TENNANTS DISTRIBUTION LIMITED
HAZELBOTTOM ROAD, CHEETHAM, MANCHESTER M8 0GR TEL 44(0)161 205 4454 FAX 44(0)161 203 4298

PRODUCT: N,N-DIMETHYLETHANOLAMINE (DMEA) (DMEA) REVISION: 1

PRODUCT SPECIFICATION

Product Name	N,N-Dimethylethanolamine (DMEA)
Alternative Name	2-Dimethylaminoethanol (DMAE), Deanol, DMEA, N,N-Dimethyl-2-Hydroxyethylamine, N,N-Dimethyl-N-ethanolamine
Specification Reference	DMEA (05/12)

SALES SPECIFICATION

Property	**Specification**
DMEA	≥99.8%
Water	≤0.1%
Colour	≤20 APHA

CHEMICAL AND PHYSICAL PROPERTIES

CAS No.	108-01-0
EINECS No.	203-542-8
UN No.	2051
Form	Liquid
Colour	Colourless
Odour	Amine-like
Molecular weight	89.14
Melting point	-59ºC
Boiling point	134.5ºC
Flash point	39ºC (DIN 51755)
Explosion limits	Lower LEL 1.4 vol% Upper UEL 12.2 vol %
Ignition temperature	245ºC (DIN 51794)
Heat of vaporisation	94.8 kcal/kg
Heat of combustion	768 kcal/mol
Refractive index nD20	1.4294
Density	0.887 kg/l
Viscosity (20ºC)	3.85 cPoise
Vapour pressure (20ºC)	6.1 mbar
Solubility in water	Complete
Partition coefficient Octanol/water	-0.55 (log Pow)
pH of a 0.001 N aqueous solution	9.5
Critical temperature	299ºC

Further Information

Presentation

DMEA is a clear hygroscopic liquid with amine-like odour. The freshly distilled product is colourless, but prolonged storage may induce a yellowish discolouration

Physical and chemical behaviour

DMEA can be mixed in all proportions with water. It is also soluble in most organic solvents. In chemical nature it is both a tertiary amine and an alcohol. Neutralisation of the amino function by acids will result in salts. The product is stable at high temperatures but must be kept away from oxidisers and acids

Storage

Carbon steel is adequate for storage of DMEA. Stainless AISI 316 L is preferable if colour stability is to be maintained over a long period. Copper and copper alloys should be avoided. For bulk storage a nitrogen blanket is necessary to prevent moisture uptake and discolouration

Applications

Flocculents

DMEA is a key intermediate in the production of dimethylaminoethyl (meth)acrylate. The water soluble polymers produced from this ester, mostly by copolymerisation with acrylamide, are useful as flocculents

Pulp and paper chemicals

The dry strength or wet strength of paper is increased by adding to the unbleached kraft paper a homopolymer of dimethylaminoethyl(meth)acrylate

Ion exchange resins

Anion exchange resins can be prepared by reacting tertiary amines like DMEA or trimethylamine with the chloromethylated vinyl or styrene resin. Increased exchange capacity is obtained by reacting a cross-linked polymer, containing haloalkyl functions with an amine. The anion exchange membranes are animated with DMEA

Applications (continued)

Polyurethane

In the production of PU foam for insulating purposes, the use of DMEA is a practical and effective way of reducing the total formula cost

Resins

Epoxy: DMEA is an effective and versatile curing agent for epoxy resins. It also acts as viscosity reducing agent for resinous polyamides and other viscous hardeners. DMEA is also an extremely good wetting agent for various filters in epoxy formulations

Acrylics

DMEA improves the acid-dyeing properties of acrylonitrile polymers by copolymerisation of DMEA esters. Water-soluble DMEA salts are used to improve the behaviour of coatings and films to make them water-resistant or provide specific desired sensitivity to water

Textiles – Leather

The acid-dyeing capability of polyacrylonitrile is improved by copolymerisation of the acrylonitrile with DMEA esters, such as dimethylaminoethyl acrylate. Cellulose modified with the homopolymer of dimethylaminoethyl methacrylate can be dyed with ester salts of a leuco vat dye. The impregnation of cellulose with polydimethylaminoethyl methacrylate also improves the gas-fading resistance of the fabric. Long chain alkylphosphates of DMEA form anti-static agents for non-cellulosic hydrophobic textile materials

Paints, coatings inks

DMEA is excellent for neutralising free acidity in water-soluble coating resins. The resin can be acrylic, alkyd or styrene –maleic. DMEA is often preferred to triethylamine when lower volatility is required, as in electrodeposition. It also improves pigment wettability. Some synthetic enamels with a metallic appearance can be prepared from dimethylaminoethyl methacrylate polymers. In flexographic inks DMEA can be used to solubilise resins and inoxes. In leather the adhesion of latex coatings can be improved by copolymerisation of the acrylic monomers with dimethylaminoethyl acrylate.

Surfactants – detergents

Alkylethanolamine salts of anionic surfactants are generally much more soluble than the corresponding sodium salts, both in water and oil systems. DMEA can be an excellent starting material in the product of shampoos from fatty acids. The fatty acid soaps are especially effective as wax emulsifiers for water-resistant floor polishes. DMEA titanates, zirconates and other group IV-A metal esters are useful as dispersing agents for polymers, hydrocarbons and waxes in aqueous or organic solvent systems

Drugs and pharmaceuticals

DMEA is often transformed by chlorination into dimethylaminoethylchloride. HCL. Some of the following pharmaceutical products can be synthesised:bephenium hydroxynaphthoate, brompheniramine, carboxamine, chloropyramine, chlorophenamine, chlophenoxamine, dibenzepin, diltiazem, dimethindene, diphenhydramine, doxylamine, meclofenoxate, mepyramine, noxiptiline HCL, phenyriamine, phenyltoloxamine, tarnoxifen, tripelenamine, cefotiam

NOTES

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SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

1.1 Product Identifier

Product Name	N,N-Dimethylethanolamine (DMEA)
Alternative Name	2-Dimethylaminoethanol (DMAE), Deanol, DMEA, N,N-Dimethyl-2-Hydroxyethylamine, N,N-Dimethyl-N-ethanolamine
CAS Number	108-01-0
EC Number	203-542-8
REACH Registration Number	01-2119492298-24-XXXX

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

Identified use(s)	Chemical intermediate
Uses advised against	Cosmetics. Food or feeding stuffs

1.3 Details of the supplier of the safety data sheet

Tennants Distribution Limited
Hazelbottom Road
Cheetham
Manchester
M8 0GR
Tel: 44(0)161 205 4454
Fax: 44(0) 161 203 4298
Email: msds@tennantsdistribution.com

1.4 Emergency telephone number

Tel: 44(0) 844 3350001 (24 hours)

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture
Classification (EC 1272/2008)

Acute Toxicity - Oral	Category 4 - (H302)
Acute Toxicity - Dermal	Category 4 - (H312)
Acute toxicity - Inhalation (Vapours)	Category 3 - (H331)
Skin Corrosion/Irritation	Category 1 Sub-category B - (H314)
Serious eye damage/eye irritation	Category 1 - (H318)
Specific target organ toxicity (single exposure)	Category 3 - (H335)
Flammable liquids	Category 3 - (H226)

2.2. Label elements

Signal Word: Danger

Hazard Statements

H302 - Harmful if swallowed
H312 - Harmful in contact with skin
H331 - Toxic if inhaled
H314 - Causes severe skin burns and eye damage
H335 - May cause respiratory irritation
H226 - Flammable liquid and vapour

Precautionary Statements

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P260 - Do not breathe dust/fume/gas/mist/vapours/spray
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTRE or doctor/physician
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

2.3 Other Hazards

None known

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Characterisation	2-(Dimethylamino)ethanol
Weight %	>99%
CAS No.	108-01-0
EC No.	203-542-8
Reach Registration Number	01-2119492298-24-XXXX
Classification (EC No. 1272/2008)	Skin Corr. 1B (H314) Acute Tox. 4 (H302) Acute Tox. 4 (H312) Acute Tox. 3 (H331) STOT SE3 (H335)

4. FIRST AID MEASURES

Description of first aid measures

General Advice
If symptoms persist, call a physician. Show this safety data sheet to the doctor in attendance.

Inhalation
Move to fresh air. Do not give mouth-to-mouth. If breathing is difficult, give oxygen. If breathing is irregular or stopped, administer artificial respiration. Consult a physician after significant exposure. Symptoms may be delayed.

Ingestion
Clean mouth with water and afterwards drink plenty of water. Never give anything by mouth to an unconscious person. Consult a physician. Do not induce vomiting without medical advice.

Skin contact
Immediately flush skin with running water for 30 minutes or until no traces remain. Wash with soap and water. Remove contaminated clothing immediately. Consult a physician.

Eye contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Protection of first-aiders
Use personal protective equipment.

Most important symptoms and effects, both acute and delayed
Symptoms: See Section 11: TOXICOLOGICAL INFORMATION

Indication of any immediate medical attention and special treatment needed
Notes to physician: Treat symptomatically

5. FIRE FIGHTING MEASURES

Extinguishing Media
Carbon dioxide (CO2), water spray, dry chemical, Alcohol-resistant foam
Unsuitable extinguishing media
High volume water jet

Special hazards arising from the substance or mixture
Flammable liquid. Keep product and empty container away from heat and sources of ignition.
Hazardous combustion products
Nitrogen oxides (NOx)
Carbon monoxide
Ammonia

Advice for fire-fighters
Wear self-contained breathing apparatus and protective suit. Use personal protective equipment as required. Do not allow run-off from fire-fighting to enter drains or water courses.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Personal precautions
Avoid contact with skin, eyes and clothing. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear self-contained breathing apparatus and protective suit. rubber gloves.
For emergency responders
Use personal protection recommended in Section 8.

Environmental precautions
Should not be released into the environment. Remove immediately adhering matter. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system. Contain all contaminated water for removal and treatment.

Methods and material for containment and cleaning up
Methods for containment

Large spills should be collected mechanically (remove by pumping) for disposal. Keep in suitable, closed containers for disposal.

Methods for cleaning up

Take precautionary measures against static discharges.

Reference to other sections

For personal protection, see section 8. For waste disposal, see section 13.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling

Use only in area provided with appropriate exhaust ventilation. Use spark-proof tools and explosion-proof equipment. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Wear personal protective equipment. Use product only in closed system. Ensure that eyewash stations and safety showers are close to the workstation location. Do not eat, drink or smoke when using this product.

Hygiene measures

Regular cleaning of equipment, work area and clothing. Keep away from food, drink and animal feeding stuffs. Contaminated work clothing should not be allowed out of the workplace. For environmental protection remove and wash all contaminated protective equipment before re-use.

Storage

Keep containers tightly closed in a cool, well-ventilated place. Keep away from heat. Protect from light. Keep in properly labelled containers.

Specific end use(s)

Risk Management Methods (RMM)

The information required is contained in this Material Safety Data Sheet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical Name	Eu	United Kingdom	France	Spain	Germany
2-(Dimethylamino) ethanol 108-01-0	-	TWA: 2 ppm STEL: 22 mg/m³ STEL: 6 ppm TWA: 7.4 mg/m³	-	-	-

Chemical Name	Italy	Portugal	Netherlands	Finland	Denmark
2-(Dimethylamino) ethanol 108-01-0	-	-	MAC: 2 ppm STEL: 22 mg/m³ STEL: 6 ppm MAC: 7.4 mg/m³	-	-

Derived No Effect Level (DNEL) Long term.

Dermal 1.04 mg/kg bw/day

Inhalation 7.4 mg/m³

Derived No Effect Level (DNEL) Short term

Dermal 5 mg/kg bw/day

Inhalation 22 mg/m³

Predicted No Effect Concentration (PNEC)

Freshwater 0.0661 mg/l

Freshwater sediment 0.0529 mg/kg

Marine water 0.0066 mg/l

Soil 0.0177 mg/kg

Impact on Sewage Treatment 10 mg/l

Exposure Controls

Engineering Controls

Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Respiratory Protection

In the case of vapour formation use a respirator with filter model K.

Hand Protection

Rubber gloves. Neoprene gloves. The selected protective gloves have to satisfy the specifications of EU Directive 89/689/EEC and the standard EN 374 derived from it. The suitability for a specific workplace should be discussed with the producers of the protective gloves. The exact break through time can be obtained from the protective glove producer and this has to be observed. Gloves must be disposed of and replaced before the breakthrough time and when they show signs of degradation.

Eye/face protection
Face-shield. Tightly fitting safety goggles.

Body Protection
Boots. Complete suit protecting against chemicals.

Environmental exposure controls
Prevent product from entering drains. Do not contaminate surface water. Avoid subsoil penetration.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties	
Appearance	Colourless Liquid
Odour	Amine-like
Odour threshold	No further information
pH	10.5 – 11 @ 100g/l, 20ºC
Melting point/freezing point	-59ºC
Boiling point/range	134.1ºC
Flash point	40ºC
Evaporation rate	No information available
Flammability (solid, gas) Flammability limit in air Upper flammability limit Lower flammability limit	 12.2 vol % 1.4 vol %
Vapour pressure value	10 hPa @ 28.1ºC
Vapour density	3.03 (Air = 1.09)
Specific gravity	0.89 @ 21.6ºC
Water solubility	Miscible
Partition co-efficient	Log pow: -0.55
Auto ignition temperature	230ºC
Decomposition temperature	Not applicable
Kinematic viscosity Dissociation constant	 pKa: 9.3 @ 20ºC
Surface tension	28.2 mN/m @ 20ºC
Explosive properties	Not explosive
Oxidising properties	Not applicable
9.2 Other information	
Dynamic viscosity	3.584 mPas @ 21.6ºC
Molecular weight	89.14 g/mol
Density	0.89 g/cm^3@ 21.6ºC

10. STABILITY AND REACTIVITY

Reactivity
See Incompatible Materials

Chemical stability
Stable under normal conditions.
Explosion data
Sensitivity to Mechanical Impact: None.
Sensitivity to Static Discharge: None.

Possibility of hazardous reactions
Polymerisation
Hazardous polymerization does not occur.
Possibility of hazardous reactions
Heating can release vapours which can be ignited.

Conditions to avoid
To avoid thermal decomposition, do not overheat. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Handle under nitrogen, protect from moisture.

Materials to avoid
Strong acids and oxidizing agents. Halogenated hydrocarbons. Isocyanates.

Hazardous decomposition products
Heating or fire can release toxic gas. Nitrogen oxides (NOx). Carbon monoxide. Ammonia.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Product information

LD50 Oral Rat: 1187 mg/kg
LD50 Dermal Rabbit: 1219 – 3135 mg/kg
LC50 Inhalation Rat: 5983 mg/m^3
Eye irritation: Corrosive. Risk of serious damage to eyes
Skin Irritation: Corrosive. Causes burns
Sensitisation: Did not cause sensitisation on laboratory animals
Mutagenic effects: Did not show mutagenic effects in animal experiments
Reproductive toxicity: Possible risk of harm to the unborn child
Carcinogenic effects: Not expected

Human experience

Causes skin and eye burns
Inhalation of vapours in high concentration may cause shortness of breath (lung oedema)
Chronic exposure causes drying effect on the skin and eczema
May cause adverse liver effects
Repeated or prolonged exposure may cause central nervous system damage
Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness
Lachrymation
Exposure may result in reddening, tears and itching of the eyes and soreness in the nose and throat, together with coughing
Inhalation of vapours is irritating to the respiratory system, may cause throat pain and cough
Suffocation
Pneumonia
Asthma
Nausea
Diarrhoea
Vomiting
Abdominal pain

Repeated dose toxicity

No further relevant information available

12. ECOLOGICAL INFORMATION

Toxicity

Fish toxicity: LC50 Golden orfe 146.63 mg/l 96h
EC50 Daphnia 98.37 mg/l 48h
EC50 Algae: 34.47 mg/l 72h
Bacterial toxicity: EC20 (30 min): >1000 mg/l

Persistence and degradability

According to the results of tests of biodegradability this product is considered as being readily biodegradable

Bioaccumulative potential

Does not bioaccumulate
Chemical name: 2-(Dimethylamino) ethanol. Log Pow -0.55

Mobility in soil

Koc = 0.848

Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT). This substance is not considered to be very persistent nor very bioaccumulating (vPvB)

Other adverse effects

No further relevant information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused product

Dispose of in accordance with local regulations. Waste codes should be assigned by the user based on the application for which the product was used. Classified as hazardous waste according to national equivalent of EC-Dir. 91/689; disposal of toxic and hazardous waste.

Contaminated packaging

Empty containers should be transported/delivered using a registered waste carrier for local recycling or waste disposal.

14. TRANSPORT INFORMATION

Road Transport	
Class	8
Subsidiary Class	3
UN No.	UN2051
Packing Group	II
Marine Pollutant	No
Proper Shipping Name	2-Dimethylaminoethanol
Hazard Indicator	83
Sea Transport	
Class	8
Subsidiary Class	3
UN No.	UN2051
Packing Group	II
Marine Pollutant	No
Proper Shipping Name	2-Dimethylaminoethanol
Air Transport	
Class	8
Subsidiary Class	3
UN No.	UN2051
Packing Group	II
Marine Pollutant	No
Proper Shipping Name	2-Dimethylaminoethanol

Special Provisions: Not relevant
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
European Union
Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances
Chemical safety assessment
A Chemical Safety Assessment has been carried out

16. OTHER INFORMATION

Key or legend to abbreviations and acronyms used in the safety data sheet
Full text of H-Statements referred to under section 3
H226 - Flammable liquid and vapour
H302 - Harmful if swallowed
H312 - Harmful in contact with skin
H331 - Toxic if inhaled
H335 - May cause respiratory irritation

H314 - Causes severe skin burns and eye damage
Supplier information
List of relevant R Phrases
Legend
SVHC: Substances of Very High
Concern for Authorisation:

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Training advice
Provide adequate information, instruction and training for operators

Modifications from last revision
GHS Classification update.
Date: 30/09/15

Annex to extended Safety Data Sheet

2-Dimethylaminoethanol (CAS No. 108-01-0)

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23.08.2012

Table of contents

1 Environmental exposure

Based on the results of the environmental hazard assessment performed according to Article 14.3 of REACH regulation, it can be concluded that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.

2 Human exposure

Exposure estimation was performed only for workers since there are no uses intended for general public.

3 List of Exposure Scenarios (ES)

3.1 Description of ES 1: Production of DMAE (Manufacture and Distribution)

Part A	**Substance/User identity**
Downstream user identity and contact data	
Registration number	01-2119492298-24-0000
Substance identity	2-dimethylaminoethanol
Identity of supplier	Tennants Distribution Limited Hazelbottom Road, Cheetham, Manchester. M8 0GR
Part B	**Title**
Free short title of the exposure scenario	Production of DMAE (manufacture and distribution)
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 1, PROC 2 Environmental release category: ERC 1 Sector of end use: SU 3
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substance by workers and consumers**
1. Hazard assessment	
DNELs (workers):	
Oral short-term local: Oral short-term systemic: Oral long-term local: Oral long-term systemic:	Not relevant Not relevant Not relevant Not relevant

Dermal short-term local: Dermal short-term systemic: Dermal long-term local: Dermal long-term systemic: Inhalation short-term local: Inhalation short-term systemic: Inhalation long-term local: Inhalation long-term systemic:	80 µg/cm² 5 mg/kg bw Not applicable 1.04 mg/kg/bw 22 mg/m³ 22 mg/m³ 7.4 mg/m³ 7.4 mg/m³
DNELs (consumers):	
DNELs are not relevant since there is no consumer use	
PNECs:	
Environmental: Water	Fresh water: 0.0661 mg/L Marine water: 0.0066 mg/L Intermittent releases: 0.0661 mg/L
Environmental: Air	Not relevant
Environmental: Soil	0.0177 mg/kg soil dw
Environmental: Sediment	0.0529 mg/kg sediment dw
Environmental: Sewage treatment plant	10 mg/L
PBT/vPvB data	DMAE does not fulfil criteria for PBT or vPvB substance
2. Operational conditions and risk management measures	
Control of worker exposure	
Processes, tasks, activities covered	PROC 1: Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. PROC 2: Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages.
Product characteristic:	
Physical state	Liquid
Concentration of substance	Pure substance
Vapour pressure	10 hPa
Fugacity	moderate
Amounts used:	
This information is not needed for assessment of worker's exposure.	
Frequency and duration of use/exposure:	
Duration of exposure	> 4 hours/day
Frequency of exposure	≤ 240 days/year
Human factors not influenced by risk management :	
Exposed skin surface	PROC 1 : Palm of one hand (240 cm²) PROC 2 : Palm of both hands (480 cm²)

Other given operational conditions affecting workers exposure:	
Location	Indoor with Local Exhaust Ventilation (LEV)
Domain	Industrial
Technical conditions and measures at process level (source) to prevent release:	Minimisation of manual phases/work tasks, avoidance of contact with contaminated tools and objects, regular cleaning of equipment and work area
Technical conditions and measures to control dispersion from source towards the worker:	Local exhaust ventilation: yes Minimisation of splashes and spills
Organisational measures to prevent/limit releases, dispersion and exposure:	Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed, training for staff on good practice, and good standard of personal hygiene, regular cleaning of equipment and work area
Conditions and measures related to personal protection, hygiene and health evaluation:	Suitable respiratory protection: Yes : PROC 2 No : PROC 1 Gloves (suitable chemical resistant gloves + - basic and specific activity training): yes Chemical goggles: yes Face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier material
Control of consumer exposure	
Product characteristic:	Not applicable – no consumer use
Amounts used:	
Frequency and duration of use/exposure:	
Human factors not influenced by risk management:	
Other given operational conditions affecting consumers exposure:	
Conditions and measures related to information and behavioural advice to consumers:	
Conditions and measures related to personal protection and hygiene:	
Control of environmental exposure	
Worker:	
Product characteristic:	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental
Amounts used:	
Frequency and duration of use/exposure:	
Environmental factors not influenced by risk management:	
Other given operational conditions affecting environmental exposure:	
Technical conditions and measures at process level (source) to prevent release:	
Technical onsite conditions and measures to reduce or limit	

discharges, air emissions and releases to soil:	compartments can be neglected and was not characterized.
Organisational measures to prevent/limit release from site:	
Conditions and measures related to municipal sewage treatment plant:	
Conditions and measures related to external treatment of waste for disposal:	
Conditions and measures related to external recovery of waste:	
Consumer:	
Product characteristics:	
Amounts used	
Frequency and duration of use/exposure:	
Environmental factors not influenced by risk management:	
Other given operational conditions affecting environmental exposure:	
Conditions and measures related to municipal sewage treatment plant:	
Conditions and measures related to external treatment of waste for disposal:	
Conditions and measures related to external recovery of waste:	

3. Exposure estimation and reference to its source

Routes of exposure and environmental compartments	
Routes of exposure	Dermal and inhalative routes are relevant for workers
Environmental compartments	Not applicable - closed systems
Human exposure prediction (dermal, inhalative):	
Exposure levels for PROC 1:	
Long-term exposure, systemic, dermal:	0.00686 mg/kg bw/d
Long-term exposure, systemic, inhalative:	0.03714 mg/m³
Long-term exposure, systemic, combined:	0.01217 mg/kg bw/d
Exposure levels for PROC 2:	
Long-term exposure, systemic, dermal:	0.02742 mg/kg bw/d
Long-term exposure, systemic, inhalative:	0.18570 mg/m³
Long-term exposure, systemic, combined:	0,05395 mg/kg bw/d
Risk characterization for human health:	
Exposures are not expected to exceed the predicted DNELs and the resulting risk characterization ratios are expected to be less than 1.	
Environmental exposure prediction (soil/water, air):	
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.	
Risk characterization for environment:	
Not applicable	

Exposure assessment tool reference
ECETOC TRA Worker v2.0 with modifications (for further information please refer to CSR)
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES
Human health
No specific measures identified – closed systems
Environment
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.

3.2 Description of ES 2: Formulation and (Re)packaging of Substances and Mixtures

Part A	**See ES 1**
Part B	**Title**
Free short title of the exposure scenario	Formulation & (Re)packaging of Substances and Mixtures
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 15. Environmental release category: ERC 1, ERC 2, ERC 6a. Sector of end use: SU 10
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substance by workers and consumers**
For further information regarding PROC 1 and 2 see ES 1	
1. Hazard assessment (see ES 1)	
2. Operational conditions and risk management measures	
Control of worker exposure:	
Processes, tasks, activities covered	PROC 3: Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfer, but where some opportunity for contact with chemicals occurs, e.g. through sampling;

	PROC 4: Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure; PROC 5: Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage; PROC 8a: Sampling, loading, filling, transfer, dumping, bagging in non dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. PROC 8b: Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected; PROC 9: Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage; PROC 15: Use of substance at small scale laboratory (<1 L or 1 kg). Larger laboratories and R+D installations should be treated as industrial processes.
Product characteristic:	
Physical state	Liquid
Concentration of substance	Pure substance PROC 5 : 1 – 5% active substance PROC 9 : 5 – 25% active substance
Vapour pressure	10 hPa
Fugacity	moderate
Amounts used:	
This information is not needed for assessment of worker's exposure.	
Frequency and duration of use/exposure	
Duration of exposure	1 - 4 hours/day PROC 1, 2 and 15 : > 4 hours/day
Frequency of exposure	≤ 240 days/year
Human factors not influenced by risk management	
Exposed skin surface	PROC 1, 3 and 15: Palm of one hand (240 cm²): PROC 2, 4, 5, 8b, 9: Palm of both hands (480 cm²); PROC 8a: Both hands (960 cm²)
Other given operational conditions affecting workers/consumers exposure	
Location	Indoor with Local Exhaust Ventilation (LEV)
Domain	Industrial
Technical conditions and measures at process level (source) to prevent release	Minimisation of manual phases/work tasks, avoidance of contact with contaminated tools and objects, regular cleaning of equipment and work area
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation: yes Minimisation of splashes and spills
Organisational measures to prevent/limit releases, dispersion	Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed,

and exposure	training for staff on good practice, and good standard of personal hygiene, regular cleaning of equipment and work area
Conditions and measures related to personal protection, hygiene and health evaluation	Suitable respiratory protection: no , PROC 8a : yes Gloves (suitable chemical resistant gloves + - basic and specific activity training): yes Chemical goggles: yes Face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier material
Control of consumer exposure	
Not applicable – no consumer use	
Control of environmental exposure	
Worker	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.
Consumer	

3. Exposure estimation and reference to its source

Routes of exposure and environmental compartments

Routes of exposure	Dermal and inhalative
Environmental compartments	Not applicable
Human exposure prediction (dermal, inhalative):	
Exposure levels for PROC 3:	
Long-term exposure, systemic, dermal:	0.00686 mg/kg bw/d
Long-term exposure, systemic, inhalative:	5.57100 mg/m³
Long-term exposure, systemic, combined:	0.80272 mg/kg bw/d
Exposure levels for PROC 4:	
Long-term exposure, systemic, dermal:	0.13714 mg/kg bw/d
Long-term exposure, systemic, inhalative:	4.45680 mg/m³
Long-term exposure, systemic, combined:	0.77383 mg/kg bw/d
Exposure levels for PROC 5:	
Long-term exposure, systemic, dermal:	0.05486 mg/kg bw/d
Long-term exposure, systemic, inhalative:	2.22840 mg/m³
Long-term exposure, systemic, combined:	0.37320 mg/kg bw/d
Exposure levels for PROC 8a:	
Long-term exposure, systemic, dermal:	0.27429 mg/kg bw/d
Long-term exposure, systemic, inhalative:	1.11420 mg/m³
Long-term exposure, systemic, combined:	0.34346 mg/kg bw/d
Exposure levels for PROC 8b:	
Long-term exposure, systemic, dermal:	0.13714 mg/kg bw/d
Long-term exposure, systemic, inhalative:	0.34260 mg/m³
Long-term exposure, systemic, combined:	0.61466 mg/kg bw/d

Exposure levels for PROC 9:	
Long-term exposure, systemic, dermal:	0.08229 mg/kg bw/d
Long-term exposure, systemic, inhalative:	6.68520 mg/m³
Long-term exposure, systemic, combined:	1.03731 mg/kg bw/d
Exposure levels for PROC 15:	
Long-term exposure, systemic, dermal:	0.00686 mg/kg bw/d
Long-term exposure, systemic, inhalative:	3.71400 mg/m³
Long-term exposure, systemic, combined:	0.53743 mg/kg bw/d
Risk characterization for human health:	
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterization ratios are expected to be less than 1.	
Environmental exposure prediction (soil/water, air):	
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.	
Risk characterization for environment:	
Not applicable	
Exposure assessment tool reference	
ECETOC TRA Worker v2.0 with modifications (for further information please refer to CSR)	
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	
Human health	
Confirm that RMMs and OCs are implemented as described.	
Environment	
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.	

3.3 Description of ES 3: Distribution

Part A	**See ES 1**
Part B	**Title**
Free short title of the exposure scenario	Distribution
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9, PROC 15; Environmental release category: ERC 1, ERC 2 Sector of end use: SU 3, SU 8, SU 9
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substances by workers and consumers**
For further information regarding PROC 1 and 2 see ES 1, regarding other PROCs see ES 2	

3.4 Description of ES 4: Industrial Use Resulting in Manufacture of another Substance

Part A	**See ES 1**
Part B	**Title**
Free short title of the exposure scenario	Industrial Use Resulting in Manufacture of Another Substance
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9, PROC 15; Environmental release category: ERC 6a Sector of end use: SU 3, SU 8, SU 9
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substance by workers and consumers**
For further information regarding PROC 1 and 2 see ES 1, regarding other PROCs ES 2	

3.5 Description of ES 5: Use as Laboratory Chemical

Part A	**See ES 1**
Part B	**Title**
Free short title of the exposure scenario	Use as laboratory chemical
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 15; Environmental release category: ERC 4, ERC 6a Sector of end use: SU 3, SU 22
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substance by workers and consumers**
For further information see ES 2	

3.6 Description of ES 6: Use as Processing Aid (Catalyst) in Polymerization Reactions

Part A	**See ES 1**
Part B	**Title**
Free short title of the exposure scenario	Use as Processing Aid (Catalyst) in Polymerization Reactions (industrial)
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 7, PROC 14, PROC 21, PROC 24 Environmental release category: ERC 3, ERC 5, Sector of end use: SU 3
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substance by workers and consumers**
1. Hazard assessment (see ES1)	
2.Operational conditions and risk management measures	
Control of worker exposure:	
Processes, tasks, activities covered	PROC 7: Air dispersive techniques; Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting; Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may leads to waste water and waste. PROC 14: Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. PROC 21: Manual cutting, cold rolling or assembly/disassembly of material/article, possibly resulting in the release of fibres, rubber fumes, metal fumes or dust PROC 24: Substantial thermal or kinetic energy applied to substance by hot rolling/forming, grinding, mechanical cutting, drilling or sanding. Exposure is predominantly expected to be to dust. Dust or aerosol emission as result of direct cooling may be expected.
Product characteristic:	
Physical state	Liquid
Concentration of substance	PROC 7: 5 – 25 % active substance PROC 14, 21 and 24: 1 – 5% active substance
Vapour pressure	10 hPa
Fugacity	moderate
Amounts used:	
This information is not needed for assessment of worker's exposure.	

Frequency and duration of use/exposure	
Duration of exposure	PROC 7 : > 4 hours/day PROC 14, 21 and 24 : 1 - 4 hours/day
Frequency of exposure	≤ 240 days/year
Human factors not influenced by risk management	
Exposed skin surface	PROC 7: Both hands and forearms (1500 cm²) PROC 14: Palm of both hands (480 cm²); PROC 21 and 24: Both hands (1980 cm²)
Other given operational conditions affecting workers/consumers exposure	
Location	Indoor with Local Exhaust Ventilation (LEV)
Domain	Industrial
Technical conditions and measures at process level (source) to prevent release	Avoid frequent and direct contact with substance. Minimisation of manual phases/work tasks, avoidance of contact with contaminated tools and objects, regular cleaning of equipment and work area
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation: yes Minimisation of splashes and spills
Organizational measures to prevent/limit releases, dispersion and exposure	Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed, training for staff on good practice, and good standard of personal hygiene, regular cleaning of equipment and work area
Conditions and measures related to personal protection, hygiene and health evaluation	Suitable respiratory protection: no, PROC 7 : yes Gloves (suitable chemical resistant gloves + basic and specific activity training): yes Chemical goggles: yes
Control of consumer exposure	
Not applicable – no consumer use	
Control of environmental exposure	
Workers	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.
Consumers	
3.Exposure estimation and reference to its source	
Routes of exposure and environmental compartments	
Routes of exposure	Dermal and inhalative
Environment compartments	Not applicable
Human exposure prediction (dermal, inhalative):	
Exposure levels for PROC 7:	
Long-term exposure, systemic, dermal:	0.51428 mg/kg bw/d
Long-term exposure, systemic, inhalative:	1.39275 mg/m³
Long-term exposure, systemic, combined:	0.71325 mg/kg bw/d

Exposure levels for PROC 14:	
Long-term exposure, systemic, dermal:	0.01371 mg/kg bw/d
Long-term exposure, systemic, inhalative:	2.22840 mg/m³
Long-term exposure, systemic, combined:	0.33206 mg/kg bw/d
Exposure levels for PROC 21:	
Long-term exposure, systemic, dermal:	0.00137 mg/kg bw/d
Long-term exposure, systemic, inhalative:	2.22840 mg/m³
Long-term exposure, systemic, combined:	0.31971 mg/kg bw/d
Exposure levels for PROC 24:	
Long-term exposure, systemic, dermal:	0.00137 mg/kg bw/d
Long-term exposure, systemic, inhalative:	2.22840 mg/m³
Long-term exposure, systemic, combined:	0.31971 mg/kg bw/d
Risk characterization for human health:	
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterization ratios are expected to be less than 1.	
Environmental exposure prediction (soil/water, air):	
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.	
Risk characterization for environment:	
Not applicable	
Exposure assessment tool reference	
ECETOC TRA Worker v2.0 with modifications (for further information please refer to CSR)	
4.Guidance to DU to evaluate whether he works inside the boundaries set by the ES	
Human health	
Confirm that RMMs and OCs are implemented as described.	
Environment	
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.	

3.7 Description of ES 7 (Professional uses): Use as Additive in Concrete and Cement

Part A	**See ES 1**
Part B	**Title**
Free short title of the exposure scenario	Use as Additive in Concrete and Cement
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 5, PROC 8a, PROC 10, PROC 13, PROC 19, PROC 21, PROC 24; Environmental release category: ERC 8f Sector of end use: SU 22
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substance by workers and consumers**
For further information regarding PROC 5 and 8a see ES 2, regarding PROC 21 and 24 see ES 6	
1. Hazard assessment (see ES 1)	
2. Operational conditions and risk management measures	
Control of worker exposure:	
Processes, tasks, activities covered	PROC 10: Low energy spreading of e.g. coatings: Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces. PROC 13: Immersion operations: Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface. PROC 19: Addresses occupations where intimate and intentional contact with substances occurs without any specific exposure controls other than PPE.
Product characteristic:	
Physical state	Liquid
Concentration of substance	PROC 10 : < 1 % active substance; PROC 5, 13, 19, 21, 24 : 1 – 5 % active substance; PROC 8a : Pure substance
Vapour pressure	10 hPa

Fugacity	moderate
Amounts used:	
This information is not needed for assessment of worker's exposure.	
Frequency and duration of use/exposure	
Duration of exposure	PROC 5, 19: 15 min – 1 hour; PROC 8a, 10, 13, 21 : 1 – 4 hours/day; PROC 24 : > 4 hours/day
Frequency of exposure	≤ 240 days/year
Human factors not influenced by risk management	
Exposed skin surface	PROC 5, 13: Palm of both hands (480 cm²); PROC 8a, 10: Both hands (960 cm²) PROC 19, 21, 24: Both hands (1980 cm²)
Other given operational conditions affecting workers/consumers exposure	
Location	Indoor with Local Exhaust Ventilation (LEV)
Domain	Professional
Technical conditions and measures at process level (source) to prevent release	Minimisation of manual phases/work tasks, avoidance of contact with contaminated tools and objects, regular cleaning of equipment and work area
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation: yes Minimisation of splashes and spills
Organisational measures to prevent/limit releases, dispersion and exposure	Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed, training for staff on good practice, and good standard of personal hygiene, regular cleaning of equipment and work area
Conditions and measures related to personal protection, hygiene and health evaluation	Suitable respiratory protection: yes : PROC 8a (90% efficacy), 19 (90% efficacy) no : PROC 5, 10, 13, 21, 24 Gloves (suitable chemical resistant gloves + - basic and specific activity training): yes Chemical goggles: yes Face shield, substance/task appropriate gloves and full skin coverage with appropriate light-weight barrier material
Control of consumer exposure	
Not applicable – no consumer use	
Control of environmental exposure	
Workers	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.
Consumers	
3. Exposure estimation and reference to its source	
Routes of exposure and environmental compartments	

Routes of exposure	Dermal and inhalative
Environmental compartments	Not applicable
Human exposure prediction (dermal, inhalative):	
Exposure levels for PROC 5:	
Long-term exposure, systemic, dermal:	0.05486 mg/kg bw/d
Long-term exposure, systemic, inhalative:	2.97120 mg/m³
Long-term exposure, systemic, combined:	0.47931 mg/kg bw/d
Exposure levels for PROC 8a:	
Long-term exposure, systemic, dermal:	0.27429 mg/kg bw/d
Long-term exposure, systemic, inhalative:	4.45680 mg/m³
Long-term exposure, systemic, combined:	0.91097 mg/kg bw/d
Exposure levels for PROC 10:	
Long-term exposure, systemic, dermal:	0.05486 mg/kg bw/d
Long-term exposure, systemic, inhalative:	4.45680 mg/m³
Long-term exposure, systemic, combined:	0.69154 mg/kg bw/d
Exposure levels for PROC 13:	
Long-term exposure, systemic, dermal:	0.05488 mg/kg bw/d
Long-term exposure, systemic, inhalative:	4.45680 mg/m³
Long-term exposure, systemic, combined:	0.69154 mg/kg bw/d
Exposure levels for PROC 19:	
Long-term exposure, systemic, dermal:	0.56571 mg/kg bw/d
Long-term exposure, systemic, inhalative:	0.29712 mg/m³
Long-term exposure, systemic, combined:	0.60816 mg/kg bw/d
Exposure levels for PROC 21:	
Long-term exposure, systemic, dermal:	0.00137 mg/kg bw/d
Long-term exposure, systemic, inhalative:	4.45680 mg/m³
Long-term exposure, systemic, combined:	0.63806 mg/kg bw/d
Exposure levels for PROC 24:	
Long-term exposure, systemic, dermal:	0.00137 mg/kg bw/d
Long-term exposure, systemic, inhalative:	4.45680 mg/m³
Long-term exposure, systemic, combined:	0.63806 mg/kg bw/d
Risk characterization for human health:	
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterization ratios are expected to be less than 1.	
Environmental exposure prediction (soil/water, air):	
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.	
Risk characterization for environment:	
Not applicable	
Exposure assessment tool reference	

ECETOC TRA Worker v2.0 with modifications (for further information please refer to CSR)
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES
Human health
Confirm that RMMs and OCs are as described.
Environment
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment. Therefore the possible exposure of the substance to environmental compartments can be neglected and was not characterized.

3.8 Description of ES 8: Use as Monomer in Epoxy

Part A	**See ES 1**
Part B	**Title**
Free short title of the exposure scenario	Use as Monomer in Epoxy (industrial)
Free short title of the generic exposure scenario	Not relevant
Systematic title based on use descriptor	Process category: PROC 14 Environmental release category: ERC 6c Sector of end use: SU 3
For substances and substances in preparation/mixtures	Not relevant
For article service life	Not relevant
For downstream use leading to inclusion in article	Not relevant
Part C	**Use of substance by workers and consumers**
For further information regarding PROC 14 see ES 6	