Target Organs	:	Central nervous system

Aspiration toxicity

Components:

Toluene:

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

11.2 Information on other hazards

Endocrine disrupting properties

Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Further information

Product:

Remarks	:	Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Components:

Toluene:

Remarks	:	Classifications by other authorities under varying regulatory frameworks may exist.

SECTION 12: Ecological information

12.1 Toxicity

Components:

Toluene:

Toxicity to fish	:	LC50 (Oncorhynchus kisutch (coho salmon)): 4,02 mg/l Exposure time: 96 h Method: Literature data. Remarks: Toxic LC/EC/IC50 >1 - <=10 mg/l
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Ceriodaphnia dubia (water flea)): 3,78 mg/l Exposure time: 48 h Method: Other guideline method. Remarks: Toxic LC/EC/IC50 >1 - <=10 mg/l
Toxicity to algae/aquatic plants	:	EC50 (Chlorella vulgaris (Fresh water algae)): 134 mg/l Exposure time: 3 h Method: Literature data. Remarks: Practically non toxic: LC/EC/IC50 > 100 mg/l
Toxicity to microorganisms	:	EC50 (Nitrosomonas): 84 mg/l Exposure time: 24 h Method: Literature data. Remarks: Harmful LL/EL/IL50 10-100 mg/l
Toxicity to fish (Chronic toxicity)	:	NOEC: 1,4 mg/l Exposure time: 40 d Species: Oncorhynchus kisutch (coho salmon) Method: Literature data. Remarks: NOEC/NOEL > 1.0 - <= 10 mg/l
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 0,74 mg/l Exposure time: 7 d Species: Ceriodaphnia dubia (Water flea) Method: Other guideline method. Remarks: NOEC/NOEL > 0.1 - <=1.0 mg/l

12.2 Persistence and degradability

Components:

Toluene:

Biodegradability : Biodegradation: 81 %
Exposure time: 5 d
Method: ASTM D1252-67
Remarks: Readily biodegradable.

Remarks: Not Persistent per IMO criteria.
International Oil Pollution Compensation (IOPC) Fund definition: "A non-persistent oil is oil, which, at the time of shipment, consists of hydrocarbon fractions, (a) at least 50% of which, by volume, distills at a temperature of 340ºC (645ºF) and (b) at least 95% of which, by volume, distils at a temperature of 370ºC (700ºF) when tested by the ASTM Method D-86/78 or any subsequent revision thereof."

12.3 Bioaccumulative potential

Components:

Toluene:

Bioaccumulation : Remarks: Does not bioaccumulate significantly.

12.4 Mobility in soil

Components:

Toluene:

Mobility : Remarks: Floats on water., If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.

12.5 Results of PBT and vPvB assessment

Components:

Toluene:

Assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB..

12.6 Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Product:

Additional ecological information	:	Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Waste, spills or used product is dangerous waste. Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with. MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.
Contaminated packaging	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer. Comply with any local recovery or waste disposal regulations.

SECTION 14: Transport information

14.1 UN number or ID number

ADN : 1294

ADR : 1294

RID : 1294

IMDG : 1294

IATA : 1294

14.2 UN proper shipping name

ADN : TOLUENE

ADR : TOLUENE

RID : TOLUENE

IMDG : TOLUENE

IATA : Toluene

14.3 Transport hazard class(es)

ADN : 3

ADR : 3

RID : 3

IMDG : 3

IATA : 3

14.4 Packing group

ADN

Packing group : II
Classification Code : F1
Labels : 3 (N3)
CDNI Inland Water Waste Agreement : NST 8199 Toluene

ADR

Packing group : II
Classification Code : F1
Hazard Identification Number : 33
Labels : 3

RID

Packing group : II
Classification Code : F1
Hazard Identification Number : 33
Labels : 3

IMDG

Packing group : II
Labels : 3

IATA

Packing group : II
Labels : 3

14.5 Environmental hazards

ADN

Environmentally hazardous : yes

ADR
Environmentally hazardous : no

RID
Environmentally hazardous : no

IMDG
Marine pollutant : no

14.6 Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

14.7 Maritime transport in bulk according to IMO instruments

Pollution category : Y
Ship type : 3; Must be Double Hulled
Product name : Toluene

Additional Information **:** This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen enriched atmospheres displaces available oxygen which may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

Transport in bulk according to Annex II of Marpol and the IBC Code

SECTION 15: Regulatory information

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

REACH - List of substances subject to authorisation (Annex XIV) : Product is not subject to Authorisation under REACH.

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57).

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.
P5c FLAMMABLE LIQUIDS

Waters Protection Ordinance (WPO 814.201)
Water pollution class : Swiss Class A, (www.tankportal.ch)

Other regulations:

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Product is subject to Stoerfallverordnung (StFV).
Compliance with the requirements of the Youth Employment Protection Ordinance (ArGV 5, SR 822.115) & Ordinance on Dangerous Labour for Young People (SR 822.115.2) must be ensured.
Take note of Law on the protection of mothers at work, in education and in studies (Maternity Protection Act – Mutterschutzverordnung).

The components of this product are reported in the following inventories:

AIIC	:	Listed
DSL	:	Listed
IECSC	:	Listed
ENCS	:	Listed
KECI	:	Listed
NZIoC	:	Listed
PICCS	:	Listed
TSCA	:	Listed
TCSI	:	Listed

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of other abbreviations

CH BAT	:	Switzerland. List of BAT-values
CH SUVA	:	Switzerland. Limit values at the work place
CH SUVA / TWA	:	Time Weighted Average
CH SUVA / STEL	:	Short Term Exposure Limit

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergen-

cy Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Training advice	:	Provide adequate information, instruction and training for operators.
Other information	:	For Industry guidance and tools on REACH please visit the CEFIC website at http://cefic.org/Industry-support. The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB. A vertical bar (|) in the left margin indicates an amendment from the previous version.
Sources of key data used to compile the Safety Data Sheet	:	The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).

Identified Uses according to the Use Descriptor System
Uses - Worker

Title	:	Manufacture of substance - Industrial

Uses - Worker

Title	:	Use as an intermediate - Industrial

Uses - Worker
Title : Distribution of substance
- Industrial

Uses - Worker
Title : Formulation & (re)packing of substances and mixtures
- Industrial

Uses - Worker
Title : Uses in Coatings
- Industrial

Uses - Worker
Title : Uses in Coatings
- Professional

Uses - Worker
Title : Use in Cleaning Agents
- Industrial

Uses - Worker
Title : Use in Cleaning Agents
- Professional

Uses - Worker
Title : Use in Oil and Gas field drilling and production operations
- Industrial

Uses - Worker
Title : Use as binders and release agents
- Industrial

Uses - Worker
Title : Use as binders and release agents
- Professional

Uses - Worker
Title : Use as a fuel
- Industrial

Uses - Worker
Title : Use as a fuel

- Professional

Uses - Worker
Title : Functional Fluids
- Industrial

Uses - Worker
Title : Functional Fluids
- Professional

Uses - Worker
Title : Use in laboratories
- Industrial

Uses - Worker
Title : Use in laboratories
- Professional

Uses - Worker
Title : Rubber production and processing
- Industrial

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

CH / EN

Exposure Scenario - Worker

300000000481	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Manufacture of substance- Industrial
Use Descriptor	**Sector of Use**: SU 3, SU8, SU9 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 **Environmental Release Categories**: ERC1, ERC4, ESVOC SpERC 1.1.v1
Scope of process	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems)with sample collectionGeneral measures (skin irritants).	No other specific measures identified.
General exposures (closed	No other specific measures identified.

systems)Use in contained batch processes	
General exposures (open systems)Batch processwith sample collection	No other specific measures identified.
Process sampling	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). , or: Sample via a closed loop or other system to avoid exposure
Laboratory activities	No other specific measures identified.
Bulk transfers(open systems)with potential for aerosol generation.	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). , or: Operate activity away from sources of substance emission or release. If technical measures not practical: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Bulk transfers(closed systems)	Transfer via enclosed lines. Clear transfer lines prior to de-coupling. , or: Operate activity away from sources of substance emission or release. If technical measures not practical: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Equipment cleaning and maintenance	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.
Section 2.2	**Control of Environmental Exposure**

Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	3,0E+05
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	3,0E+05
Maximum daily site tonnage (kg/day):	1,0E+06
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	40
Local marine water dilution factor:	100

Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	5,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-04
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by wastewater treatment plant microbes.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	4,07E+06
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management	

Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000484	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use as an intermediate- Industrial
Use Descriptor	**Sector of Use**: SU 3, SU8, SU9 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 **Environmental Release Categories**: ERC6a
Scope of process	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems)with sample collectionGeneral measures (skin irritants).	No other specific measures identified.
General exposures (closed systems)Use in contained	No other specific measures identified.

batch processes	
General exposures (open systems)Batch processwith sample collection	No other specific measures identified.
Process sampling	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). , or: Sample via a closed loop or other system to avoid exposure
Laboratory activities	No other specific measures identified.
Bulk transfers(open systems)with potential for aerosol generation.	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). , or: Operate activity away from sources of substance emission or release. If technical measures not practical: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Bulk transfers(closed systems)	Transfer via enclosed lines. Clear transfer lines prior to de-coupling. , or: Operate activity away from sources of substance emission or release. If technical measures not practical: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Equipment cleaning and maintenance	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,2E+04
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1,2E+04
Maximum daily site tonnage (kg/day):	4,0E+04
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	

Release fraction to air from process (initial release prior to RMM):	2,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-03
Release fraction to soil from process (initial release prior to RMM):	1,0E-03
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	4,56E+04
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of substance is generated.	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of substance is generated.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users	

should ensure that risks are managed to at least equivalent levels.

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000482	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Distribution of substance- Industrial
Use Descriptor	**Sector of Use**: SU 3, SU8, SU9 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9, PROC 15 **Environmental Release Categories**: ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC 6C, ERC 6D, ERC7, ESVOC SpERC 1.1b.v1
Scope of process	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)with sample collectionGeneral measures (skin irritants).	No other specific measures identified.
General exposures (closed systems)Use in contained batch processes	No other specific measures identified.

General exposures (open systems)Batch processwith sample collection	No other specific measures identified.
Process sampling	No other specific measures identified.
Laboratory activities	No other specific measures identified.
Bulk transfers(closed systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or: Ensure operation is undertaken outdoors.
Bulk transfers(open systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or: Operate activity away from sources of substance emission or release. If technical measures not practical: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Drum and small package filling	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance. , or: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	3,0E+05
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	3,0E+05
Maximum daily site tonnage (kg/day):	1,0E+06
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10

Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1,0E-04
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-05
Release fraction to soil from process (initial release prior to RMM):	1,0E-05
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,36E+07
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**

Section 4.1 - Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000513	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Formulation & (re)packing of substances and mixtures- Industrial
Use Descriptor	**Sector of Use**: SU 3, SU 10 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 14, PROC 15 **Environmental Release Categories**: ERC2, ESVOC SpERC 2.2.v1
Scope of process	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems)with sample collectionGeneral measures (skin irritants).	No other specific measures identified.

General exposures (closed systems)Use in contained batch processes	No other specific measures identified.
General exposures (open systems)Batch processwith sample collectionwith potential for aerosol generation.	No other specific measures identified.
Batch processes at elevated temperatures	Ensure material transfers are under containment or extract ventilation. Provide extraction ventilation at points where emissions occur.
Process sampling	No other specific measures identified.
Laboratory activities	No other specific measures identified.
Bulk transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or: Operate activity away from sources of substance emission or release. If technical measures not practical: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Mixing operations (open systems)with potential for aerosol generation.	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
ManualTransfer from/pouring from containers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Drum/batch transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Production or preparation or articles by tabletting, compression, extrusion or pelletisation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Drum and small package filling	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.
Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	

Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1,5E+03
Maximum daily site tonnage (kg/day):	5,0E+03
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	2,5E-02
Release fraction to wastewater from process (initial release prior to RMM):	2,0E-03
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6,78E+04
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise	

indicated.

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000490	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Uses in Coatings- Industrial
Use Descriptor	**Sector of Use**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 10, PROC 13, PROC 15 **Environmental Release Categories**: ERC4, ESVOC SpERC 4.3a.v1
Scope of process	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
General exposures (closed	No other specific measures identified.

systems)	
General exposures (closed systems)with sample collectionUse in contained systems	No other specific measures identified.
Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing	No other specific measures identified.
Mixing operations (closed systems)General exposures (closed systems)	No other specific measures identified.
Film formation - air drying	No other specific measures identified.
Preparation of material for applicationMixing operations (open systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Spraying (automatic/robotic)	Carry out in a vented booth or extracted enclosure.
ManualSpraying	Carry out in a vented booth or extracted enclosure. , or: Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better.
Material transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Roller, spreader, flow application	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Dipping, immersion and pouring	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Laboratory activities	No other specific measures identified.
Material transfersDrum/batch transfersTransfer from/pouring from containers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Production or preparation or articles by tabletting, compression, extrusion or pelletisation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Equipment cleaning and maintenance	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.
Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	

Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	4,5E+03
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	4,5E+03
Maximum daily site tonnage (kg/day):	1,5E+04
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	9,8E-01
Release fraction to wastewater from process (initial release prior to RMM):	7,0E-03
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,99E+04
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**

Section 3.1 - Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000492	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Uses in Coatings- Professional
Use Descriptor	**Sector of Use**: SU 22 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 13, PROC 15, PROC 19 **Environmental Release Categories**: ERC8a, ERC8d, ESVOC SpERC 8.3b.v1
Scope of process	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation), and equipment cleaning, maintenance and associated laboratory activities.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
General exposures (closed	No other specific measures identified.

systems)	
Filling/ preparation of equipment from drums or containers.	No other specific measures identified.
General exposures (closed systems)Use in contained systems	No other specific measures identified.
Film formation - air dryingOutdoor	Ensure operation is undertaken outdoors.
Film formation - air dryingIndoor	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Preparation of material for applicationIndoor	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Avoid carrying out activities involving exposure for more than 4 hours
Preparation of material for application	Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours
Material transfersDrum/batch transfers	Use drum pumps or carefully pour from container.
Roller, spreader, flow applicationIndoor	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Avoid carrying out activities involving exposure for more than 4 hours , or: Wear a respirator conforming to EN140 with Type A filter or better.
Roller, spreader, flow applicationOutdoor	Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours , or: Wear a respirator conforming to EN140 with Type A filter or better.
ManualSprayingIndoor	Carry out in a vented booth or extracted enclosure.
ManualSprayingOutdoor	Ensure operation is undertaken outdoors. Wear a respirator conforming to EN140 with Type A filter or better.
Dipping, immersion and pouringIndoor	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Avoid carrying out activities involving exposure for more than 4 hours

Dipping, immersion and pouringOutdoor	Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours
Laboratory activities	No other specific measures identified.
Hand application - finger-paints, pastels, adhe-sivesIndoor	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Avoid carrying out activities involving exposure for more than 4 hours
Hand application - finger-paints, pastels, adhe-sivesOutdoor	Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours
Equipment cleaning and maintenance	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+04
Fraction of Regional tonnage used locally:	0,002
Annual site tonnage (tonnes/year):	30
Maximum daily site tonnage (kg/day):	82,2
Frequency and Duration of Use	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	9,8E-01
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-02
Release fraction to soil from process (initial release prior to RMM):	1,0E-02
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	

Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,27E+04
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org).

Exposure Scenario - Worker

300000000485	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use in Cleaning Agents- Industrial
Use Descriptor	**Sector of Use**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 7, PROC 8a, PROC 8b, PROC 10, PROC 13 **Environmental Release Categories**: ERC4, ESVOC SpERC 4.4a.v1
Scope of process	Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
Bulk transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Automated process with (semi) closed systems.Use in contained systems	No other specific measures identified.
Automated process with (semi) closed systems.Use in contained systems-Drum/batch transfers	No other specific measures identified.
Application of cleaning products in closed systems	No other specific measures identified.
Filling/ preparation of equipment from drums or containers.Dedicated facility	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Use in contained batch processesTreatment by heating	Provide extraction ventilation at points where emissions occur.
Degreasing small objects in cleaning station	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Cleaning with low-pressure washers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Cleaning with high pressure washers	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
ManualSurfacesCleaningno spraying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Equipment cleaning and maintenance	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1,5E+03
Maximum daily site tonnage (kg/day):	5,0E+03
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	3,0E-01
Release fraction to wastewater from process (initial release prior to	3,0E-05

RMM):	
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by freshwater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	70,0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,77E+06
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users	

should ensure that risks are managed to at least equivalent levels.

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000486	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use in Cleaning Agents- Professional
Use Descriptor	**Sector of Use**: SU 22 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 13 **Environmental Release Categories**: ERC8a, ERC8d, ESVOC SpERC 8.4b.v1
Scope of process	Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
Filling/ preparation of equipment from drums or containers.Dedicated facility	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

Automated process with (semi) closed systems.Use in contained systems	No other specific measures identified.
Automated process with (semi) closed systems.Use in contained systemsDrum/batch transfers	No other specific measures identified.
Semi Automated process. (e.g.: Semi automatic application of floor care and maintenance products)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Filling/ preparation of equipment from drums or containers.Outdoor	Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours
ManualSurfacesCleaningDipping, immersion and pouring	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Cleaning with low-pressure washersRolling, Brushingno spraying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better.
Cleaning with high pressure washersSprayingIndoor	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better.
Cleaning with high pressure washersSprayingOutdoor	Ensure operation is undertaken outdoors. Wear a respirator conforming to EN140 with Type A filter or better.
ManualSurfacesCleaningSpraying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better.
Ad hoc manual application via trigger sprays, dipping, etc.Rolling, Brushing	Provide extraction ventilation at points where emissions occur. , or: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better.
Application of cleaning products in closed systems	Ensure operation is undertaken outdoors. , or: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Cleaning of medical devices	Provide extraction ventilation at points where emissions occur.

Equipment cleaning and maintenance	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	2,0E-03
Annual site tonnage (tonnes/year):	3,0
Maximum daily site tonnage (kg/day):	8,2
Frequency and Duration of Use	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	2,0E-02
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-06
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by freshwater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	3,9E+03
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	

Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or regional regulations.

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000499	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use in Oil and Gas field drilling and production operations-Industrial
Use Descriptor	**Sector of Use**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b **Environmental Release Categories**: ERC4
Scope of process	Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Additional Information	No exposure assessment presented for the environment. Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment.
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Bulk transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or: Operate activity away from sources of substance emission or

	release. If technical measures not practical: Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
Filling/ preparation of equipment from drums or containers.	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Drill floor operations	No other specific measures identified.
Operation of solids filtering equipment	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Treatment and disposal of filtered solids	No other specific measures identified.
Process sampling	No other specific measures identified.
General exposures (closed systems)	No other specific measures identified.
Pouring from small containers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
General exposures (open systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Equipment cleaning and maintenance	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Storage.	Store substance within a closed system.
Section 2.2	**Control of Environmental Exposure**
No exposure assessment presented for the environment.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users	

should ensure that risks are managed to at least equivalent levels.

Section 4.2 -Environment
No exposure assessment presented for the environment.
Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment.

Exposure Scenario - Worker

300000000501	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use as binders and release agents- Industrial
Use Descriptor	**Sector of Use**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 6, PROC 7, PROC 8b, PROC 10, PROC 13, PROC 14 **Environmental Release Categories**: ERC4, ERC5, ESVOC SpERC 4.10a.v1
Scope of process	Covers the use as binders and release agents including material transfers, mixing, application (including spraying and brushing), and handling of waste.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
Material transfers(closed systems)General measures (skin irritants).	No other specific measures identified.
Material transfersBatch process(closed systems)	No other specific measures identified.

Drum/batch transfers	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Mixing operations (closed systems)	No other specific measures identified.
Mixing operations (open systems)	No other specific measures identified.
Mold forming	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Casting operations	Provide extraction ventilation at points where emissions occur.
Spraying/ fogging by machine application	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Spraying/ fogging by manual application	Carry out in a vented booth or extracted enclosure.
ManualRolling, Brushing	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1,5E+03
Maximum daily site tonnage (kg/day):	5,0E+03
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	2,0E-01
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-05
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary	

wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	7,44E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000503	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use as binders and release agents- Professional
Use Descriptor	**Sector of Use**: SU 22 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 6, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 14 **Environmental Release Categories**: ERC8a, ERC8d, ESVOC SpERC 8.10b.v1
Scope of process	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
Material transfers(closed systems)General measures (skin irritants).	No other specific measures identified.
Material transfersBatch	No other specific measures identified.

process(closed systems)	
Drum/batch transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours
Mixing operations (closed systems)	No other specific measures identified.
Mixing operations (open systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Mold forming	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Casting operations(open systems)	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
SprayingManual	Carry out in a vented booth or extracted enclosure. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Ensure operatives are trained to minimise exposures. , or: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better.
ManualRolling, Brushing	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	2,0E-03
Annual site tonnage (tonnes/year):	3
Maximum daily site tonnage (kg/day):	8,2
Frequency and Duration of Use	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	9,5E-01
Release fraction to wastewater from process (initial release prior to RMM):	2,5E-02
Release fraction to soil from process (initial release prior to RMM):	2,5E-02

Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by freshwater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,66E+03
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000487	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use as a fuel- Industrial
Use Descriptor	**Sector of Use**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 **Environmental Release Categories**: ERC7, ESVOC SpERC 7.12a.v1
Scope of process	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Bulk transfers	No other specific measures identified.
Drum/batch transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
General exposures (closed systems)	No other specific measures identified.
Use as a fuel(closed systems)	No other specific measures identified.

Equipment maintenance	Drain down system prior to equipment opening or maintenance.
Storage.	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+04
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1,5E+04
Maximum daily site tonnage (kg/day):	5,0E+04
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	2,5E-03
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-05
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by freshwater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,1E+07
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of substance is generated.	

Conditions and measures related to external recovery of waste
This substance is consumed during use and no waste of substance is generated.

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000488	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use as a fuel- Professional
Use Descriptor	**Sector of Use**: SU 22 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 **Environmental Release Categories**: ERC9a, ERC9b, ESVOC SpERC 9.12b.v1
Scope of process	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Bulk transfers	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Drum/batch transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Dipping, immersion and pouring	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

General exposures (closed systems)	No other specific measures identified.
Use as a fuel(closed systems)General measures (skin irritants).	No other specific measures identified.
Equipment cleaning and maintenance	Drain down system prior to equipment opening or maintenance.
Storage.	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+04
Fraction of Regional tonnage used locally:	2,00E-03
Annual site tonnage (tonnes/year):	3,0E+01
Maximum daily site tonnage (kg/day):	8,2E+01
Frequency and Duration of Use	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-05
Release fraction to soil from process (initial release prior to RMM):	1,0E-05
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by freshwater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following	3,9E+03

total wastewater treatment removal (kg/d)	
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of substance is generated.	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of substance is generated.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000507	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Functional Fluids- Industrial
Use Descriptor	**Sector of Use**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9 **Environmental Release Categories**: ERC7, ESVOC SpERC 7.13a.v1
Scope of process	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Bulk transfers(closed systems)General measures (skin irritants).	No other specific measures identified.
Bulk transfersBatch process(open systems)	No other specific measures identified.
Drum/batch transfersDedicated facility	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Filling of articles/equipment	Minimise exposure by partial enclosure of the operation or

	equipment and provide extract ventilation at openings.
Filling/ preparation of equipment from drums or containers.	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
General exposures (closed systems)	No other specific measures identified.
General exposures (open systems)	No other specific measures identified.
Remanufacture of reject articles	Drain down system prior to equipment opening or maintenance.
Equipment maintenance	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1,5E+03
Maximum daily site tonnage (kg/day):	5,0E+03
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1,0E-02
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-04
Release fraction to soil from process (initial release prior to RMM):	1,0E-03
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	

Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	4,55E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000510	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Functional Fluids- Professional
Use Descriptor	**Sector of Use**: SU 22 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 9, PROC 20 **Environmental Release Categories**: ERC9a, ERC9b, ESVOC SpERC 9.13b.v1
Scope of process	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Drum/batch transfersNon-dedicated facility	Use drum pumps or carefully pour from container.
Transfer from/pouring from containers	Use drum pumps or carefully pour from container.
Filling/ preparation of equipment from drums or containers.	Use drum pumps or carefully pour from container.
General exposures (closed systems)	No other specific measures identified.

General exposures (open systems)elevated temperature	Handle substance within a predominantly closed system provided with extract ventilation.
Remanufacture of reject articles	Drain down system prior to equipment opening or maintenance.
Equipment maintenanceNon-dedicated facility	Drain down system prior to equipment opening or maintenance.
Storage.General measures (skin irritants).	Store substance within a closed system.
Section 2.2	**Control of Environmental Exposure**

Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	2,0E-03
Annual site tonnage (tonnes/year):	3
Maximum daily site tonnage (kg/day):	8,2
Frequency and Duration of Use	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	5,0E-02
Release fraction to wastewater from process (initial release prior to RMM):	2,5E-02
Release fraction to soil from process (initial release prior to RMM):	2,5E-02
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by freshwater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3

Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,66E+03
Assumed domestic sewage treatment plant flow (m3/d)	2.000

Conditions and Measures related to external treatment of waste for disposal

External treatment and disposal of waste should comply with applicable local and/or regional regulations.

Conditions and measures related to external recovery of waste

External recovery and recycling of waste should comply with applicable local and/or regional regulations.

SECTION 3	**EXPOSURE ESTIMATION**

Section 3.1 - Health

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

Section 3.2 -Environment

Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**

Section 4.1 - Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Section 4.2 -Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000504	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use in laboratories- Industrial
Use Descriptor	**Sector of Use**: SU 3 **Process Categories**: PROC 10, PROC 15 **Environmental Release Categories**: ERC2, ERC4
Scope of process	Use of the substance within laboratory settings, including material transfers and equipment cleaning.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Laboratory activitiessmall scale	No other specific measures identified.
CleaningRolling, BrushingVessel and container cleaning	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	1

Annual site tonnage (tonnes/year):	1,5E+03
Maximum daily site tonnage (kg/day):	5,0E+03
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	2,5E-02
Release fraction to wastewater from process (initial release prior to RMM):	2,0E-02
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	7,02E+03
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000506	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use in laboratories- Professional
Use Descriptor	**Sector of Use**: SU 22 **Process Categories**: PROC 10, PROC 15 **Environmental Release Categories**: ERC4, ESVOC SpERC 8.17.v1
Scope of process	Use of small quantities within laboratory settings, including material transfers and equipment cleaning.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Laboratory activitiessmall scale	No other specific measures identified.
CleaningRolling, BrushingVessel and container cleaning	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03

Fraction of Regional tonnage used locally:	2,0E-03
Annual site tonnage (tonnes/year):	3
Maximum daily site tonnage (kg/day):	8,2
Frequency and Duration of Use	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	5,0E-01
Release fraction to wastewater from process (initial release prior to RMM):	5,0E-01
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,8E+02
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).

Exposure Scenario - Worker

300000000512	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Rubber production and processing- Industrial
Use Descriptor	**Sector of Use**: SU 3, SU 10 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 6, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 13, PROC 14, PROC 15, PROC 21 **Environmental Release Categories**: ERC1, ERC4, ERC 6D, ESVOC SpERC 4.19.v1
Scope of process	Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing.

SECTION 2	**OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES**
Section 2.1	**Control of Worker Exposure**
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Contributing Scenarios	**Risk Management Measures**
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
Material transfers(closed systems)General measures (skin irritants).	No other specific measures identified.
Material transfersDedicated	Provide a good standard of general ventilation (not less than

facility	3 to 5 air changes per hour).
Bulk weighing(closed systems)General measures (skin irritants).	No other specific measures identified.
Small scale weighing	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Material transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Additive premixingBatch process	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Calendering (including Banburys)elevated temperature	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Pressing uncured rubber blanks	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Vulcanisation	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Cooling cured articles	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Laboratory activities	No other specific measures identified.
Equipment maintenance	Drain or remove substance from equipment prior to break-in or maintenance.

Section 2.2	**Control of Environmental Exposure**
Substance is a unique structure.	
Readily biodegradable.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	6,0E+03
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	6,0E+03
Maximum daily site tonnage (kg/day):	2,0E+04
Frequency and Duration of Use	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1,0E-02
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-03
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
Technical conditions and measures at process level (source) to prevent release	

Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Risk from environmental exposure is driven by soil.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	93,3
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	93,3
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	4,67E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 -Environment
Used EUSES model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).