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

1.1. Product identifier

Product form	Substance
Trade name/designation	Butyl di glycol
EC Index	603-096-00-8
EC-No.	203-961-6
CAS-No.	112-34-5
REACH registration No	01-2119475104-44

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

Main use category
Industrial uses,Professional use,Consumer use

Further information:
see exposure scenarios attached to this safety data sheet.

Uses advised against
No data available.

1.3. Details of the supplier of the safety data sheet

Company
SysKem Chemie GmbH
Brucknerweg 26
D-42289 Wuppertal

Telephone	+49 (0) 202/30999510
Telefax	+49 (0) 202/87088403
E-mail address	info@syskem.de

Prepared by / E-mail address of person responsible for the SDS
info@syskem.de

1.4. Emergency telephone number

Vergiftungs-Informations-Zentrale Freiburg, Tel. +49 761 19240.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)
Eye Irrit. 2 H319 Causes serious eye irritation

Remarks
For full text of Hazard- and EU Hazard-statements: see SECTION 16.

2.2. Label elements

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

GHS07

Signal word (CLP)
Warning

Hazard statements (CLP)
H319 - Causes serious eye irritation.

Precautionary statements (CLP)
P264 - Wash face, hands and any exposed skin thoroughly after handling.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 - If eye irritation persists: Get medical advice/attention.

Listed in Annex VI
EC Index-No. : 603-096-00-8

2.3. Other hazards

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).

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance name	Butyl di glycol
CAS-No.	112-34-5
EC-No.	203-961-6
EC Index	603-096-00-8

Substance name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
2-(2-butoxyethoxy)ethanol	(CAS-No.) 112-34-5 (EC-No.) 203-961-6 (EC Index) 603-096-00-8	>= 99	Eye Irrit. 2, H319

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

Additional advice
First aider: Pay attention to self-protection. See also section 8 . In case of doubt or persistent symptoms, consult always a physician. Show this safety data sheet to the doctor in attendance. Treat symptomatically.

Following inhalation
Keep at rest. Provide fresh air. Get medical advice/attention if you feel unwell.

Following skin contact
Take off immediately all contaminated clothing. Wash with plenty of water/. In case of doubt or persistent symptoms, consult always a physician. Wash contaminated clothing before reuse.

Following eye contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Do not apply (chemical) neutralizing agents. Call a physician immediately.

Following ingestion
Rinse mouth. Drink plenty of water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical advice/attention if you feel unwell.

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

Inhalation
May cause respiratory irritation. Sore throat. Dry throat.

Skin contact
May cause skin irritation. Slight irritation. Repeated exposure may cause skin dryness or cracking.

Eyes contact
Irritating to eyes. Inflammation.

Ingestion
Headache. Dizziness. Coordination disorders. Rapid respiration. May cause gastrointestinal irritation, nausea, vomiting and diarrhoea. AFTER ABSORPTION OF HIGH QUANTITIES: Drunkenness. Vomiting. Decreased renal function. Central nervous system depression. Nausea. Accelerated heart action. Lowered blood pressure. Unconsciousness.

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

No data available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media
Carbon dioxide. Water spray. Alcohol resistant foam. BC-powder.

Unsuitable extinguishing media
Strong water jet.

5.2. Special hazards arising from the substance or mixture

Specific hazards
Hazardous decomposition products COx. Do not allow run-off from fire-fighting to enter drains or water courses.

5.3. Advice for firefighters

Special protective equipment for firefighters. In case of fire: Wear self-contained breathing apparatus. Compressed air/oxygen apparatus. Safety glasses. Gloves. Evacuate personnel to a safe area. Cool containers / tanks with water spray.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Evacuate personnel to a safe area. Provide adequate ventilation. Use personal protective equipment as required. Concerning personal protective equipment to use, see section 8. Do not breathe vapour/aerosol. Avoid contact with skin, eyes and clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ensure equipment is adequately earthed.

For emergency responders
Ensure procedures and training for emergency decontamination and disposal are in place. Concerning personal protective equipment to use, see section 8 .

6.2. Environmental precautions

Do not allow to enter into surface water or drains. Prevent environmental discharge consistent with regulatory requirements. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.

6.3. Methods and material for containment and cleaning up

Stop leak if safe to do so. Clean-up methods - small spillage: Take up liquid spill into absorbent material, e.g.: sand, earth, vermiculite or powdered limestone. Keep in suitable, closed containers for disposal. Clean contaminated surfaces with an excess of water. Clean-up methods - large spillage: Dam up. Recover large spills by pumping (use an explosion proof or hand pump). Dispose of contaminated materials in accordance with current regulations

6.4. Reference to other sections

Concerning disposal elimination after cleaning, see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Provide adequate ventilation. Use personal protective equipment as required. Concerning personal protective equipment to use, see section 8. Avoid inhalation of vapour and spray mist. Avoid contact with skin, eyes and clothing. Ensure equipment is adequately earthed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. T > Flash point : Use spark-/explosionproof appliances and lighting system. Finely divided: spark- and explosionproof appliances. See also section 10

Hygiene measures
Keep good industrial hygiene. Wash hands and face before breaks and immediately after handling of the product. Take off contaminated clothing. Keep away from food, drink and animal feedingstuffs.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures
Keep container tightly closed in a cool, well-ventilated place. Incompatible with oxidizing agents. Incompatible with bases. Incompatible with acids. Reference to other sections 9,10.

Packaging materials
Steel. Stainless steel. Polypropylene. Glass. Tin. Do not use containers made of copper /. Aluminium.

Specific designs for storage rooms or vessels
Recommended storage temperature: 15 - 25 °C.

7.3. Specific end use(s)

see attached exposure scenario.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

2-(2-Butoxyethoxy)ethanol (112-34-5)

EU	IOELV TWA (mg/m3)	67,5 mg/m3
EU	IOELV TWA (ppm)	10 ppm
EU	IOELV STEL (mg/m3)	101,2 mg/m3
EU	IOELV STEL (ppm)	15 ppm
Austria	MAK (mg/m3)	67,5 mg/m3
Austria	MAK (ppm)	10 ppm
Austria	MAK Short time value (mg/m3)	101,2 mg/m3
Austria	MAK Short time value (ppm)	15 ppm
Belgium	Grenzwert (mg/m3)	67,5 mg/m3
Belgium	Grenzwert (ppm)	10 ppm
Belgium	Limit value (mg/m3)	101,2 mg/m3
Belgium	Limit value (ppm)	15 ppm
Bulgaria	OEL TWA (mg/m3)	67,5 mg/m3
Bulgaria	OEL TWA (ppm)	10 ppm
Bulgaria	OEL STEL (mg/m3)	101,2 mg/m3
Bulgaria	OEL STEL (ppm)	15 ppm
Croatia	GVI (granična vrijednost izloženosti) (mg/m3)	67,5 mg/m3
Croatia	GVI (granična vrijednost izloženosti) (ppm)	10 ppm
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m3)	101,2 mg/m3
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (ppm)	15 ppm
Cyprus	OEL TWA (mg/m3)	67,5 mg/m3
Cyprus	OEL TWA (ppm)	10 ppm
Cyprus	OEL STEL (mg/m3)	101,2 mg/m3
Cyprus	OEL STEL (ppm)	15 ppm
Czech Republic	Expoziční limity (PEL) (mg/m3)	100 mg/m3
Denmark	Grænseværdie (langvarig) (mg/m3)	68 mg/m3
Denmark	Grænseværdie (langvarig) (ppm)	10 ppm
Estonia	OEL TWA (mg/m3)	67,5 mg/m3
Estonia	OEL TWA (ppm)	10 ppm
Finland	HTP-arvo (8h) (mg/m3)	68 mg/m3
Finland	HTP-arvo (8h) (ppm)	10 ppm
France	VME (mg/m3)	67,5 mg/m3 (indicative limit)
France	VME (ppm)	10 ppm (indicative limit)
France	VLE (mg/m3)	101,2 mg/m3 (indicative limit)
France	VLE (ppm)	15 ppm (indicative limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m3)	67 mg/m3 (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 Occupational exposure limit value (ppm)	10 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Gibraltar	8h mg/m3	67,5 mg/m3
Gibraltar	8h ppm	10 ppm
Gibraltar	kurzzeitig mg/m3	101,2 mg/m3
Gibraltar	Short-term ppm	15 ppm

2-(2-Butoxyethoxy)ethanol (112-34-5)

Greece	OEL TWA (mg/m3)	67,5 mg/m3
Greece	OEL TWA (ppm)	10 ppm
Greece	OEL STEL (mg/m3)	101,2 mg/m3
Greece	OEL STEL (ppm)	15 ppm
Hungary	AK-érték	67,5 mg/m3
Hungary	CK-érték	101,2 mg/m3
Ireland	OEL (8 hours ref) (mg/m3)	67,5 mg/m3
Ireland	OEL (8 hours ref) (ppm)	10 ppm
Ireland	OEL (15 min ref) (mg/m3)	101,2 mg/m3
Ireland	OEL (15 min ref) (ppm)	15 ppm
Italy	OEL TWA (mg/m3)	67,5 mg/m3
Italy	OEL TWA (ppm)	10 ppm
Italy	OEL STEL (mg/m3)	101,2 mg/m3
Italy	OEL STEL (ppm)	15 ppm
Latvia	OEL TWA (mg/m3)	67,5 mg/m3
Latvia	OEL TWA (ppm)	10 ppm
Lithuania	IPRV (mg/m3)	100 mg/m3
Lithuania	IPRV (ppm)	15 ppm
Lithuania	TPRV (mg/m3)	200 mg/m3
Lithuania	TPRV (ppm)	30 ppm
Luxembourg	OEL TWA (mg/m3)	67,5 mg/m3
Luxembourg	OEL TWA (ppm)	10 ppm
Luxembourg	OEL STEL (mg/m3)	101,2 mg/m3
Luxembourg	OEL STEL (ppm)	15 ppm
Malta	OEL TWA (mg/m3)	67,5 mg/m3
Malta	OEL TWA (ppm)	10 ppm
Malta	OEL STEL (mg/m3)	101,2 mg/m3
Malta	OEL STEL (ppm)	15 ppm
Netherlands	Grenswaarde TGG 8H (mg/m3)	50 mg/m3
Netherlands	Grenswaarde TGG 15MIN (mg/m3)	100 mg/m3
Poland	NDS (mg/m3)	67 mg/m3
Poland	NDSCh (mg/m3)	100 mg/m3
Portugal	OEL TWA (mg/m3)	67,5 mg/m3 (indicative limit value)
Portugal	OEL TWA (ppm)	10 ppm (indicative limit value)
Portugal	OEL STEL (mg/m3)	101,2 mg/m3 (indicative limit value)
Portugal	OEL STEL (ppm)	15 ppm (indicative limit value)
Romania	OEL TWA (mg/m3)	67,5 mg/m3
Romania	OEL TWA (ppm)	10 ppm
Romania	OEL STEL (mg/m3)	101,2 mg/m3
Romania	OEL STEL (ppm)	15 ppm
Slovakia	NPHV (priemerná) (mg/m3)	67,5 mg/m3
Slovakia	NPHV (priemerná) (ppm)	10 ppm
Slovakia	NPHV (Hraničná) (mg/m3)	101,2 mg/m3
Slovenia	OEL TWA (mg/m3)	67,5 mg/m3
Slovenia	OEL TWA (ppm)	10 ppm
Slovenia	OEL STEL (mg/m3)	101,25 mg/m3
Slovenia	OEL STEL (ppm)	15 ppm
Spain	VLA-ED (mg/m3)	67,5 mg/m3 (indicative limit value)
Spain	VLA-ED (ppm)	10 ppm (indicative limit value)
Spain	VLA-EC (mg/m3)	101,2 mg/m3
Spain	VLA-EC (ppm)	15 ppm
Sweden	nivågränsvärde (NVG) (mg/m3)	68 mg/m3
Sweden	nivågränsvärde (NVG) (ppm)	10 ppm
Sweden	kortidsvärde (KTV) (mg/m3)	101 mg/m3
Sweden	kortidsvärde (KTV) (ppm)	15 ppm
United Kingdom	WEL TWA (mg/m3)	67 mg/m3
United Kingdom	WEL TWA (ppm)	10 ppm
United Kingdom	WEL STEL (mg/m3)	101,2 mg/m3
United Kingdom	WEL STEL (ppm)	15 ppm

2-(2-Butoxyethoxy)ethanol (112-34-5)

Norway	Grenseverdier (AN) (mg/m3)	67,5 mg/m3
Norway	Grenseverdier (AN) (ppm)	10 ppm
Norway	Grenseverdier (Korttidsverdi) (mg/m3)	102 mg/m3 (value calculated)
Norway	Grenseverdier (Korttidsverdi) (ppm)	15 ppm (value calculated)
Switzerland	MAK (mg/m3)	67 mg/m3
Switzerland	MAK (ppm)	10 ppm
Switzerland	KZGW (mg/m3)	101 mg/m3
Switzerland	KZGW (ppm)	15 ppm
USA - ACGIH	ACGIH TWA (ppm)	10 ppm (inhalable fraction and vapor)

Butyl di glycol (112-34-5)
PNEC (Wasser)

PNEC aqua (freshwater)	1 mg/l
PNEC aqua (marine water)	0,1 mg/l

8.2. Exposure controls

Engineering measure(s)
Provide adequate ventilation. Use only in area provided with appropriate exhaust ventilation. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Organisational measures to prevent /limit releases, dispersion and exposure. See also section 7.

Personal protective equipment
The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hand protection
Polyvinyl alcohol -. neoprene gloves -. rubber gloves. (EN 374). The selection of specific gloves for a specific application and time of use in a working area, should also take into account other factors on the working space, such as (but not limited to): other chemicals that are possibly used, physical requirements (protection against cutting/drilling, skill, thermal protection), and the instructions/specification of the supplier of gloves. NBR (Nitrile rubber)

Eye protection
Safety glasses (EN166).

Respiratory protection
In case of insufficient ventilation, wear suitable respiratory equipment. Half-face mask (DIN EN 140) (EN 140). full face mask (DIN EN 136) (EN 136). Filter type: A (EN 141).

Thermal hazard protection
Not required for normal conditions of use .
Use dedicated equipment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: liquid.
Colour	: clear.
Odour	: characteristic.
Odour threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butylacetate=1)	: No data available
Melting / freezing point	: No data available
Freezing point	: No data available
Initial boiling point and boiling range	: 224 - 234 °C
Flash point	: 115 °C
Auto-ignition temperature	: ~ 210 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Not applicable,liquid
Vapour pressure	: 0,029 hPa @ 25°C
Vapour density	: 5,6
Relative density	: 0,955 @ 20 °C
Density	: ~ 0,953 - 0,956 g/cm3 @ 20°C
Solubility	: Water: Completely soluble
Partition coefficient n-octanol/water	: ~ 1
Kinematic viscosity	: No data available
Dynamic viscosity	: 0,006 Pa.s @ 20°C
Explosive properties	: Not applicable. The classification procedures for self-reactive substances and mixtures need not be applied because there are no chemical groups present in the molecule associated with explosive or selfreactive properties.
Oxidising properties	: Not applicable.
Explosive limits	: 0,7 - 24,6 vol %

9.2. Other information

VOC content	: 0 %
Additional information	: Relative density of saturated gas/air mixture

SECTION 10: Stability and reactivity

10.1. Reactivity

Reference to other sections: 10.5.

10.2. Chemical stability

No data available.

10.3. Possibility of hazardous reactions

Strong oxidizing agents. Risk of violent reaction. Reacts with air to form peroxides. Vapours may form explosive mixture with air.

10.4. Conditions to avoid

Aerosol or mist formation. Avoid formation of aerosol. T> Flash point : Fire and explosion hazards. Keep away from sources of heat (e.g. hot surfaces), sparks and open flames. See also section 7.

10.5. Incompatible materials

oxidising substances. Strong acids . Strong bases. Metals. Peroxide. Reference to other sections 7.

10.6. Hazardous decomposition products

Hazardous decomposition products. Carbon oxides . Reference to other sections: 7.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity
Not classified (Based on available data, the classification criteria are not met.)

2-(2-butoxyethoxy)ethanol (112-34-5)

LD50/oral/rat	5660 mg/kg
LD50/dermal/rabbit	2700 mg/kg
IRT, Inhalation, Rat	> 29 ppm (2 hours, BASF Test)

Skin corrosion/irritation
Not classified (Based on available data, the classification criteria are not met.)
pH: Not applicable

Serious eye damage/eye irritation
Causes serious eye irritation.
pH: Not applicable

Respiratory or skin sensitisation
Not classified (Based on available data, the classification criteria are not met.)

Germ cell mutagenicity
Not classified (Based on available data, the classification criteria are not met.)

Carcinogenicity
Not classified (Based on available data, the classification criteria are not met.)

Reproductive toxicity
Not classified (Based on available data, the classification criteria are not met.)

STOT - single exposure
Not classified (Based on available data, the classification criteria are not met.)

STOT - repeated exposure
Not classified (Based on available data, the classification criteria are not met.)

2-(2-butoxyethoxy)ethanol (112-34-5)

NOAEL (oral, rat, 90 days)	250 mg/kg bodyweight/day OECD 408
NOAEC (inhalation, rat, vapour, 90 days)	14 ppm OECD 413
NOAEL, Dermal, Rat	> 2000 mg/kg bw/day (13 weeks, OECD 411)

Aspiration toxicity
Not classified (Based on available data, the classification criteria are not met.)

Butyl di glycol (112-34-5)

Kinematic viscosity	~ 0,953 - 6,27615063 mm2/s

Other information
Symptoms related to the physical, chemical and toxicological characteristics.
Reference to other sections: 4.2.

SECTION 12: Ecological information

12.1 Toxicity

acc. to 1272/2008/EC: Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)

Endpoint	Value	Species	Source	Exposure time
EC50	>100 mg / l	daphnia magna		48 h
LC50	2.750 mg / l	orfe (Leuciscus idus)		48 h

12.2 Persistence and degradability

Butyl di glycol (112-34-5)

Persistence and degradability	Readily biodegradable.

12.3 Bioaccumulative potential

Butyl di glycol (112-34-5)

Partition coefficient n-octanol/water	~ 1

2-(2-butoxyethoxy)ethanol (112-34-5)

BCF fish 1	(no bioconcentration expected)
Partition coefficient n-octanol/water	3

12.4 Mobility in soil

Butyl di glycol (112-34-5)

Ecology – soil	Soluble.

12.5 Results of PBT and vPvB assessment

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

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product/Packaging disposal recommendations
Handle with care. Safe handling: see section 7. Do not allow to enter into surface water or drains. Refer to manufacturer/supplier for information on recovery/recycling. Collect and dispose of waste product at an authorised disposal facility. Dispose of contaminated materials in accordance with current regulations.

Additional information
Delivery to an approved waste disposal company.

Further ecological information
Do not allow to enter into surface water or drains.

European waste catalogue (2001/573/EC, 75/442/EEC, 91/689/EEC)
The following Waste Codes are only suggestions:
07 01 04* - other organic solvents, washing liquids and mother liquors
16 05 06*
Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: Transport information

14.1 UN number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

14.8 Information for each of the UN Model Regulations

Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN)
Not subject to ADR, RID and ADN.

International Maritime Dangerous Goods Code (IMDG)
Not subject to IMDG.

International Civil Aviation Organization (ICAO-IATA/DGR)
Not subject to ICAO-IATA.

SECTION 15: Regulatory information

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

EU-Regulations
The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006:

3. Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008	Butyl di glycol - 2-(2-butoxyethoxy)ethanol
55. 2-(2-butoxyethoxy)ethanol (DEGBE)	Butyl di glycol - 2-(2-butoxyethoxy)ethanol

Butyl di glycol is not on the REACH Candidate List
Butyl di glycol is not on the REACH Annex XIV List

VOC content : 0 %

National regulations
Germany
Reference to AwSV
Water hazard class (WGK) 1, low hazard to waters

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV
Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

TA Luft
Organic Substances

Netherlands

Waterbezwaarlijkheid	11 - Weinig schadelijk voor in het water levende organismen (B)
SZW-lijst van kankerverwekkende stoffen	The substance is not listed
SZW-lijst van mutagene stoffen	The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding	The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid	The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling	The substance is not listed

15.2 Chemical Safety Assessment

No data available

SECTION 16: Other information

Indication of changes:
Not applicable - first issue.

Abbreviations and acronyms
ADN = Accord Européen relatif au Transport International des Marchandises Dangereuses par voie de Navigation du Rhin
ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route
CLP = Classification, Labelling and Packaging Regulation according to 1272/2008/EC
IATA = International Air Transport Association
IMDG = International Maritime Dangerous Goods Code
LEL = Lower Explosive Limit/Lower Explosion Limit
UEL = Upper Explosion Limit/Upper Explosive Limit
REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals
CSR = CSR = Chemical Safety Report
DNEL = DNEL = Derived No Effect Level
NOAEL = No observed adverse effect level
LD50 = Median lethal dose
EC50 = Median Effective Concentration
N.O.S. = Not Otherwise Specified
PNEC = Predicted No Effect Concentration
STEL = Short term exposure limit
TLV = Threshold limits
TWA = time weighted average
persistent, bioaccumulating and toxic (PBT).
vPvB = very persistent and very bioaccumulating

Sources of key data used to compile the datasheet
European Chemicals Bureau

List of relevant phrases (code and full text as stated in chapter 2 and 3)
H319 Causes serious eye irritation

Datasheet exhibiting area
SysKem Chemie GmbH
Department Product safety
Telephone +49 (0) 202/30999510

Indication of changes
Section 1

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Classification according to Regulation (EC) No. 1272/2008 [CLP]
Labelling according to Regulation (EC) No. 1272/2008 [CLP]

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Annex to the Safety Data Sheet

Annex : Identified uses						
Title	**Sector of use**	**Product category**	**Process category**	**Article category**	**Environmental release**	**SPERC**
Manufacture of substance Use as an intermediate	SU3		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15		ERC1, ERC6a	
Formulation & (re)packing of substances and mixtures	SU3		PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15		ERC2	
Distribution of substance	SU3		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15		ERC2	
Uses in coatings	SU3		PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15		ERC4	
Uses in coatings	SU22		PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC19		ERC8a, ERC8d	

Uses in coatings	SU21	PC9a, PC9c			ERC8a, ERC8d	
Use in cleaning agents	SU3		PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13		PROC4	
Use in cleaning agents	SU22		PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13		ERC8a, ERC8d	
Use in cleaning agents	SU21	PC35			ERC8a, ERC8d	
Metal working fluids/rolling oils	SU3		PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC17		ERC4	
Metal working fluids/rolling oils Low environmental release	SU22		PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC17, PROC19		ERC4	
Mining chemicals	SU3		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9		ERC4	

Lubricants	SU3		PROC1, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18		ERC4, ERC7	
Lubricants	SU21	PC24			ERC8a, ERC8d	
Use in agrochemicals	SU22		PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC11, PROC13		ERC8a, ERC8d	
Use in agrochemicals	SU21	PC12, PC27			ERC8a, ERC8d	
Functional fluids	SU3		PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9		ERC7	
Functional fluids	SU22		PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC20		ERC9a, ERC9b	
Functional fluids	SU21	PC16, PC17			ERC9a, ERC9b	
Water treatment chemicals	SU3		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13		ERC3, ERC4	
Water treatment chemicals	SU22		PROC1, PROC3, PROC4, PROC8a, PROC8b, PROC13		ERC8f	
Water treatment chemicals	SU21	PC37			ERC8f	

Use in laboratories	SU3		PROC10, PROC15		ERC4	
Use in laboratories	SU22		PROC10, PROC15		ERC8a	
Other consumer uses	SU21	PC28, PC39			ERC8a	
Covers the use in manual and fixed systems	SU3		PROC1, PROC4, PROC7, PROC8a, PROC8b		ERC4	
Use in fire fighting foams Marine and offshore use	SU22		PROC1, PROC4, PROC8a, PROC8b, PROC11		ERC8d	
Use in fire fighting foams Aviation use	SU22		PROC1, PROC3, PROC8a, PROC8b, PROC11		ERC8d	
Use in fire fighting foams Fire brigades use Only for small scale applications	SU22		PROC1, PROC4, PROC8a, PROC11		ERC8d	
Use in fire fighting foams indoor	SU22		PROC1, PROC3, PROC8a, PROC11		ERC8a	
Use in oil and gas field drilling and production operations	SU22		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b		ERC8d	
Lubricants	SU22		PROC1, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20		ERC8a, ERC8d	

1. Exposure scenario 01

Herstellung des Stoffes

ES Ref.: 01 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 SU3 ERC1, ERC6a
Processes, tasks activities covered	Manufacture of substance or use as process chemical or extracting 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. 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). Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC15	Use as laboratory reagent

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.
General exposures,CS54 - Continuous process	E47 - Handle substance within a closed system.
General exposures,CS54 - Continuous process,CS56 - with sample collection	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
General exposures,CS37 - Use in contained batch processes,CS56 - with sample collection	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
CS2 - Process sampling	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
CS14 - Bulk transfers,internal	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling,PPE15 - Wear suitable gloves tested to EN374.
CS39 - Equipment cleaning and maintenance	E1 - 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,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Drain down and flush system prior to equipment break-in or maintenance,Clear spills immediately,Retain drain downs in sealed storage pending disposal or for subsequent recycle.
CS14 - Bulk transfers,CS58 – transport	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling,PPE15 - Wear suitable gloves tested to EN374.
Storage	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Avoid dip sampling.
CS36 - Laboratory activities	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling environmental exposure (ERC1, ERC6a)

ERC1	Manufacture of substances
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 15000,(50000 kg/day)
Frequency and duration of use	Continuous process,300 days/year
Environmental factors not influenced by riskmanagemen	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Local marine water dilution factor: 100 Release fraction to air from process (initial releaseprior to RMM): 0.1,kg/day Release fraction to wastewater from process (initial releaseprior to RMM): 0.18,kg/day Release fraction to soil from process (initial releaseprior to RMM): 0,kg/day

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatment plant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 2% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98 Suitable waste treatment,Cement kiln fuels,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

1. Exposure scenario 02

Formulation & (re)packing of substances and mixtures	ES Ref.: 02 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15 SU3 ERC2
Processes, tasks activities covered	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. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupationalhygiene is implemented,Covers use at ambienttemperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.
General exposures,CS54 - Continuous process,CS57 - no sampling,In line injection of process chemicals by fixed dose pumping	E47 - Handle substance within a closed system.
General exposures,CS54 - Continuous process,CS56 - with sample collection	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection.
General exposures,CS37 - Use in contained batch processes,CS56 - with sample collection,In line injection of process chemicals by fixed dose pumping	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection.
General exposures (open systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
CS2 - Process sampling	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection.
CS14 - Bulk transfers	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E39 - Clear transfer lines prior to de-coupling,PPE15 - Wear suitable gloves tested to EN374.
CS30 - Mixing operations (open systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),PPE15 - Wear suitable gloves tested to EN374.
CS22 - Transfer from/pouring from containers,CS34 - Manual	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Use drum pumps or carefully pour from container,PPE15 - Wear suitable gloves tested to EN374.
CS39 - Equipment cleaning and maintenance	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Drain down and flush system prior to equipment break-in or maintenance,PPE15 - Wear suitable gloves tested to EN374.

CS8 - Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Use drum pumps or carefully pour from container,Avoid spillage when withdrawing pump,PPE15 - Wear suitable gloves tested to EN374.
CS6 - Drum and small package filling	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
Storage	E52 - Transfer via enclosed lines,E84 - Store substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Avoid dip sampling.
CS36 - Laboratory activities	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling environmental exposure (ERC2)

ERC2	Formulation of preparations

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 1250,(4100 kg/day)
Frequency and duration of use	Continuous process,300 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.01 Release fraction to wastewater from process (initial releaseprior to RMM): 0.005 Release fraction to soil from process (initial releaseprior to RMM): 0.0001

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 5% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98 Suitable waste treatment,Cement kiln fuels,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

1. Exposure scenario 03

Verteilung des Stoffes

ES Ref.: 03 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 SU3 ERC2
Processes, tasks activities covered	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. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15)

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

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Covers use at ambienttemperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.
General exposures (closed systems),CS54 - Continuous process,CS57 - no sampling,In line injection of process chemicals by fixed dose pumping	E47 - Handle substance within a closed system.
General exposures (closed systems),CS54 - Continuous process,CS56 - with sample collection	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection.
General exposures (closed systems),CS37 - Use in contained batch processes	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection.
General exposures (open systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
CS2 - Process sampling	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection.
CS36 - Laboratory activities	PPE26 - Use suitable eye protection.
CS14 - Bulk transfers,road/railcar bottom loading/unloading,marine vessel/barge (un)loading,CS107 - (closed systems)	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E39 - Clear transfer lines prior to de-coupling,PPE15 - Wear suitable gloves tested to EN374.
CS14 - Bulk transfers,road/railcar bottom loading/unloading,road/railcar top loading/unloading,CS108 - (open systems)	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E39 - Clear transfer lines prior to de-coupling,PPE15 - Wear suitable gloves tested to EN374.
CS6 - Drum and small package filling	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Fill containers/cans at dedicated fill points supplied with local extract ventilation,Clear spills immediately,PPE15 - Wear suitable gloves tested to EN374.
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance,AP15 - Apply vessel entry procedures including use of forced supplied air,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),E52 - Transfer via enclosed lines,Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE15 - Wear suitable gloves tested to EN374.
Storage	E84 - Store substance within a closed system.

2.2 Contributing scenario controlling environmental exposure (ERC2)

ERC2	Formulation of preparations

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 1250,(31000 kg/day)
Frequency and duration of use	Continuous process,40 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.0001 Release fraction to wastewater from process (initial releaseprior to RMM): 0.00001 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 5% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Cement kiln fuels,Required removal efficiency: 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

1. Exposure scenario 04

Uses in coatings

ES Ref.: 04 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15 SU3 ERC4
Processes, tasks activities covered	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. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significantcontact)
PROC7	Industrial spraying
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC15	Use as laboratory reagent

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Covers use at ambienttemperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.
General exposures (closed systems)	E47 - Handle substance within a closed system.
General exposures (closed systems),CS56 - with sample collection,CS38 - Use in contained systems	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
Film formation - force drying (50-100°C). Stoving (>100°C). UV/EB radiation curing	E61 - Minimise exposure by extracted full enclosure for the operation or equipment,E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection.
CS29 - Mixing operations (closed systems),General exposures (closed systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
Film formation - air drying	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide extract ventilation to points where emissions occur,Avoid manual contact with wet work pieces.
Preparation of material for application,CS30 - Mixing operations (open systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.
Spraying (automatic/robotic)	E59 - Carry out in a vented booth provided with laminar airflow,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.
CS34 – Manual,Spraying	E59 - Carry out in a vented booth provided with laminar airflow,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.

CS14 - Bulk transfers,CS82 - Non-dedicated facility,CS108 - (open systems)	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E39 - Clear transfer lines prior to de-coupling,Provide extract ventilation to points where emissions occur,PPE15 - Wear suitable gloves tested to EN374.
CS14 - Bulk transfers,CS81 - Dedicated facility,CS107 - (closed systems)	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E39 - Clear transfer lines prior to de-coupling,Provide extract ventilation to points where emissions occur,PPE15 - Wear suitable gloves tested to EN374.
Roller, spreader, flow application	PPE15 - Wear suitable gloves tested to EN374,E84 - Store substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
CS4 - Dipping, immersion and pouring	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide extract ventilation to points where emissions occur,Avoid manual contact with wet work pieces.
CS36 - Laboratory activities	PPE26 - Use suitable eye protection.
CS3 - Material transfers,CS8 - Drum/batch transfers,CS22 - Transfer from/pouring from containers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 400,(1300 kg/day)
Frequency and duration of use	Continuous process,300 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.98 Release fraction to wastewater from process (initial releaseprior to RMM): 0.02 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Soil emission controls are not applicable as there is no direct release to soil. Use a wet scrubber or dry filtration system to control air emissions of aerosols Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.5
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 5% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Cement kiln fuels,Required removal efficiency: 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations. Dispose of waste water from wet scrubbers using a waste disposal contractor only
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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.

4.2 Environment

Guidance - Environment	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures,If scaling reveals a condition of unsafe use (i.e, RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required,Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Exposure scenario 05

Uses in coatings

ES Ref.: 05 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC19 SU22 ERC8a, ERC8d
Processes, tasks activities covered	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. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC19)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significantcontact)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC15	Use as laboratory reagent
PROC19	Hand-mixing with intimate contact and only PPE available

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None

Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Covers use at ambienttemperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.
General exposures (closed systems)	E47 - Handle substance within a closed system.
CS45 - Filling/ preparation of equipment from drums or containers.	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps or carefully pour from container.
General exposures (closed systems),CS38 - Use in contained systems	E47 - Handle substance within a closed system.
Preparation of material for application	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps or carefully pour from container,Clear up spills immediately and dispose of waste safely
Film formation - air drying,indoor	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Avoid manual contact with wet work pieces,PPE15 - Wear suitable gloves tested to EN374.
Film formation - air drying,outdoor	Ensure operation is undertaken outdoors,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Avoid manual contact with wet work pieces,PPE15 - Wear suitable gloves tested to EN374.
Preparation of material for application,indoor	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),PPE15 - Wear suitable gloves tested to EN374.
Preparation of material for application,outdoor	Ensure operation is undertaken outdoors,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.

CS3 - Material transfers,CS8 - Drum/batch	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Provide

transfers,CS82 - Non-dedicated facility	a good standard of general ventilation (not less than 3 to 5 air changes per hour),Use drum pumps or carefully pour from container.
CS3 - Material transfers,CS8 - Drum/batch transfers,CS81 - Dedicated facility	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),E52 - Transfer via enclosed lines,PPE15 - Wear suitable gloves tested to EN374.
Roller, spreader, flow application,indoor	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Roller, spreader, flow application,outdoor	Ensure operation is undertaken outdoors,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.
CS34 - Manual,CS10 – Spraying,indoor	E57 - Carry out in a vented booth or extracted enclosure,Local exhaust ventilation - efficiency of at least [%]: 90,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training,PPE26 - Use suitable eye protection.
CS34 - Manual,CS10 – Spraying,outdoor	Ensure operation is undertaken outdoors,Wear a respirator conforming to EN140 with Type A filter or better,PPE25 - Change filter cartridge on respirator daily,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training,PPE26 - Use suitable eye protection.
CS4 - Dipping, immersion and pouring,indoor	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Avoid manual contact with wet work pieces,PPE15 - Wear suitable gloves tested to EN374,Clear up spills immediately and dispose of waste safely
CS4 - Dipping, immersion and pouring,outdoor	Ensure operation is undertaken outdoors,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Avoid manual contact with wet work pieces,PPE15 - Wear suitable gloves tested to EN374,Clear up spills immediately and dispose of waste safely
CS36 - Laboratory activities	PPE26 - Use suitable eye protection.
CS72 - Hand application - fingerpaints, pastels, adhesives,indoor	OC18 - Limit the substance content in the product to 25 %,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training,E72 - Ensure doors and windows are opened,PPE26 - Use suitable eye protection.

CS72 - Hand application - fingerpaints, pastels, adhesives,outdoor	Ensure operation is undertaken outdoors,OC18 - Limit the substance content in the product to 25 %,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training,PPE26 - Use suitable eye protection.

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.05,(0.13 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.98 Release fraction to wastewater from process (initial releaseprior to RMM): 0.01 Release fraction to soil from process (initial releaseprior to RMM): 0.01

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Use a wet scrubber or dry filtration system to control air emissions of aerosols Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 10% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations. Dispose of waste water from wet scrubbers using a waste disposal contractor only
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 06

Uses in coatings

ES Ref.: 06 ES Type: Consumer	

Use descriptors	PC9a, PC9c SU21 ERC8a, ERC8d
Processes, tasks activities covered	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC9a, PC9c)

PC9a	Coatings and paints, thinners, paint removers
PC9c	Finger paints

Product characteristics

Physical form	liquid, Vapour pressure 1-10 Pa
Concentration of the Substance in Mixture/Article	See specific operational conditions below
Vapour pressure	0,029 hPa
Volatility	Medium volatile liquid

Operational conditions

Amount used	See specific operational conditions below	
Frequency and duration of use	See specific operational conditions below	
Human factors not influenced by risk management	See specific operational conditions below	
Other given operational conditions affecting consumers exposure	Covers use at ambient temperatures,Unless otherwise stated. Coatings and paints, thinners, paint removers,Fillers and putty,Waterborne latex wall paint	Unless otherwise stated. Covers concentrations up to 3%. For each use event, covers use amounts up to: 2760 g. Covers use up to 4. days/year. Covers exposure up to 2.2. Hours/event. Covers skin contact area up to 420 cm2. Covers use in room size of 20 m3. For each use event, assumes swallowed amount of . 0 g

	Finger paints,Artists' paints	Unless otherwise stated. Covers concentrations up to 5%. For each use event, covers use amounts up to: 100 g. covers use up to 1 time/on day of use. Covers exposure up to 8. Hours/event. Covers skin contact area up to 420 cm2. Covers use in room size of 20 m3. For each use event, assumes swallowed amount of . 0 g

Risk management measures:
Other risk management measures:

Coatings and paints, thinners, paint removers,Fillers and putty,Waterborne latex wall paint	Avoid using at a product concentration greater than . 3%,For each use event, avoid using a product amount greater than . 2760 g,Avoid using product more than . 4,days/year,For each use, avoid using for more than . 2.2,Hours/event,Avoid skin contact area greater than ,Palms of both hands (480 cm2),Avoid using in room size less than . 20 m3,Avoid using when windows closed,For each use event, avoid swallowing amounts more than . 0 g
Finger paints,Artists' paints	Avoid using at a product concentration greater than . 5%,For each use event, avoid using a product amount greater than . 100 g,covers use up to 1 time/on day of use,For each use, avoid using for more than . 8,Hours/event,Avoid skin contact area greater than ,Palms of both hands (480 cm2),Avoid using in room size less than . 20 m3,For each use event, avoid swallowing amounts more than . 0 g

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	See contributing scenarios above
Frequency and duration of use	See contributing scenarios above
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	None

Risk management measures:

Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87
Conditions and measures related to external treatmentof waste for disposal	None,The substance is completely released to the environment or destroyed during use and no significant waste is generated
Conditions and measures related to external recoveryof waste	None

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	Coatings and paints, thinners, paint removers,Waterborne latex wall paint,Dermal,ECETOC TRA,Inhalation,US EPA Wall Paint exposure,Finger paints,Artists' paints,ConsExpo 4.1 (Consumer inhalation exposure)

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 07

Use in cleaning agents

ES Ref.: 07 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13 SU3 ERC4
Processes, tasks activities covered	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. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Covers use at ambienttemperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.
CS14 - Bulk transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling.
CS93 - Automated process with (semi) closed systems,CS38 - Use in contained systems,CS54 - Continuous process	PPE26 - Use suitable eye protection.
CS93 - Automated process with (semi) closed systems,CS38 - Use in contained systems,CS55 - Batch process	PPE26 - Use suitable eye protection.
CS101 - Application of cleaning products in closed systems	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS45 - Filling/ preparation of equipment from drums or containers.	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E39 - Clear transfer lines prior to de-coupling,Use drum pumps.
CS37 - Use in contained batch processes	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide extract ventilation to points where emissions occur
CS41 - Degreasing small objects in cleaning station	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Clear spills immediately,Provide extract ventilation to points where emissions occur
CS42 - Cleaning with low-pressure washers	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),EI19 - Ensure operatives are trained to minimise exposures.
CS44 - Cleaning with high pressure washers	Wear a respirator conforming to EN140 with Type A filter or better,PPE25 - Change filter cartridge on respirator daily,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,EI19 - Ensure operatives are trained to minimise exposures.

CS51 - Rolling, Brushing,CS34 - Manual	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Dispose of waste wipe cloths in closed containers
Storage	No specific measures identified.

2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 60,(3000 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.3 Release fraction to wastewater from process (initial releaseprior to RMM): 0.0001 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 70% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Cement kiln fuels,Required removal efficiency: 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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.

4.2 Environment

Guidance - Environment	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures,If scaling reveals a condition of unsafe use (i.e, RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required,Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Exposure scenario 08

Use in cleaning agents

ES Ref.: 08 ES Type: Worker	

Use descriptors	PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13 SU22 ERC8a, ERC8d
Processes, tasks activities covered	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). Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13)

PROC2	Use in closed, continuous process with occasional controlled exposure
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Covers use at ambienttemperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.
CS45 - Filling/ preparation of equipment from drums or containers,CS81 - Dedicated facility	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),PPE15 - Wear suitable gloves tested to EN374.
CS93 - Automated process with (semi) closed systems,CS38 - Use in contained systems	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E41 - Use in semi-automated and predominantly enclosed filling lines.
CS76 - Semi Automated process. (e.g.: Semi automatic application of floor care and maintenance products)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),PPE15 - Wear suitable gloves tested to EN374.
CS45 - Filling/ preparation of equipment from drums or containers,CS82 - Non-dedicated facility	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.
CS34 - Manual,CS48 - Surfaces,CS47 - Cleaning,CS4 - Dipping, immersion and pouring	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS42 - Cleaning with low-pressure washers,CS51 - Rolling, Brushing,CS60 - no spraying	OC18 - Limit the substance content in the product to 25 %,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS44 - Cleaning with high pressure washers,CS10 - Spraying,indoor	Provide a good standard of controlled ventilation (10 to 15 air changes per hour),OC18 - Limit the substance content in the product to 25 %,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training,PPE26 - Use suitable eye protection.
CS44 - Cleaning with high pressure washers,CS10 - Spraying,outdoor	Ensure operation is undertaken outdoors,Wear a respirator conforming to EN140 with Type A filter or better,PPE25 - Change filter cartridge on respirator daily,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training,PPE26 - Use suitable eye protection.

CS34 - Manual,CS48 - Surfaces,CS47 - Cleaning,CS50 – Wiping	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS27 - Ad hoc manual application via trigger sprays, dipping, etc,CS51 - Rolling, Brushing	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS101 - Application of cleaning products in closed systems,CS51 - Rolling, Brushing,outdoor	Ensure operation is undertaken outdoors,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.125,(0.34 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.02 Release fraction to wastewater from process (initial releaseprior to RMM): 0.000001 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 100% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Dispose of waste product or used containers according to local regulations
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 09

Uses in coatings

ES Ref.: 09 ES Type: Consumer	

Use descriptors	PC35 SU21 ERC8a, ERC8d
Processes, tasks activities covered	Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC35)

PC35	Washing and cleaning products (including solvent based products)

Product characteristics

Physical form	liquid, Vapour pressure 1-10 Pa
Concentration of the Substance in Mixture/Article	See specific operational conditions below
Vapour pressure	0,029 hPa
Volatility	Medium volatile liquid

Operational conditions

Amount used	See specific operational conditions below	
Frequency and duration of use	See specific operational conditions below	
Human factors not influenced by risk management	See specific operational conditions below	
Other given operational conditions affecting consumers exposure	Covers use at ambient temperatures,Unless otherwise stated. Washing and cleaning products (including solvent based products),Laundry and dish washing products	Unless otherwise stated. Covers concentrations up to 5%. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 15 g. Covers skin contact area up to 857 cm2. Covers use in room size of 20 m3. Covers exposure up to 0.5. Hours/event. Covers use under typical household ventilation.

	Washing and cleaning products (including solvent based products),Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)	Unless otherwise stated. Covers concentrations up to 5%. Covers use up to 125. days/year. For each use event, covers use amounts up to: 27 g. Covers skin contact area up to 857 cm2. Covers use in room size of 20 m3. Covers use under typical household ventilation. Covers exposure up to 0.3. Hours/event
	Washing and cleaning products (including solvent based products),Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)	Unless otherwise stated. Covers concentrations up to 3%. Covers use up to 125. days/year. For each use event, covers use amounts up to: 35 g. Covers skin contact area up to 428 cm2. Covers use in room size of 20 m3. Covers use under typical household ventilation. Covers exposure up to 0.2. Hours/event

Risk management measures:

Other risk management measures:

Washing and cleaning products (including solvent based products),Laundry and dish washing products	Avoid using at a product concentration greater than . 5%	
Washing and cleaning products (including solvent based products),Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)	Avoid using at a product concentration greater than . 5%	
Washing and cleaning products (including solvent based products),Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)	Avoid using at a product concentration greater than . 5%	

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	See contributing scenarios above
Frequency and duration of use	See contributing scenarios above
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	See contributing scenarios above

Risk management measures:

Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	The substance is completely released to the environment or destroyed during use and no significant waste is generated
Conditions and measures related to external recoveryof waste	None

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 10

Metal working fluids / rolling oils

ES Ref.: 10 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC17 SU3 ERC4
Processes, tasks activities covered	Covers the use in formulated MWFs (MWFs)/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significantcontact)
PROC7	Industrial spraying
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Covers use at ambienttemperatures,Unless otherwise stated.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
General exposures (closed systems),CS56 - with sample collection	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E47 - Handle substance within a closed system,Ensure material transfers are under containment or extract ventilation.	PROC 1, 2
General exposures (closed systems),Including closed EDM processes	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E47 - Handle substance within a closed system,Ensure material transfers are under containment or extract ventilation.	PROC 3
General exposures (open systems),Including open EDM processes	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E47 - Handle substance within a closed system,Ensure material transfers are under containment or extract ventilation,PPE15 - Wear suitable gloves tested to EN374.	PROC 4
CS14 - Bulk transfers,General exposures (closed systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Ensure material transfers are under containment or extract ventilation,PPE15 - Wear suitable gloves tested to EN374,Clear spills immediately,Remotely vent displaced vapours.	PROC 8b
CS45 - Filling/ preparation of equipment from drums or containers.	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,Use drum pumps or carefully pour from container,PPE15 - Wear suitable gloves tested to EN374.	PROC 8b, 5, 9
CS2 - Process sampling	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E85 - Use dedicated equipment,PPE15 - Wear suitable gloves tested to EN374.	PROC 8b

CS79 - Metal machining operations	E1 - 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,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E68 - Restrict area of openings to equipment.	PROC17
CS35 - Treatment by dipping and pouring	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide extract ventilation to points where emissions occur,Allow time for product to drain from workpiece,PPE15 - Wear suitable gloves tested to EN374,Automate activity where possible.	PROC13
Spraying,With potential for aerosol generation	E59 - Carry out in a vented booth provided with laminar airflow,PPE15 - Wear suitable gloves tested to EN374,PPE29 - Wear a respirator conforming to EN140 with Type A/P2 filter or better,PPE26 – Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE27 – Wear suitable coveralls to prevent exposure to the skin,Automate activity where possible.	
Roller application or brushing,CS34 - Manual	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide enhanced general ventilation by mechanical means,Avoid splashing.	PROC10
CS80 - Automated metal rolling/forming,Elevated temperature	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings,OC7 - Operation is carried out at elevated temperature (> 20°C above ambient temperature),PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	PROC2
CS83 - Semi-automated metal rolling/forming,Solvent based products,Elevated temperature	Provide extract ventilation to points where emissions occur,PPE15 - Wear suitable gloves tested to EN374,OC7 - Operation is carried out at elevated temperature (> 20°C above ambient temperature),PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Automate activity where possible.	PROC17

CS83 - Semi-automated metal rolling/forming,Solvent based products,With potential for aerosol generation	E1 - 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,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Automate activity where possible.	PROC 17
CS83 - Semi-automated metal rolling/forming,Water based products	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,Automate activity where possible.	PROC4
CS39 - Equipment cleaning and maintenance,CS83 - Semi-automated metal rolling/forming	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E81 - Drain or remove substance from equipment prior to break-in or maintenance,Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE15 - Wear suitable gloves tested to EN374.	PROC8b
CS39 - Equipment cleaning and maintenance,CS82 - Non-dedicated facility	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	PROC8a
Storage,CS56 - with sample collection	E84 - Store substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,Avoid dip sampling.	PROC2

2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 50,(2500 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.006 Release fraction to wastewater from process (initial releaseprior to RMM): 0.001 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Treat onsite wastewater (prior to receiving water discharge) to p
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 60% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	External treatment and disposal of waste should comply with applicable local and/or national regulations. Estimated amount entering waste treatment no greater than 40% Suitable waste treatment,redistillation

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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.

4.2 Environment

Guidance - Environment	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures,If scaling reveals a condition of unsafe use (i.e, RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required,Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Exposure scenario 11

Metal working fluids / rolling oils

ES Ref.: 11 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC17, PROC19 SU22 ERC4
Processes, tasks activities covered	Covers the use in formulated MWFs including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/reject articles, and disposal of waste oils. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC17, PROC19)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significantcontact)
PROC7	Industrial spraying
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC19	Hand-mixing with intimate contact and only PPE available

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
General exposures (closed systems),CS56 - with sample collection,CS54 - Continuous process	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E47 - Handle substance within a closed system,Ensure material transfers are under containment or extract ventilation.	
General exposures (closed systems),CS56 - with sample collection,CS55 - Batch process	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E47 - Handle substance within a closed system,Ensure material transfers are under containment or extract ventilation.	
CS14 - Bulk transfers,e.g. deliveries to dealerships	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Ensure material transfers are under containment or extract ventilation,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers,CS81 - Dedicated facility	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps or carefully pour from container,PPE15 - Wear suitable gloves tested to EN374,Clear spills immediately,Remotely vent displaced vapours.	
CS45 - Filling/ preparation of equipment from drums or containers,CS82 - Non-dedicated facility	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps or carefully pour from container.	
CS2 - Process sampling	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide enhanced general ventilation by mechanical means,E85 - Use dedicated equipment,PPE15 - Wear suitable gloves tested to EN374.	
CS79 - Metal machining operations	Provide a good standard of controlled ventilation (10 to 15 air changes per hour),PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
CS79 - Metal machining operations,With potential for aerosol generation	Provide a good standard of controlled ventilation (10 to 15 air changes per hour),PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	

Roller application or brushing,CS34 - Manual,with local exhaust ventilation	Provide extract ventilation to points where emissions occur,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
Roller application or brushing,CS34 - Manual,without local exhaust ventilation	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
Spraying,with local exhaust ventilation,Elevated temperature	E57 - Carry out in a vented booth or extracted enclosure,OC18 - Limit the substance content in the product to 25 %,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
Spraying,without local exhaust ventilation,G16 - If technical measures not practical:	Wear a respirator conforming to EN140 with Type A filter or better,PPE25 - Change filter cartridge on respirator daily,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training,PPE27 - Wear suitable coveralls to prevent exposure to the skin,PPE26 - Use suitable eye protection.	
CS35 - Treatment by dipping and pouring	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E1 - 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,Allow time for product to drain from workpiece,PPE15 - Wear suitable gloves tested to EN374,Automate activity where possible.	
CS39 - Equipment cleaning and maintenance,CS82 - Non-dedicated facility	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E81 - Drain or remove substance from equipment prior to break-in or maintenance,Retain drain downs in sealed storage pending disposal or for subsequent recycle,enclosed,Machine	
CS39 - Equipment cleaning and maintenance,CS81 - Dedicated facility	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide enhanced general ventilation by mechanical means,E81 - Drain or remove substance from equipment prior to break-in or maintenance,Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE15 - Wear suitable gloves tested to EN374.	

Storage,CS56 - with sample collection	E84 - Store substance within a closed system,PPE26 - Use suitable eye protection.	
CS30 - Mixing operations (open systems),CS34 - Manual,without local exhaust ventilation	OC11 - Avoid carrying out operation for more than 1 hour,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training,PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.025,(0.068 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.05 Release fraction to wastewater from process (initial releaseprior to RMM): 0.025 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 92.5% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations. Dispose of waste product or used containers according to local regulations
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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.

4.2 Environment

Guidance - Environment	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures,If scaling reveals a condition of unsafe use (i.e, RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required,Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Exposure scenario 12

Mining chemicals

ES Ref.: 12 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 SU3 ERC4
Processes, tasks activities covered	Covers the use of the substance in extraction processes at mining operations, including material transfers, winning and separation activities, and substance recovery and disposal. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
CS14 - Bulk transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling.	
CS8 - Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps or carefully pour from container,Avoid spillage when withdrawing pump,PPE15 - Wear suitable gloves tested to EN374.	
Pouring from small containers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Carefully pour from containers,PPE15 - Wear suitable gloves tested to EN374	
CS29 - Mixing operations (closed systems),CS55 - Batch process	PPE26 - Use suitable eye protection.	
CS30 - Mixing operations (open systems),CS55 - Batch process	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS30 - Mixing operations (open systems),Elevated temperature,CS55 - Batch process	Provide extract ventilation to points where emissions occur,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
CS106 - phase separation,CS107 - (closed systems)	PPE26 - Use suitable eye protection.	
CS105 - ion exchange processes,CS107 - (closed systems)	PPE26 - Use suitable eye protection.	
CS2 - Process sampling	PPE26 - Use suitable eye protection.	
In line injection of process chemicals by fixed dose pumping,CS107 - (closed systems)	No specific measures identified.	
CS39 - Equipment cleaning and maintenance	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Drain down and flush system prior to equipment opening or maintenance,Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE15 - Wear suitable gloves tested to EN374.	
Storage	Additional good practice advice beyond the REACH CSA,E84 - Store substance within a closed system.	

2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 100,(333 kg/day)
Frequency and duration of use	Continuous process,300 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.05 Release fraction to wastewater from process (initial releaseprior to RMM): 0.5 Release fraction to soil from process (initial releaseprior to RMM): 0,05

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Onsite wastewater treatment required. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Assumed on-site sewage treatment plant flow (m3/d): 2000 Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Not applicable Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4,Domestic sewage treatment is not assumed
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 40% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations. Dispose of waste product or used containers according to local regulations
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - 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,If scalingreveals a condition of unsafe use (i.e, RCRs > 1), additional RMMs or a site-specific chemical safetyassessment is required,Further details on scaling and control technologies are provided in SpERCfactsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Exposure scenario 13

Lubricants

ES Ref.: 13 ES Type: Worker	

Use descriptors	PROC1, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18 SU3 ERC4, ERC7
Processes, tasks activities covered	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
General exposures (closed systems),CS57 - no sampling	No other specific measures identified.	
General exposures (closed systems),CS56 - with sample collection	Use a sampling system designed to control exposure.	
CS16 - General exposures (open systems)	E52 - Transfer via enclosed lines,Formulate in enclosed or ventilated mixing vessels,PPE26 – Use suitable eye protection.	
CS16 - General exposures (open systems),With potential for aerosol generation	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection.	
CS14 - Bulk transfers	E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling,PPE26 - Use suitable eye protection.	
CS45 - Filling/ preparation of equipment from drums or containers,CS34 – Manual	Use drum pumps,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,PPE27 - Wear suitable coveralls to prevent exposure to the skin.	
CS45 - Filling/ preparation of equipment from drums or containers,CS33 - Machine	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,PPE27 – Wear suitable coveralls to prevent exposure to the skin.	
CS75 - Initial factory fill of equipment	E41 - Use in semi-automated and predominantly enclosed filling lines,PPE26 - Use suitable eye protection.	
CS17 - Operation and lubrication of high energy open equipment,Lubricants,With potential for aerosol generation	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
CS17 - Operation and lubrication of high energy open equipment,Grease,With potential for aerosol generation	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings,Additional good practice advice beyond the REACH CSA,PPE14 - Use suitable eye protection and gloves.	
CS51 - Rolling, Brushing	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	

CS35 - Treatment by dipping and pouring	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,E56 – Use ventilation to extract vapours from freshly coated articles/objects.	
CS10 - Spraying,with local exhaust ventilation,With potential for aerosol generation	E70 - Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
CS10 - Spraying,without local exhaust ventilation,With potential for aerosol generation	Wear a respirator conforming to EN140 with Type A filter or better,PPE25 - Change filter cartridge on respirator daily,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
CS77 - Maintenance (of larger plant items) and machine set up	E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS77 - Maintenance (of larger plant items) and machine set up,Elevated temperature	Provide extract ventilation to material transfer points and other openings,E39 - Clear transfer lines prior to de-coupling,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS18 - Maintenance of small items	Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS19 - Remanufacture of reject articles	Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
Material storage	Ensure dedicated sample points are provided.	

2.2 Contributing scenario controlling environmental exposure (ERC4, ERC7)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC7	Industrial use of substances in closed systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 20,(1000 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.00015 Release fraction to wastewater from process (initial releaseprior to RMM): 0.001 Release fraction to soil from process (initial releaseprior to RMM): 0.001

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 5% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Cement kiln fuels,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 95% Suitable waste treatment,redistillation External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - 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,If scalingreveals a condition of unsafe use (i.e, RCRs > 1), additional RMMs or a site-specific chemical safetyassessment is required,Further details on scaling and control technologies are provided in SpERCfactsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Exposure scenario 14

Lubricants

ES Ref.: 14 ES Type: Worker	

Use descriptors	PROC1, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20 SU22 ERC8a, ERC8d
Processes, tasks activities covered	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions
PROC20	Heat and pressure transfer fluids in dispersive use but closed systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
General exposures (closed systems),CS57 - no sampling	No other specific measures identified.	
General exposures (closed systems),CS56 - with sample collection	Use a sampling system designed to control exposure,PPE26 - Use suitable eye protection.	
General exposures (closed systems),CS57 - no sampling,internal	No other specific measures identified.	
CS16 - General exposures (open systems),With potential for aerosol generation	E52 - Transfer via enclosed lines,PPE26 - Use suitable eye protection.	
CS14 - Bulk transfers	E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling,PPE26 - Use suitable eye protection.	
CS45 - Filling/ preparation of equipment from drums or containers,CS81 - Dedicated facility	Use drum pumps,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,PPE27 - Wear suitable coveralls to prevent exposure to the skin.	
CS45 - Filling/ preparation of equipment from drums or containers,CS82 - Non-dedicated facility	PPE15 - Wear suitable gloves tested to EN374,Use drum pumps,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE27 - Wear suitable coveralls to prevent exposure to the skin.	
CS17 - Operation and lubrication of high energy open equipment,Lubricants,indoor	Provide extract ventilation to points where emissions occur,PPE15 - Wear suitable gloves tested to EN374,E68 - Restrict area of openings to equipment,PPE26 - Use suitable eye protection.	
CS17 - Operation and lubrication of high energy open equipment,Grease,indoor	Provide extract ventilation to points where emissions occur,E68 - Restrict area of openings to equipment.	
CS17 - Operation and lubrication of high energy open equipment,Lubricants,outdoor	Ensure operation is undertaken outdoors,OC18 - Limit the substance content in the product to 25 %,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	

CS77 - Maintenance (of larger plant items) and machine set up	E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide extract ventilation to points where emissions occur	
CS77 - Maintenance (of larger plant items) and machine set up,Elevated temperature	Provide extract ventilation to points where emissions occur,Local exhaust ventilation - efficiency of at least [%]: 90,E52 - Transfer via enclosed lines,E39 – Clear transfer lines prior to de-coupling,PPE26 – Use suitable eye protection.	
CS18 - Maintenance of small items,with local exhaust ventilation	PPE15 - Wear suitable gloves tested to EN374,Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE26 - Use suitable eye protection.	
Engine lubricant service,without local exhaust ventilation	No other specific measures identified,PPE26 – Use suitable eye protection.	
CS51 - Rolling, Brushing,Manual,with local exhaust ventilation	Provide extract ventilation to points where emissions occur,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
CS51 - Rolling, Brushing,Manual,without local exhaust ventilation	PPE15 - Wear suitable gloves tested to EN374,With potential for aerosol generation,Wear a respirator conforming to EN140 with Type A filter or better,PPE26 - Use suitable eye protection.	
CS10 - Spraying,with local exhaust ventilation	E57 - Carry out in a vented booth or extracted enclosure,Local exhaust ventilation - efficiency of at least [%]: 90,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training,Retain drain downs in sealed storage pending disposal or for subsequent recycle,PPE26 - Use suitable eye protection.	
CS10 - Spraying,without local exhaust ventilation	E1 - 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,Wear a respirator conforming to EN140 with Type A filter or better,PPE25 - Change filter cartridge on respirator daily,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training,With potential for aerosol generation,PPE26 - Use suitable eye protection.	
CS35 - Treatment by dipping and pouring	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E56 – Use ventilation to extract vapours from freshly coated articles/objects.	
Storage	Ensure dedicated sample points are provided.	

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.01,(0.27 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.005 Release fraction to wastewater from process (initial releaseprior to RMM): 0.05 Release fraction to soil from process (initial releaseprior to RMM): 0.05

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 50% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Cement kiln fuels,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 50% Suitable waste treatment,redistillation External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 15

Lubricants

ES Ref.: 15 ES Type: Consumer	

Use descriptors	PC24 SU21 ERC8a, ERC8d
Processes, tasks activities covered	Covers the consumer use of formulated lubricants in closed and open systems including transfer operations, application, operation of engines and similar articles, equipment maintenance and disposal of waste oil. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC9a, PC9c)

PC24	Lubricants, Greases and Release Products

Product characteristics

Physical form	liquid, Vapour pressure 1-10 Pa
Concentration of the Substance in Mixture/Article	See specific operational conditions below
Vapour pressure	0,029 hPa
Volatility	Medium volatile liquid

Operational conditions

Amount used	See specific operational conditions below	
Frequency and duration of use	See specific operational conditions below	
Human factors not influenced by risk management	See specific operational conditions below	
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use at ambient temperatures,Covers use under typical household ventilation. Lubricants, Greases and Release Products	Unless otherwise stated. Covers concentrations up to 10%. Covers use up to 4. days/year. For each use event, covers use amounts up to: 2200 g. Covers skin contact area up to 468 cm2. Covers use in a one car garage (34m3) under typical ventilation. Covers exposure up to 0.17. Hours/event

	Lubricants, Greases and Release Products	Unless otherwise stated. Covers concentrations up to 10%. Covers use up to 10. days/year. For each use event, covers use amounts up to: 34 g. Covers
	Lubricants, greases, release products,Sprays	Unless otherwise stated. Covers concentrations up to 3%. Covers use up to 6. days/year. For each use event, covers use amounts up to: 30 g. Covers skin contact area up to 428 cm2. Covers use in room size of 20 m3. Covers use under typical household ventilation. Covers exposure up to 0.17. Hours/event

Risk management measures:

Other risk management measures:

Lubricants, greases, release products	Avoid using at a product concentration greater than . 10%
Lubricants, greases, release products,Pastes	Avoid using at a product concentration greater than . 10%
Lubricants, greases, release products,Sprays	Avoid using at a product concentration greater than . 10%

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	See contributing scenarios above
Frequency and duration of use	See contributing scenarios above
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	See contributing scenarios above

Risk management measures:

Conditions and measures related to sewage treatmentplant	Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4 Assumed domestic sewage treatment plant flow (m3/d): 2000
Conditions and measures related to external treatmentof waste for disposal	Dispose of empty containers and wastes safely,External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	None External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 16

Use in agrochemicals

ES Ref.: 16 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC11, PROC13 SU22 ERC8a, ERC8d
Processes, tasks activities covered	Use as an agrochemical excipient for application by manual or machine spraying, smokes and fogging; including equipment clean-downs and disposal. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions
PROC20	Heat and pressure transfer fluids in dispersive use but closed systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers concentrations up to 25%

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
CS22 - Transfer from/pouring from containers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS30 - Mixing operations (open systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS24 - Spraying/ fogging by manual application,With potential for aerosol generation	Wear a respirator conforming to EN140 with Type A filter or better,PPE25 - Change filter cartridge on respirator daily,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training,PPE27 - Wear suitable coveralls to prevent exposure to the skin,PPE26 - Use suitable eye protection.	
CS25 - Spraying/ fogging by machine application,With potential for aerosol generation	E70 - Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training,PPE26 - Use suitable eye protection.	
CS27 - Ad hoc manual application via trigger sprays, dipping, etc,With potential for aerosol generation	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
Equipment cleaning and maintenance	Avoid carrying out operation for more than 4 hours,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E81 - Drain or remove substance from equipment prior to break-in or maintenance,Retain drain downs in sealed storage pending disposal or for subsequent recycle.	
Disposal of wastes	Avoid carrying out operation for more than 4 hours,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
Storage,CS57 - no sampling	Additional good practice advice beyond the REACH CSA,E84 - Store substance within a closed system.	
Storage,CS56 - with sample collection	PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC4, ERC7)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.02,(0.054 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.01 Release fraction to wastewater from process (initial releaseprior to RMM): 0.99 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	None. No wastewater treatment required.
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 10% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 17

Use in agrochemicals

ES Ref.: 17 ES Type: Consumer	

Use descriptors	PC12, PC27 SU21 ERC8a, ERC8d
Processes, tasks activities covered	Covers the consumer use of agrochemicals in liquid and solid forms. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC12, PC27)

PC12	Fertilizers
PC27	Plant protection products

Product characteristics

Physical form	liquid, Vapour pressure 1-10 Pa
Concentration of the Substance in Mixture/Article	See specific operational conditions below
Vapour pressure	0,029 hPa
Volatility	Medium volatile liquid

Operational conditions

Amount used	See specific operational conditions below	
Frequency and duration of use	See specific operational conditions below	
Human factors not influenced by risk management	See specific operational conditions below	
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use at ambient temperatures,Covers use under typical household ventilation. Fertilizers,Lawn and garden preparations	Unless otherwise stated. Covers concentrations up to 3%. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 25 g. Covers skin contact area up to 857 cm2. Covers use in room size of 20 m3. Covers use under typical household ventilation. Covers exposure up to 4. Hours/event. For each use event, assumes swallowed amount of . 0.15 g

	Plant protection products	Unless otherwise stated. Covers concentrations up to 3%. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 25 g. Covers skin contact area up to 857 cm2. Covers use in room size of 20 m3. Covers use under typical household ventilation. Covers exposure up to 4. Hours/event. For each use event, assumes swallowed amount of . 0.15

Risk management measures:

Other risk management measures:

Fertilizers,Lawn and garden preparations	Avoid using at a product concentration greater than . 3%,For each use event, avoid using a product amount greater than . 25 g,Avoid skin contact area greater than . 857 cm2,For each use, avoid using for more than . 4,Hours/event	
Plant protection products	Avoid using at a product concentration greater than . 3%,For each use event, avoid using a product amount greater than . 25 g,Avoid skin contact area greater than . 857 cm2,For each use, avoid using for more than . 4,Hours/event	

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	See contributing scenarios above
Frequency and duration of use	See contributing scenarios above
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	See contributing scenarios above

Risk management measures:

Conditions and measures related to sewage treatmentplant	Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4 Assumed domestic sewage treatment plant flow (m3/d): 2000
Conditions and measures related to external treatmentof waste for disposal	Dispose of empty containers and wastes safely,External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	None External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 18

Functional fluids

ES Ref.: 18 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9 SU3 ERC7
Processes, tasks activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
General exposures (closed systems)	Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,E39 – Clear transfer lines prior to de-coupling.	
General exposures (closed systems),CS56 - with sample collection	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling.	
CS8 - Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps,Provide extract ventilation to points where emissions occur	
CS84 - Filling of articles/equipment,CS107 - (closed systems)	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps or carefully pour from container,EI19 - Ensure operatives are trained to minimise exposures.	
General exposures (closed systems),operation of closed equipment containing functional fluids	PPE26 - Use suitable eye protection.	
CS16 - General exposures (open systems),Functional fluids	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E1 - 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.	
CS19 - Remanufacture of reject articles	PPE26 - Use suitable eye protection,Allow time for product to drain from workpiece.	
CS39 - Equipment cleaning and maintenance	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Drain down and flush system prior to equipment break-in or maintenance.	
Storage	E84 - Store substance within a closed system.	
Storage,CS56 - with sample collection	E84 - Store substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Ensure dedicated sample points are provided.	
General exposures (open systems),Functional fluids,Elevated temperature,With potential for aerosol generation	Provide extract ventilation to points where emissions occur,PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 20,(1000 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.0005 Release fraction to wastewater from process (initial releaseprior to RMM): 0.001 Release fraction to soil from process (initial releaseprior to RMM): 0.001

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. A leak prevention plan is needed to prevent low level continual releases. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 5% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Cement kiln fuels,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 95% Suitable waste treatment,redistillation External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - 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.

1. Exposure scenario 19

Functional fluids

ES Ref.: 19 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC20 SU22 ERC9a, ERC9b
Processes, tasks activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC20)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC20	Heat and pressure transfer fluids in dispersive use but closed systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
CS8 - Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps,Provide extract ventilation to points where emissions occur	
CS22 - Transfer from/pouring from containers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps.	
General exposures (closed systems),Functional fluids	Additional good practice advice beyond the REACH CSA,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	PROC 1
General exposures (closed systems),Functional fluids	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	PROC 2
General exposures (closed systems),Functional fluids	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	PROC 3
General exposures (closed systems)	Additional good practice advice beyond the REACH CSA,Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
General exposures (closed systems),operation of closed equipment containing functional fluids,Elevated temperature	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings,Local exhaust ventilation - efficiency of at least [%]: 90	
CS19 - Remanufacture of reject articles	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Allow time for product to drain from workpiece.	
CS39 - Equipment cleaning and maintenance	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Drain down and flush system prior to equipment break-in or maintenance.	
Storage	E84 - Store substance within a closed system.	
Storage,CS56 - with sample collection	E84 - Store substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Ensure dedicated sample points are provided.	

2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.005,(0.013 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.05 Release fraction to wastewater from process (initial releaseprior to RMM): 0.025 Release fraction to soil from process (initial releaseprior to RMM): 0.025

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Prevent environmental discharge consistent with regulatory requirements.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 50% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Suitable waste treatment,redistillation External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 20

Use in agrochemicals

ES Ref.: 20 ES Type: Consumer	

Use descriptors	PC16, PC17 SU21 ERC9a, ERC9b
Processes, tasks activities covered	Use of sealed items containing functional fluids e.g. transfer oils, hydraulic fluids, refrigerants. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC16, PC17)

PC16	Heat Transfer Fluids
PC17	Hydraulic Fluids

Product characteristics

Physical form	liquid, Vapour pressure 1-10 Pa
Concentration of the Substance in Mixture/Article	See specific operational conditions below
Vapour pressure	0,029 hPa
Volatility	Medium volatile liquid

Operational conditions

Amount used	See specific operational conditions below	
Frequency and duration of use	See specific operational conditions below	
Human factors not influenced by risk management	See specific operational conditions below	
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use at ambient temperatures,Covers use under typical household ventilation,Avoid contact with eyes Heat transfer fluids,Liquids	Unless otherwise stated. Covers concentrations up to 50%. Covers use up to 4. days/year. For each use event, covers use amounts up to: 2200 g. Covers skin contact area up to 468 cm2. Covers use in a one car garage (34m3) under typical ventilation. Covers exposure up to 0.2. Hours/event

	Hydraulic fluids,Liquids	Unless otherwise stated. Covers concentrations up to 50%. Covers use up to 4. days/year. For each use event, covers use amounts up to: 2200 g. Covers skin contact area up to 468 cm2. Covers use in a one car garage (34m3) under typical ventilation. Covers exposure up to 0.2. Hours/event

Risk management measures:

Other risk management measures:

Heat transfer fluids,Liquids	Avoid using at a product concentration greater than . 50%
Hydraulic fluids,Liquids	Avoid using at a product concentration greater than . 50%

2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems

Product characteristics

Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	See contributing scenarios above
Frequency and duration of use	See contributing scenarios above
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	See contributing scenarios above

Risk management measures:

Conditions and measures related to sewage treatmentplant	Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4 Assumed domestic sewage treatment plant flow (m3/d): 2000
Conditions and measures related to external treatmentof waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. Dispose of empty containers and wastes safely,External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	None External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 21

Water treatment chemicals

ES Ref.: 21 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13 SU3 ERC3, ERC4
Processes, tasks activities covered	Covers the use of the substance for the treatment of water at industrial facilities in open and closed systems. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC13	Treatment of articles by dipping and pouring

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
CS14 - Bulk transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E52 - Transfer via enclosed lines.	
CS8 - Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 -Wear suitable gloves tested to EN374,Use drum pumps,Avoid spillage when withdrawing pump.	
General exposures (closed systems),CS55 - Batch process	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS16 - General exposures (open systems),CS55 - Batch process	PPE26 - Use suitable eye protection.	
Pouring from small containers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,E68 – Restrict area of openings to equipment.	
CS5 - Equipment maintenance	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,E81 - Drain or remove substance from equipment prior to break-in or maintenance,Retain drain downs in sealed storage pending disposal or for subsequent recycle.	
Storage	Additional good practice advice beyond the REACH CSA,E84 - Store substance within a closed system.	

2.2 Contributing scenario controlling environmental exposure (ERC3, ERC4)

ERC3	Formulation in materials
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 20,(67 kg/day)
Frequency and duration of use	Continuous process,300 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.05 Release fraction to wastewater from process (initial releaseprior to RMM): 0.95 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater. Prevent environmental discharge consistent with regulatory requirements.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 5% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - 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.

1. Exposure scenario 22

Water treatment chemicals

ES Ref.: 22 ES Type: Worker	

Use descriptors	PROC1, PROC3, PROC4, PROC8a, PROC8b, PROC13 SU22 ERC8f
Processes, tasks activities covered	Covers the use of the substance for the treatment of water in open and closed systems. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC13	Treatment of articles by dipping and pouring

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
CS8 - Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,Use drum pumps,Avoid spillage when withdrawing pump.	
General exposures (closed systems),CS55 - Batch process	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 -Wear suitable gloves tested to EN374.	
CS16 - General exposures (open systems),CS55 - Batch process	PPE26 - Use suitable eye protection.	
Pouring from small containers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,E68 – Restrict area of openings to equipment.	
CS5 - Equipment maintenance	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,E81 - Drain or remove substance from equipment prior to break-in or maintenance,Retain drain downs in sealed storage pending disposal or for subsequent recycle.	
Storage	Additional good practice advice beyond the REACH CSA,E84 - Store substance within a closed system.	

2.2 Contributing scenario controlling environmental exposure (ERC8f)

ERC8f	Wide dispersive outdoor use resulting in inclusion into or onto a matrix

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 1.5,(4.1 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.01 Release fraction to wastewater from process (initial releaseprior to RMM): 0.99 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 10% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 23

Water treatment chemicals

ES Ref.: 23 ES Type: Consumer	

Use descriptors	PC37 SU21 ERC8f
Processes, tasks activities covered	Covers the use of the substance for the treatment of water in open and closed systems. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC37)

PC37	Water treatment chemicals

Product characteristics

Physical form	liquid, Vapour pressure 1-10 Pa
Concentration of the Substance in Mixture/Article	See specific operational conditions below
Vapour pressure	0,029 hPa
Volatility	Medium volatile liquid

Operational conditions

Amount used	See specific operational conditions below	
Frequency and duration of use	See specific operational conditions below	
Human factors not influenced by risk management	See specific operational conditions below	
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use at ambient temperatures,Covers use under typical household ventilation,Avoid contact with eyes Water treatment chemicals	Unless otherwise stated. Covers concentrations up to 20%. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 10 g. Covers skin contact area up to 6600 cm2. Covers use in room size of 20 m3. Covers exposure up to 4. Hours/event. For each use event, assumes swallowed amount of . 0.000154 g

Risk management measures:
None weiteren Informationen

2.2 Contributing scenario controlling environmental exposure (ERC8f)

ERC8f	Wide dispersive outdoor use resulting in inclusion into or onto a matrix

Product characteristics

Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	See contributing scenarios above
Frequency and duration of use	See contributing scenarios above
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	See contributing scenarios above

Risk management measures:

Conditions and measures related to sewage treatmentplant	Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4 Assumed domestic sewage treatment plant flow (m3/d): 2000
Conditions and measures related to external treatmentof waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. Dispose of empty containers and wastes safely
Conditions and measures related to external recoveryof waste	None External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 24

Use in laboratories

ES Ref.: 24 ES Type: Worker	

Use descriptors	PROC10, PROC15 SU3 ERC4
Processes, tasks activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC10, PROC15)

PROC10	Roller application or brushing
PROC15	Use as laboratory reagent

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
CS36 - Laboratory activities	PPE26 - Use suitable eye protection.	
CS47 - Cleaning,CS50 - Wiping,CS51 - Rolling, Brushing	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 2,(100 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.025 Release fraction to wastewater from process (initial releaseprior to RMM): 0.02 Release fraction to soil from process (initial releaseprior to RMM): 0.001

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 95% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - 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.

1. Exposure scenario 25

Use in laboratories

ES Ref.: 25 ES Type: Worker	

Use descriptors	PROC10, PROC15 SU22 ERC8a
Processes, tasks activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC10, PROC15)

PROC10	Roller application or brushing
PROC15	Use as laboratory reagent

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stateddifferently),Continuous process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupationalhygiene is implemented,Assumes use at not morethan 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Avoid manual contact with wet work pieces.	
CS36 - Labortätigkeiten	PPE26 - Use suitable eye protection.	
CS47 - Reinigung,CS50 - Wischen,CS51 - Rollen/Bürsten	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC8a)

ERC8a	Wide dispersive indoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.005,(0.013 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.5 Release fraction to wastewater from process (initial releaseprior to RMM): 0.5 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Do not allow uncontrolled discharge of product into the environment If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 10% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 26

Other consumer uses

ES Ref.: 26 ES Type: Consumer	

Use descriptors	PC28, PC39 SU21 ERC8a
Processes, tasks activities covered	Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC28, PC39)

PC28	Perfumes, fragrances
PC39	Cosmetics, personal care products

Product characteristics

Physical form	liquid, Vapour pressure 1-10 Pa
Concentration of the Substance in Mixture/Article	See specific operational conditions below
Vapour pressure	0,029 hPa
Volatility	Medium volatile liquid

Operational conditions

Amount used	Not applicable	
Frequency and duration of use	Not applicable	
Human factors not influenced by risk management	Not applicable	
Other given operational conditions affecting consumers exposure	Not applicable	

Risk management measures:
None weiteren Informationen

2.2 Contributing scenario controlling environmental exposure (ERC8f)

ERC8a	Wide dispersive indoor use of processing aids in open systems

Product characteristics

Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	See contributing scenarios above
Frequency and duration of use	See contributing scenarios above
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	See contributing scenarios above

Risk management measures:

Conditions and measures related to sewage treatmentplant	Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4 Assumed domestic sewage treatment plant flow (m3/d): 2000
Conditions and measures related to external treatmentof waste for disposal	Dispose of empty containers and wastes safely External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	None External recovery and recycling of waste should comply with applicable local and/or national regulations.

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	Nicht anwendbar

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - Health	Not applicable

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 27

Covers the use in manual and fixed systems	ES Ref.: 27 ES Type: Worker	

Use descriptors	PROC1, PROC4, PROC7, PROC8a, PROC8b SU3 ERC4
Processes, tasks activities covered	Covers the use described in the exposure scenario title, including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk) and equipment cleaning, maintenance and associated laboratory activities Covers the use in sprinkler systems Covers training activities Loading and unloading of concentrate Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC4, PROC7, PROC8a, PROC8b)

PROC1	Use in closed process, no likelihood of exposure
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently). Batch process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupational hygiene is implemented,Assumes use at not more than 20°C above ambient temperature, unless stated differently,Management controls should be in place to ensure that risk management measures in place are being used correctly and that operational conditions are fallowed

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Avoid manual contact with wet work pieces.	
Storage	No other specific measures identified.	
Spraying,Covers the use in sprinkler systems,Loading and unloading of concentrate	Limit the substance content in the mixture to 1 %.	
Spraying,Covers the use in sprinkler systems,Loading and unloading of concentrate,With potential for aerosol generation	Limit the substance content in the mixture to 1 %.	
Entry after systems have been in use,CS8 - Drum/batch transfers,Pouring from small containers	PPE26 - Use suitable eye protection.	
Entry after systems have been in use,CS14 – Bulk transfers	PPE26 - Use suitable eye protection.	
CS30 - Mixing operations (open systems),CS55 - Batch process,Dilution	PPE26 - Use suitable eye protection.	
CS39 - Equipment cleaning and maintenance,CS47 - Cleaning	PPE26 - Use suitable eye protection.	
Spraying,Covers training activities,It is assumed that workers are not planned to be present when sprinklers activate,Used CHARM model	Limit the substance content in the mixture to 1 %.	

2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 1,(50 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.005 Release fraction to wastewater from process (initial releaseprior to RMM): 0.09 Release fraction to soil from process (initial releaseprior to RMM): 0.005

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	No air emission controls required; required removal efficiency is 0% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements. If the amount used in any one day exceeds the Msafe figure then you must advise the local authorities and draw up an action plan to mitigate the environmental impact
Conditions and measures related to sewage treatmentplant	Estimated substance removal from wastewater via domestic sewage treatment (%): 87 Assumed domestic sewage treatment plant flow (m3/d): 2000
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 90% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Aerobic biological treatment,Anaerobic biological treatment,Removal Efficiency (total): 87% Dispose of waste product or used containers according to local regulations
Conditions and measures related to external recovery of waste	Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - 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,If scaling reveals a condition of unsafe use (i.e, RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

1. Exposure scenario 28A

Use in fire fighting foams

ES Ref.: 28A ES Type: Worker	

Use descriptors	PROC1, PROC4, PROC8a, PROC8b, PROC11 SU22 ERC8d
Processes, tasks activities covered	Covers the use described in the exposure scenario title, including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk) and equipment cleaning, maintenance and associated laboratory activities Covers training activities Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC4, PROC8a, PROC8b, PROC11)

PROC1	Use in closed process, no likelihood of exposure
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC11	Non industrial spraying

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently). Batch process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupational hygiene is implemented,Assumes use at not more than 20°C above ambient temperature, unless stated differently,Management controls should be in place to ensure that risk management measures in place are being used correctly and that operational conditions are fallowed

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
Storage	No other specific measures identified.	
Spraying,Covers the use in manual and fixed systems,Covers training activities	Limit the substance content in the mixture to 1 %.	
Spraying,Covers the use in manual and fixed systems,Covers training activities,With potential for aerosol generation	Limit the substance content in the mixture to 1 %.	
Loading and unloading of concentrate,Drum/batch transfers,Pouring from small containers	Avoid carrying out activities involving exposure for more than 4 hours,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
Loading and unloading of concentrate,CS14 - Bulk transfers	PPE26 - Use suitable eye protection.	
CS30 - Mixing operations (open systems),CS55 - Batch process,Dilution	PPE26 - Use suitable eye protection.	
CS39 - Equipment cleaning and maintenance,CS47 - Cleaning	Avoid carrying out activities involving exposure for more than 4 hours,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
Spraying,Covers the use in sprinkler systems,Entry after systems have been in use,It is assumed that workers are not planned to be present when sprinklers activate	Limit the substance content in the mixture to 1 %,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374	

2.2 Contributing scenario controlling environmental exposure (ERC8d)

ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 4,(200 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0 Release fraction to wastewater from process (initial releaseprior to RMM): 1 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Air emission controls are not applicable as there is no direct release to air. Soil emission controls are not applicable as there is no direct release to soil.
Organizational measures to prevent/limit release fromthe site	Prevent environmental discharge consistent with regulatory requirements.
Conditions and measures related to sewage treatmentplant	Not applicable
Conditions and measures related to external treatmentof waste for disposal	The substance is completely released to the environment or destroyed during use and no significant waste is generated,Dispose of waste product or used containers according to local regulations.
Conditions and measures related to external recoveryof waste	Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	Used CHARM model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 28B

Use in fire fighting foams

ES Ref.: 28B ES Type: Worker	

Use descriptors	PROC1, PROC3, PROC8a, PROC8b, PROC11 SU22 ERC8d
Processes, tasks activities covered	Covers the use described in the exposure scenario title, including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk) and equipment cleaning, maintenance and associated laboratory activities Covers training activities Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC8a, PROC8b, PROC11)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC11	Non industrial spraying

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently). Batch process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupational hygiene is implemented,Assumes use at not more than 20°C above ambient temperature, unless stated differently,Management controls should be in place to ensure that risk management measures in place are being used correctly and that operational conditions are fallowed

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
Storage	No other specific measures identified.	
Spraying,Covers the use in manual and fixed systems,Covers training activities	Limit the substance content in the mixture to 1 %.	
Spraying,Covers the use in manual and fixed systems,Covers training activities,With potential for aerosol generation	Limit the substance content in the mixture to 1 %.	
Loading and unloading of concentrate,Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps.	
Loading and unloading of concentrate,CS14 - Bulk transfers	PPE26 - Use suitable eye protection.	
CS30 - Mixing operations (open systems),In line injection of process chemicals by fixed dose pumping,Dilution	PPE26 - Use suitable eye protection.	
CS39 - Equipment cleaning and maintenance,CS47 - Cleaning	PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC8d)

ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.02,(1 kg/day)
Frequency and duration of use	Continuous process,20 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.05 Release fraction to wastewater from process (initial releaseprior to RMM): 0.1 Release fraction to soil from process (initial releaseprior to RMM): 0.1

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Air emission controls are not applicable as there is no direct release to air. No wastewater treatment required.
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements. If the amount used in any one day exceeds the Msafe figure then you must advise the local authorities and draw up an action plan to mitigate the environmental impact
Conditions and measures related to sewage treatmentplant	Domestic sewage treatment is not assumed
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 75% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Collect spent foam either for disposal or treatment in a waste water treatment plant Dispose of waste product or used containers according to local regulations
Conditions and measures related to external recoveryof waste	Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 28C

Use in fire fighting foams

ES Ref.: 28C ES Type: Worker	

Use descriptors	PROC1, PROC4, PROC8a, PROC11 SU22 ERC8d
Processes, tasks activities covered	Covers the use described in the exposure scenario title, including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk) and equipment cleaning, maintenance and associated laboratory activities Covers training activities Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC4, PROC8a, PROC11)

PROC1	Use in closed process, no likelihood of exposure
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC11	Non industrial spraying

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently). Batch process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupational hygiene is implemented,Assumes use at not more than 20°C above ambient temperature, unless stated differently,Management controls should be in place to ensure that risk management measures in place are being used correctly and that operational conditions are fallowed

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
Storage	No other specific measures identified.	
Spraying,Covers the use in manual and fixed systems,Covers training activities	Limit the substance content in the mixture to 1 %.	
Spraying,Covers the use in manual and fixed systems,Covers training activities,With potential for aerosol generation	Limit the substance content in the mixture to 1 %.	
Loading and unloading of concentrate,Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps.	
CS30 - Mixing operations (open systems),Dilution	PPE26 - Use suitable eye protection.	
CS39 - Equipment cleaning and maintenance,CS47 - Cleaning	PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC8d)

ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.03,(0.082 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.05 Release fraction to wastewater from process (initial releaseprior to RMM): 0.8 Release fraction to soil from process (initial releaseprior to RMM): 0.15

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Air emission controls are not applicable as there is no direct release to air. No wastewater treatment required.
Organizational measures to prevent/limit release fromthe site	Prevent environmental discharge consistent with regulatory requirements. If the amount used in any one day exceeds the Msafe figure then you must advise the local authorities and draw up an action plan to mitigate the environmental impact
Conditions and measures related to sewage treatmentplant	Domestic sewage treatment is not assumed
Conditions and measures related to external treatmentof waste for disposal	The substance is completely released to the environment or destroyed during use and no significant waste is generated Dispose of waste product or used containers according to local regulations
Conditions and measures related to external recoveryof waste	Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 28D

Use in fire fighting foams

ES Ref.: 28D ES Type: Worker	

Use descriptors	PROC1, PROC3, PROC8a, PROC11 SU22 ERC8a
Processes, tasks activities covered	Covers the use described in the exposure scenario title, including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk) and equipment cleaning, maintenance and associated laboratory activities Covers training activities Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC8a, PROC11)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC11	Non industrial spraying

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently). Batch process
Human factors not influenced by risk management	None It is assumed that workers are not planned to be present when sprinklers activate
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupational hygiene is implemented,Assumes use at not more than 20°C above ambient temperature, unless stated differently,Management controls should be in place to ensure that risk management measures in place are being used correctly and that operational conditions are fallowed

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
Storage	No other specific measures identified.	
Spraying,Manual,Covers training activities	Limit the substance content in the mixture to 1 %,Additional good practice advice beyond the REACH CSA,Avoid carrying out operation for more than 4 hours	
Spraying,Manual,Covers training activities,With potential for aerosol generation	Limit the substance content in the mixture to 1 %,Additional good practice advice beyond the REACH CSA,Avoid carrying out operation for more than 4 hours	
Loading and unloading of concentrate,Drum/batch transfers	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Use drum pumps	
CS30 - Mixing operations (open systems),In line injection of process chemicals by fixed dose pumping,Dilution	PPE26 - Use suitable eye protection.	
CS39 - Equipment cleaning and maintenance,CS47 - Cleaning	PPE26 - Use suitable eye protection.	

2.2 Contributing scenario controlling environmental exposure (ERC8a)

ERC8a	Wide dispersive indoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 0.02,(0.54 kg/day)
Frequency and duration of use	Continuous process,365 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.05 Release fraction to wastewater from process (initial releaseprior to RMM): 0.2 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Air emission controls are not applicable as there is no direct release to air. No wastewater treatment required.
Organizational measures to prevent/limit release fromthe site	Prevent environmental discharge consistent with regulatory requirements. If the amount used in any one day exceeds the Msafe figure then you must advise the local authorities and draw up an action plan to mitigate the environmental impact
Conditions and measures related to sewage treatmentplant	Domestic sewage treatment is not assumed
Conditions and measures related to external treatmentof waste for disposal	Estimated amount entering waste treatment no greater than 75% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Collect spent foam either for disposal or treatment in a waste water treatment plant Dispose of waste product or used containers according to local regulations
Conditions and measures related to external recoveryof waste	Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.

1. Exposure scenario 29

Use in oil and gas field drilling and production operations

ES Ref.: 29 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b SU22 ERC8d
Processes, tasks activities covered	Oil field well drilling operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 12 hours (unless stated differently). Batch process
Human factors not influenced by risk management	None
Other given operational conditions affecting workersexposure	Assumes a good basic standard of occupational hygiene is implemented,Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures:

Technical conditions and measures at process level toprevent release	None
Technical conditions and measures to controldispersion from the source towards the worker	None.

Other risk management measures:

All,Contributing Scenario	No specific measures identified.	
CS114 - Bulk transfers from tote tanks and supply vessels	E52 - Transfer via enclosed lines,E39 - Clear transfer lines prior to de-coupling,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,Clear spills immediately	
CS45 - Filling/ preparation of equipment from drums or containers.	Use drum pumps or carefully pour from container,Avoid spillage when withdrawing pump,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS115 - Drilling mud (re-)formulation	E47 - Handle substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,Provide extract ventilation to points where emissions occur,Ensure the ventilation system is regularly maintained and tested.	
CS116 - Drill floor operations	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE27 - Wear suitable coveralls to prevent exposure to the skin,PPE28 - Wear rubber boots,PPE15 – Wear suitable gloves tested to EN374.	
CS117 - Operation of solids filtering equipment,With potential for aerosol generation,Elevated temperature	Provide extract ventilation to points where emissions occur,Local exhaust ventilation - efficiency of at least [%]: 90,PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Re-circulation of exhaust air is not recommended,Ensure the ventilation system is regularly maintained and tested.	
CS120 - Cleaning of solids filtering equipment	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Provide extract ventilation to points where emissions occur,Ensure the ventilation system is regularly maintained and tested.	

Treatment and disposal of filtered solids	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374,Provide extract ventilation to points where emissions occur,Ensure the ventilation system is regularly maintained and tested.	
CS2 - Process sampling	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
In line injection of process chemicals by fixed dose pumping	Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
Application of process chemicals by pouring from a jug into systems	PPE15 - Wear suitable gloves tested to EN374,PPE26 - Use suitable eye protection.	
Scale squeeze operations	PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E81 - Drain or remove substance from equipment prior to break-in or maintenance, PPE15 – Wear suitable gloves tested to EN374,PPE26 – Use suitable eye protection.	
General exposures (closed systems),Storage,CS56 - with sample collection	E84 - Store substance within a closed system,PPE26 - Use suitable eye protection,Additional good practice advice beyond the REACH CSA,Ensure dedicated sample points are provided,Avoid dip sampling.	

2.2 Contributing scenario controlling environmental exposure (ERC8d)

ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form	Liquid, vapour pressure < 0,5 kPa at STP.
Other product characteristics	Substance is a unique structure, Miscible with: Water, Practically non-toxic to aquatic species, Readily biodegradable, Low potential

Operational conditions

Amount used	Annual site tonnage (tons/year): 20,(660 kg/day)
Frequency and duration of use	Continuous process,30 days/year
Environmental factors not influenced by riskmanagement	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	No specific measures identified. Release fraction to air from process (initial releaseprior to RMM): 0.0005 Release fraction to wastewater from process (initial releaseprior to RMM): 0.07 Release fraction to soil from process (initial releaseprior to RMM): 0

Risk management measures:

Technical onsite conditions and measures to reduce orlimit discharges, air emissions and releases to soil	Soil emission controls are not applicable as there is no direct release to soil. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 87.4 Assumed on-site sewage treatment plant flow (m3/d): 2000
Organizational measures to prevent/limit release fromthe site	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases. A leak prevention plan is needed to prevent low level continual releases.
Conditions and measures related to sewage treatmentplant	Assumed domestic sewage treatment plant flow (m3/d): 2000 Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4
Conditions and measures related to external treatmentof waste for disposal	Dispose of waste product or used containers according to local regulations Estimated amount entering waste treatment no greater than 90% Suitable waste treatment,incineration,Removal Efficiency (total): 99.98% Suitable waste treatment,Aerobic biological treatment,Anaerobic biological treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recoveryof waste	Estimated amount entering waste treatment no greater than 0% Not applicable

3. Exposure estimation and reference to its source

3.1 Health

Information for contributing exposure scenario	
2.1	ECETOC TRA,Low,Vapour pressure

3.2 Environment

Information for contributing exposure scenario	
2.2	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1 Health

Guidance - 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 ManagementMeasures/Operational Conditions are adopted, then users should ensure that risks are managed to atleast equivalent levels.

4.2 Environment

Guidance - Environment	Not applicable for wide dispersive uses.