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

### 1.1. Product identifier


Product form	: Substance
Trade name/designation	: Toluene
Chemical name	: Toluene
EC-No.	: 203-625-9
CAS-No.	: 108-88-3
REACH registration No	: 01-2119471310-51-0049
Synonymes	: methylbenzene; toluol; phenylmethane
Product group	: Trade product

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

#### 1.2.1. Relevant identified uses

Main use category	: Industrial uses, Professional uses, Consumer use
Use of the substance/mixture	: Solvent
	Further information: see exposure scenarios attached to this safety data sheet.

Title	Use descriptors
Distribution (ES Ref.: 02)	SU3, SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7
Use as an intermediate (ES Ref.: 03)	SU3, SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, ERC6a
Use in cleaning agents (ES Ref.: 05)	SU3, SU10, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13, ERC4
Use as a fuel (ES Ref.: 07)	SU3, SU10, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ERC7
Uses in coatings (ES Ref.: 10)	SU3, SU10, PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15, ERC4
Use in oil and gas field drilling and production operations (ES Ref.: 13)	SU3, SU10, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, ERC4
Use as binders and release agents (ES Ref.: 14)	SU3, SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8b, PROC10, PROC13, PROC14, ERC4
Use as laboratory reagent (ES Ref.: 16)	SU3, SU10, PROC10, PROC15, ERC2, ERC4
Functional fluids (ES Ref.: 18)	SU3, SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, ERC7
Rubber production and processing (ES Ref.: 20)	SU3, SU8, SU9, SU10, PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC13, PROC14, PROC15, PROC21, ERC4, ERC6d
Formulation (ES Ref.: 21)	SU3, SU10, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, ERC2
Manufacture of substance (ES Ref.: 01)	SU3, SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, ERC1
Road and construction applications (ES Ref.: 04)	SU22, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, ERC8d, ERC8f
Use in cleaning agents (ES Ref.: 06)	SU22, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, ERC8a, ERC8d
Use as a fuel (ES Ref.: 08)	SU22, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ERC9a, ERC9b
Uses in coatings (ES Ref.: 11)	SU22, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19, ERC8a, ERC8d
Use as binders and release agents (ES Ref.: 15)	SU22, PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14, ERC8a, ERC8d

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Title	Use descriptors
Use as laboratory reagent (ES Ref.: 17)	SU22, PROC10, PROC15, ERC8a
Functional fluids (ES Ref.: 19)	SU22, PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20, ERC9a, ERC9b
Use as a fuel (ES Ref.: 09)	SU21, PC13, ERC9a, ERC9b
Uses in coatings (ES Ref.: 12)	SU21, PC1, PC4, PC5, PC8, PC9a, PC9b, PC9c, PC10, PC15, PC18, PC23, PC24, PC31, PC34, ERC8a, ERC8d

Full text of use descriptors: see section 16

### 1.2.2. Uses advised against

No data available

### 1.3. Details of the supplier of the safety data sheet

#### Supplier

NIS a.d. Novi Sad  
 Narodnog Fronta 12  
 21000 Novi Sad - Serbia  
 T + 381 (0) 21 481 1111  
[Dragana.Cvetkov@nis.eu](mailto:Dragana.Cvetkov@nis.eu) (REACH)

#### Only Representative

REACH Law Ltd.  
 Vänrikinkuja 3 JK 21  
 02600 Espoo - Finland  
 T +358(0) 9 412 3055 - F +358 (0) 9 412 3049  
[sds@reachlaw.fi](mailto:sds@reachlaw.fi)

#### Manufacturer

NIS a.d. Novi Sad  
 Narodnog Fronta 12  
 21000 Novi Sad - Serbia  
 T + 381 (0) 21 481 1111  
[Dragana.Cvetkov@nis.eu](mailto:Dragana.Cvetkov@nis.eu) (REACH)

### 1.4. Emergency telephone number

Emergency number : + 381 (0) 21 481 1111 (This telephone number is available during office hours only.)

Country	Official advisory body	Address	Emergency number
Ireland	National Poisons Information Centre Beaumont Hospital	Beaumont Hospital Beaumont Road 9 Dublin	+353 1 809 21 66 (public, 8am - 10pm, 7/7) +353 01 809 2566 (Professionals, 24/7)
United Kingdom	National Poisons Information Service (Newcastle Centre) Regional Drugs and Therapeutics Centre, Wolfson Unit	Claremont Place Newcastle-upon-Tyne NE1 4LP Newcastle	0844 892 0111 (UK only, 24/7, healthcare professionals only)


## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

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

Flam. Liq. 2 H225  
 Skin Irrit. 2 H315  
 Repr. 2 H361d  
 STOT SE 3 H336  
 STOT RE 2 H373  
 Asp. Tox. 1 H304

Full text of hazard classes and H-statements : see section 16

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## 2.2. Label elements

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

Hazard pictograms (CLP) :



Signal word :

Danger

Hazard statements (CLP) :

H225 - Highly flammable liquid and vapour.  
H304 - May be fatal if swallowed and enters airways.  
H315 - Causes skin irritation.  
H336 - May cause drowsiness or dizziness.  
H361d - Suspected of damaging the unborn child.  
H373 - May cause damage to organs through prolonged or repeated exposure.

Precautionary statements (CLP) :

P202 - Do not handle until all safety precautions have been read and understood.  
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.  
P280 - Wear protective gloves/protective clothing/eye protection/face protection.  
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER/doctor/.  
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P331 - Do NOT induce vomiting.

## 2.3. Other hazards

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

## SECTION 3: Composition/information on ingredients

### 3.1. Substances


Substance name : Toluene  
CAS-No. : 108-88-3  
EC-No. : 203-625-9

Substance name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Toluene	(CAS-No.) 108-88-3 (EC-No.) 203-625-9 (EC Index) 601-021-00-3	99,9 - 100	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361d STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304

Full text of H-statements: see section 16

### 3.2. Mixtures

Not applicable

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## 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. Never give anything by mouth to an unconscious person or a person with cramps. Show this safety data sheet to the doctor in attendance. Treat symptomatically. In case of doubt or persistent symptoms, consult always a physician.
Inhalation	: Keep at rest. Provide fresh air. Give oxygen or artificial respiration if necessary. Call a physician immediately.
Skin contact	: Wash with plenty of water/. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. If symptoms persist, call a physician.
Eyes contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical advice/attention.
Ingestion	: Do NOT induce vomiting. Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person or a person with cramps. Call a physician immediately.

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

Inhalation	: Harmful: danger of serious damage to health by prolonged exposure through inhalation. Vapours may cause drowsiness and dizziness. Cough. The following symptoms may occur: . sore throat. Unconsciousness . Headache. Nausea.
Skin contact	: Irritating to skin. The following symptoms may occur: Repeated exposure may cause skin dryness or cracking. erythema (redness).
Eyes contact	: Contact with eyes may cause irritation. The following symptoms may occur: erythema (redness). Pain .
Ingestion	: Harmful: may cause lung damage if swallowed.
Chronic symptoms	: Suspected of damaging the unborn child. May cause damage to organs through prolonged or repeated exposure (Inhalation).

### 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	: Water spray, Alcohol resistant foam, Carbon dioxide, Dry extinguishing powder.
Unsuitable extinguishing media	: Strong water jet.

### 5.2. Special hazards arising from the substance or mixture

Specific hazards	: Highly flammable liquid and vapour. Vapours are heavier than air and may spread along floors. Vapours may form explosive mixture with air. Vapours are heavier than air and may travel considerable distance to an ignition source and flash back to source of vapours. Container may explode if heated. Hazardous decomposition products Carbon oxides. Do not allow run-off from fire-fighting to enter drains or water courses.
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### 5.3. Advice for firefighters

Firefighting instructions	: Special protective equipment for firefighters. . In case of fire: Wear self-contained breathing apparatus. Use water spray or fog for cooling exposed containers. Evacuate personnel to a safe area.
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## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

#### 6.1.1. For non-emergency personnel

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

#### 6.1.2. For emergency responders

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.

### 6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Stop leak if safe to do so. Dam up. Take up liquid spill into absorbent material, e.g.: sand, earth, vermiculite or powdered limestone. Collect in closed and suitable containers for disposal. Dispose of contaminated materials in accordance with current regulations.

### 6.4. Reference to other sections

Concerning personal protective equipment to use, see section 8. Concerning disposal elimination after cleaning, see section 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Prevent unauthorised persons entering the zone. Provide adequate information, instruction and training for operators. Provide adequate ventilation. Use personal protective equipment as required. Concerning personal protective equipment to use, see section 8. Avoid contact with skin, eyes and clothing. Do not breathe vapour/aerosol. Take precautionary measures against static discharge. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use explosion-proof equipment. Ensure equipment is adequately earthed. Take any precaution to avoid mixing with combustibles/... See also section 10. Ensure proper process control to avoid excess waste discharge (temperature, concentration, pH, time). After use replace the closing cap immediately. Do not allow to enter into surface water or drains.

Hygiene measures

: Keep good industrial hygiene. When using do not eat, drink or smoke. Wash hands and face before breaks and immediately after handling of the product. Keep away from food, drink and animal feedingstuffs. Separate working clothes from town clothes. Take off contaminated clothing.

### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures

: Storage of flammable liquids. Keep container tightly closed in a cool, well-ventilated place. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Refer to the detailed list of incompatible materials in section 10 Stability/Reactivity.

Packaging materials

: Keep only in the original container.

### 7.3. Specific end use(s)

see attached exposure scenario.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Toluene (108-88-3)		
EU	IOELV TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>



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Toluene (108-88-3)		
EU	IOELV TWA (ppm)	50 ppm
EU	IOELV STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
EU	IOELV STEL (ppm)	100 ppm
Austria	MAK (mg/m <sup>3</sup> )	190 mg/m <sup>3</sup>
Austria	MAK (ppm)	50 ppm
Austria	MAK Short time value (mg/m <sup>3</sup> )	380 mg/m <sup>3</sup>
Austria	MAK Short time value (ppm)	100 ppm
Belgium	Limit value (mg/m <sup>3</sup> )	77 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	20 ppm
Belgium	Short time value (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Belgium	Short time value	100 ppm
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Bulgaria	OEL TWA (ppm)	50 ppm
Bulgaria	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Bulgaria	OEL STEL (ppm)	100 ppm
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (ppm)	50 ppm
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (ppm)	100 ppm
Cyprus	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Cyprus	OEL TWA (ppm)	50 ppm
Cyprus	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Cyprus	OEL STEL (ppm)	100 ppm
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	200 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	94 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (ppm)	25 ppm
Estonia	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Estonia	OEL TWA (ppm)	50 ppm
Estonia	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Estonia	OEL STEL (ppm)	100 ppm
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	81 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	25 ppm
Finland	HTP-arvo (15 min)	380 mg/m <sup>3</sup>
Finland	HTP-arvo (15 min) (ppm)	100 ppm
France	VME (mg/m <sup>3</sup> )	76,8 mg/m <sup>3</sup> (restrictive limit)
France	VME (ppm)	20 ppm (restrictive limit)
France	VLE (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup> (restrictive limit)
France	VLE (ppm)	100 ppm (restrictive limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	190 mg/m <sup>3</sup> (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)	50 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)



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<b>Toluene (108-88-3)</b>		
Germany	TRGS 903 (BGW)	600 µg/l Parameter: Toluene - Medium: whole blood - Sampling time: end of shift 1,5 mg/l Parameter: o-Cresol - Medium: urine - Sampling time: end of several shifts (after hydrolysis)
Gibraltar	8h mg/m <sup>3</sup>	192 mg/m <sup>3</sup>
Gibraltar	8h ppm	50 ppm
Gibraltar	Short-term mg/m <sup>3</sup>	384 mg/m <sup>3</sup>
Gibraltar	Short-term ppm	100 ppm
Greece	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Greece	OEL TWA (ppm)	50 ppm
Greece	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Greece	OEL STEL (ppm)	100 ppm
Hungary	AK-érték	190 mg/m <sup>3</sup>
Hungary	CK-érték	380 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (ppm)	50 ppm
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (ppm)	100 ppm
Italy	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Italy	OEL TWA (ppm)	50 ppm
Latvia	OEL TWA (mg/m <sup>3</sup> )	50 mg/m <sup>3</sup>
Latvia	OEL TWA (ppm)	14 ppm
Lithuania	IPRV (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Lithuania	IPRV (ppm)	50 ppm
Lithuania	TPRV (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Lithuania	TPRV (ppm)	100 ppm
Luxembourg	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Luxembourg	OEL TWA (ppm)	50 ppm
Luxembourg	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Luxembourg	OEL STEL (ppm)	100 ppm
Malta	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Malta	OEL TWA (ppm)	50 ppm
Malta	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Malta	OEL STEL (ppm)	100 ppm
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	150 mg/m <sup>3</sup>
Netherlands	Grenswaarde TGG 15MIN (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>
Poland	NDSch (mg/m <sup>3</sup> )	200 mg/m <sup>3</sup>
Portugal	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup> (indicative limit value)
Portugal	OEL TWA (ppm)	50 ppm (indicative limit value)
Portugal	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup> (indicative limit value)
Portugal	OEL STEL (ppm)	100 ppm (indicative limit value)
Romania	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Romania	OEL TWA (ppm)	50 ppm



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Toluene (108-88-3)		
Romania	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Romania	OEL STEL (ppm)	100 ppm
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (ppm)	50 ppm
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Slovenia	OEL TWA (ppm)	50 ppm
Slovenia	OEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Slovenia	OEL STEL (ppm)	100 ppm
Spain	VLA-ED (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup> (indicative limit value)
Spain	VLA-ED (ppm)	50 ppm (indicative limit value)
Spain	VLA-EC (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Spain	VLA-EC (ppm)	100 ppm
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (ppm)	50 ppm
Sweden	kortidsvärde (KTV) (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Sweden	kortidsvärde (KTV) (ppm)	100 ppm
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	191 mg/m <sup>3</sup>
United Kingdom	WEL TWA (ppm)	50 ppm
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
United Kingdom	WEL STEL (ppm)	100 ppm
Norway	Grenseverdier (AN) (mg/m <sup>3</sup> )	94 mg/m <sup>3</sup>
Norway	Grenseverdier (AN) (ppm)	25 ppm
Norway	Grenseverdier (Korttidsverdi) (mg/m <sup>3</sup> )	141 mg/m <sup>3</sup> (value calculated)
Norway	Grenseverdier (Korttidsverdi) (ppm)	37,5 ppm (value calculated)
Switzerland	MAK (mg/m <sup>3</sup> )	190 mg/m <sup>3</sup>
Switzerland	MAK (ppm)	50 ppm
Switzerland	KZGW (mg/m <sup>3</sup> )	760 mg/m <sup>3</sup>
Switzerland	KZGW (ppm)	200 ppm
Australia	TWA (mg/m <sup>3</sup> )	191 mg/m <sup>3</sup>
Australia	TWA (ppm)	50 ppm
Australia	STEL (mg/m <sup>3</sup> )	574 mg/m <sup>3</sup>
Australia	STEL (ppm)	150 ppm
Canada (Quebec)	VEMP (mg/m <sup>3</sup> )	188 mg/m <sup>3</sup>
Canada (Quebec)	VEMP (ppm)	50 ppm
USA - ACGIH	ACGIH TWA (ppm)	20 ppm
USA - IDLH	US IDLH (ppm)	500 ppm
USA - NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	375 mg/m <sup>3</sup>
USA - NIOSH	NIOSH REL (TWA) (ppm)	100 ppm
USA - NIOSH	NIOSH REL (STEL) (mg/m <sup>3</sup> )	560 mg/m <sup>3</sup>
USA - NIOSH	NIOSH REL (STEL) (ppm)	150 ppm
USA - OSHA	OSHA PEL (TWA) (ppm)	200 ppm
USA - OSHA	OSHA PEL (Ceiling) (ppm)	300 ppm





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### Toluene (108-88-3)

#### DNEL/DMEL (workers)

Acute - systemic effects, inhalation	384 mg/m <sup>3</sup>
Acute - local effects, inhalation	384 mg/m <sup>3</sup>
Long-term - systemic effects, dermal	384 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	192 mg/m <sup>3</sup>
Long-term - local effects, inhalation	192 mg/m <sup>3</sup>

#### DNEL/DMEL (general population)

Acute - systemic effects, inhalation	226 mg/kg bodyweight/day
Acute - local effects, inhalation	226 mg/m <sup>3</sup>
Long-term - systemic effects, oral	8,13 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	56,5 mg/m <sup>3</sup>
Long-term - systemic effects, dermal	226 mg/kg bodyweight/day

#### PNEC (water)

PNEC aqua (freshwater)	0,68 mg/l
PNEC aqua (marine water)	0,68
PNEC aqua (intermittent, freshwater)	0,68 mg/l
PNEC aqua (intermittent, marine water)	0,68 mg/l

#### PNEC (sediment)

PNEC sediment (freshwater)	16,39 mg/kg dwt
PNEC sediment (marine water)	16,39 mg/kg dwt

Additional information : Recommended monitoring procedures :. Personal monitoring. Concentration measurement in air


### 8.2. Exposure controls

- Engineering measure(s) : Closed system. Use with local exhaust ventilation. Take precautionary measures against static discharges. 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 : PVA (Polyvinyl alcohol) (EN 374). Breakthrough time : >360min. 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.
- Eye protection : Safety glasses (EN 166)
- Body protection : Wear chemical resistant apron.
- Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment. Full face mask (EN 136) (EN 136). Half-face mask (DIN EN 140) (EN 140). Filter type: A (EN 141). Use self-contained respiratory apparatus for rescue and maintenance work in storage vessels.
- Thermal hazard protection : Not required for normal conditions of use.
- Environmental exposure controls : Do not allow to enter into surface water or drains. Comply with applicable Community environmental protection legislation.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state : liquid

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Colour	: clear.
Odour	: characteristic.
Odour threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butylacetate=1)	: No data available
Melting / freezing point	: -95 °C
Freezing point	: No data available
Initial boiling point and boiling range	: 110,6 °C
Flash point	: 5 °C Closed cup
Auto-ignition temperature	: 480 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Not applicable, liquid
Vapour pressure	: 36 mmHg (20°C)
Vapour density	: 3,4 (Air=1)
Relative density	: 0,846 - 0,873 g/cm <sup>3</sup> (15°C)
Solubility	: Water: 573-587 mg/l (20°C)
Partition coefficient n-octanol/water	: 2,73
Kinematic viscosity	: No data available
Dynamic viscosity	: 0,56 mPa.s (25°C)
Explosive properties	: Not applicable. The study does not need to be conducted because there are no chemical groups associated with explosive properties present in the molecule.
Oxidising properties	: Not applicable. The classification procedure needs not to be applied because there are no chemical groups present in the molecule which are associated with oxidising properties.
Explosive limits	: 1,2 vol % 7 vol %

#### **9.2. Other information**

VOC content	: 100 %
Additional information	: Literary reference : CRC Handbook of Chemistry

### **SECTION 10: Stability and reactivity**

#### **10.1. Reactivity**

Highly flammable liquid and vapour. Reference to other sections: 10.5.

#### **10.2. Chemical stability**

The product is stable under storage at normal ambient temperatures.

#### **10.3. Possibility of hazardous reactions**

Vapours may form explosive mixture with air.

#### **10.4. Conditions to avoid**

Keep away from sources of heat (e.g. hot surfaces), sparks and open flames. See also section 7. Handling and storage.

#### **10.5. Incompatible materials**

oxidising substances. Strong acids. See also section 7. Handling and storage.

#### **10.6. Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. Reference to other sections: 5.2.

### **SECTION 11: Toxicological information**

#### **11.1. Information on toxicological effects**

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

### Toluene (108-88-3)

LD50/oral/rat &gt; 5000 mg/kg

LD50/dermal/rabbit &gt; 5000 mg/kg

LC50/inhalation/4h/rat &gt; 20 mg/l

Skin corrosion/irritation	: Causes skin irritation. Test Method EU B.4 pH: Not applicable
Serious eye damage/irritation	: Not classified (Based on available data, the classification criteria are not met.) 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.) NOAEC, Inhalation, Rat: 4522 mg/m <sup>3</sup>
Reproductive toxicity	: Suspected of damaging the unborn child. NOAEC, Inhalation, Rat: 2261 mg/m <sup>3</sup>
STOT-single exposure	: May cause drowsiness or dizziness.
STOT-repeated exposure	: May cause damage to organs through prolonged or repeated exposure. Inhalation of high vapour concentrations can cause CNS-depression and narcosis. OECD Test Guideline 453 Test Method EU B.29
Aspiration hazard	: May be fatal if swallowed and enters airways.
Other information	: Symptoms related to the physical, chemical and toxicological characteristics : Reference to other sections: 4.2.

## SECTION 12: Ecological information

### 12.1. Toxicity

Environmental properties : Ecological injuries are not known or expected under normal use.

### Toluene (108-88-3)

LC50 fish 1	5,5 mg/l (96h)
LC50 other aquatic organisms 1	3,78 mg/l after 2 days
ErC50 (algae)	134 mg/l
NOEC chronic fish	1,4 mg/l
NOEC chronic algae	10 mg/l
NOEC (additional information)	NOEC Invertebrates. 7 days 0.74 mg/l

### 12.2. Persistence and degradability

### Toluene (108-88-3)

Persistence and degradability Readily biodegradable.

### 12.3. Bioaccumulative potential


### Toluene (108-88-3)

Partition coefficient n-octanol/water 2,73

### 12.4. Mobility in soil

### Toluene (108-88-3)

Ecology - soil No data available.

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**12.5. Results of PBT and vPvB assessment**

<b>Toluene (108-88-3)</b>
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. Handling and storage. Collect and dispose of waste product at an authorised disposal facility. Refer to manufacturer/supplier for information on recovery/recycling. Dispose of contaminated materials in accordance with current regulations.

Additional information : Never use pressure to empty container. Do not burn, or use a cutting torch on, the empty drum. Empty pressure vessels should be returned to the supplier. Refer to manufacturer/supplier for information on recovery/recycling. Dispose of contaminated materials in accordance with current regulations.

European waste catalogue (2001/573/EC, 75/442/EEC, 91/689/EEC) : Classified as hazardous waste according to European Union regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.  
The following Waste Codes are only suggestions:  
20 01 13\*

**SECTION 14: Transport information**


In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	ADN	RID
<b>14.1. UN number</b>				
1294	1294	1294	1294	1294
<b>14.2. UN proper shipping name</b>				
TOLUENE	TOLUENE	Toluene	TOLUENE	TOLUENE
<b>Transport document description</b>				
UN 1294 TOLUENE, 3, II, (D/E)	UN 1294 TOLUENE, 3, II	UN 1294 Toluene, 3, II	UN 1294 TOLUENE, 3, II	UN 1294 TOLUENE, 3, II
<b>14.3. Transport hazard class(es)</b>				
3	3	3	3	3
				
<b>14.4. Packing group</b>				
II	II	II	II	II
<b>14.5. Environmental hazards</b>				
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No	Dangerous for the environment : No	Dangerous for the environment : No
ADN : N3				

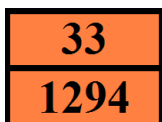
**14.6. Special precautions for user**

**- Overland transport**

Classification code (ADR) : F1  
 Limited quantities (ADR) : 11

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Excepted quantities (ADR) : E2  
 Packing instructions (ADR) : P001, IBC02, R001  
 Mixed packing provisions (ADR) : MP19  
 Portable tank and bulk container instructions (ADR) : T4  
 Portable tank and bulk container special provisions (ADR) : TP1  
 Tank code (ADR) : LGBF  
 Vehicle for tank carriage : FL  
 Transport category (ADR) : 2  
 Special provisions for carriage - Operation (ADR) : S2, S20  
 Hazard identification number (Kemler No.) : 33  
 Orange plates :



Tunnel restriction code : D/E  
 EAC code : 3YE

**- Transport by sea**


Limited quantities (IMDG) : 1 L  
 Excepted quantities (IMDG) : E2  
 Packing instructions (IMDG) : P001  
 IBC packing instructions (IMDG) : IBC02  
 Tank instructions (IMDG) : T4  
 Tank special provisions (IMDG) : TP1  
 EmS-No. (Fire) : F-E  
 EmS-No. (Spillage) : S-D  
 Stowage category (IMDG) : B  
 Flash point (IMDG) : 7 °C c.c.  
 Properties and observations (IMDG) : Colourless liquid with a benzene-like odour. Flashpoint: 7°C c.c. Explosive limits: 1.27% to 7% Immiscible with water.

**- Air transport**

PCA Excepted quantities (IATA) : E2  
 PCA Limited quantities (IATA) : Y341  
 PCA limited quantity max net quantity (IATA) : 1L  
 PCA packing instructions (IATA) : 353  
 PCA max net quantity (IATA) : 5L  
 CAO packing instructions (IATA) : 364  
 CAO max net quantity (IATA) : 60L  
 ERG code (IATA) : 3L

**- Inland waterway transport**

Classification code (ADN) : F1  
 Limited quantities (ADN) : 1 L  
 Excepted quantities (ADN) : E2  
 Carriage permitted (ADN) : T  
 Equipment required (ADN) : PP, EX, A

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Ventilation (ADN) : VE01

Number of blue cones/lights (ADN) : 1

**- Rail transport**

Classification code (RID) : F1

Limited quantities (RID) : 1L

Excepted quantities (RID) : E2

Packing instructions (RID) : P001, IBC02, R001

Mixed packing provisions (RID) : MP19

Portable tank and bulk container instructions (RID) : T4

Portable tank and bulk container special provisions (RID) : TP1

Tank codes for RID tanks (RID) : LGBF

Transport category (RID) : 2

Colis express (express parcels) (RID) : CE7

Hazard identification number (RID) : 33

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

Code: IBC : Pollution category : Y. Product name : TOLUENE. Ship type : 3.

**SECTION 15: Regulatory information**

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

**15.1.1. 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	Toluene - Toluene
3(a) Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F	Toluene - Toluene
3(b) Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10	Toluene - Toluene
40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.	Toluene - Toluene
48. Toluene	Toluene - Toluene

Toluene is not on the REACH Candidate List


Toluene is not on the REACH Annex XIV List

VOC content : 100 %

**15.1.2. National regulations**

**Germany**

VwVwS Annex reference : Water hazard class (WGK) 2, hazard to waters (Classification according to VwVwS, Annex 1 or 2; ID No. 194)

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

#### Netherlands

Waterbezwaarlijkheid : 1 - Black list substance  
 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 : Toluene is listed

#### Denmark

Class for fire hazard : Class I-1  
 Store unit : 1 liter  
 Classification remarks : F <Flam. Liq. 2>; Emergency management guidelines for the storage of flammable liquids must be followed  
 Recommendations Danish Regulation : Young people below the age of 18 years are not allowed to use the product  
 Pregnant/breastfeeding women working with the product must not be in direct contact with the product

#### 15.2. Chemical safety assessment

For this substance a chemical safety assessment has been carried out

### SECTION 16: Other information

Abbreviations and acronyms:

	DNEL = Derived No Effect Level
	DMEL = Derived Minimal Effect level
	PNEC = Predicted No Effect Concentration
	OEL-STEL = Occupational Exposure Limits - Short Term Exposure Limits (STELs)
	TWA = time weighted average
	LC50 = Median lethal concentration
	LD50 = Median lethal dose
	LL50 = Median lethal level
	EC50 = Median Effective Concentration
	EL50 = Median effective level
	ErC50 = EC50 in terms of reduction of growth rate
	ErL50 = EL50 in terms of reduction of growth rate
	NOEL = no-observed-effect level
	NOEC = No observed effect concentration
	NOELR = No observed effect loading rate
	NOAEC = No observed adverse effect concentration
	NOAEL = No observed adverse effect level
	EWC = European waste catalogue
	NA = Not applicable
	N.O.S. = Not Otherwise Specified
	VOC = Volatile organic compounds



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	mg/kg BW = mg/kg bodyweight
	QSAR = Quantitative structure-activity relationship (QSAR)
	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
	WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water Management Act)
	ABM = Algemene beoordelingsmethodiek

Sources of key data used to compile the datasheet : European Chemicals Bureau, CSR.

Full text of H- and EUH-statements:

Asp. Tox. 1	Aspiration hazard, Category 1
Flam. Liq. 2	Flammable liquids, Category 2
Repr. 2	Reproductive toxicity, Hazard Category 2
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC3	Formulation in materials
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC6c	Industrial use of monomers for manufacture of thermo-plastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7	Industrial use of substances in closed systems
ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
ERC8f	Wide dispersive outdoor use resulting in inclusion into or onto a matrix
ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
PC1	Adhesives, sealants
PC10	Building and construction mixtures not covered elsewhere
PC13	Fuels
PC15	Non-metal-surface treatment products
PC18	Ink and Toners
PC23	Leather tanning, dye, finishing, impregnation and care products
PC24	Lubricants, Greases and Release Products
PC31	Polishes and Wax Blends
PC34	Textile dyes, finishing and impregnating products; including bleaches and other processing aids
PC4	Anti-Freeze and De-icing products
PC5	Artists Supply and Hobby mixtures
PC8	Biocidal products (e.g. Disinfectants, pest control)





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PC9a	Coatings and paints, thinners, paint removers
PC9b	Fillers, putties, plasters, modelling clay
PC9c	Finger paints
PROC1	Use in closed process, no likelihood of exposure
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected
PROC19	Hand-mixing with intimate contact and only PPE available
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC20	Heat and pressure transfer fluids in dispersive use but closed systems
PROC21	Low energy manipulation of substances bound in materials and/or articles
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)
PROC6	Calendering operations
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 preparation into small containers (dedicated filling line, including weighing)
SU10	Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
SU21	Consumer uses: Private households (= general public = consumers)
SU22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
SU3	Industrial uses: Uses of substances as such or in preparations* at industrial sites
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU9	Manufacture of fine chemicals

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
Distribution	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15		ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7	
Use as an intermediate	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15		ERC6a	
Road and construction applications	SU22		PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13		ERC8d, ERC8f	
Use in cleaning agents	SU3, SU10		PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13		ERC4	
Use in cleaning agents	SU22		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13		ERC8a, ERC8d	
Use as a fuel	SU3, SU10		PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16		ERC7	
Use as a fuel	SU22		PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16		ERC9a, ERC9b	



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Use as a fuel	SU21	PC13			ERC9a, ERC9b	
Uses in coatings	SU3, SU10		PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15		ERC4	
Uses in coatings	SU22		PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19		ERC8a, ERC8d	
Uses in coatings	SU21	PC1, PC4, PC5, PC8, PC9a, PC9b, PC9c, PC10, PC15, PC18, PC23, PC24, PC31, PC34			ERC8a, ERC8d	
Use in oil and gas field drilling and production operations	SU3, SU10		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b		ERC4	
Use as binders and release agents	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8b, PROC10, PROC13, PROC14		ERC4	
Use as binders and release agents	SU22		PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14		ERC8a, ERC8d	
Use as laboratory reagent	SU3, SU10		PROC10, PROC15		ERC2, ERC4	



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Use as laboratory reagent	SU22		PROC10, PROC15		ERC8a	
Functional fluids	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9		ERC7	
Functional fluids	SU22		PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20		ERC9a, ERC9b	
Rubber production and processing	SU3, SU8, SU9, SU10		PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC13, PROC14, PROC15, PROC21		ERC4, ERC6d	
Formulation	SU3, SU10		PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15		ERC2	
Manufacture of substance	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15		ERC1	

### 1. Exposure scenario 02

#### Distribution

ES Ref.: 02  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 SU3, SU8, SU9 ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7
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,



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	distribution and associated laboratory activities. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

## 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 preparation into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

#### Other risk management measures:

General exposures (closed systems), CS56 - with sample collection, CS137 - With occasional controlled exposure.	No specific measures identified.
General exposures (closed systems), CS37 - Use in contained batch processes	No specific measures identified.
CS16 - General exposures (open systems), CS55 - Batch process, CS56 - with sample collection	No specific measures identified.
CS2 - Process sampling	No specific measures identified.
CS36 - Laboratory activities	No specific measures identified.
CS14 - Bulk transfers, CS107 - (closed systems)	No specific measures identified.
CS14 - Bulk transfers, CS108 - (open systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, Operate activity away from sources of substance emission or release, alternatively: G16 - If technical measures not practical: PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS6 - Drum and small package filling	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS39 - Equipment cleaning and maintenance	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, PPE21 - Wear suitable respiratory protection (conforming to

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	EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.	
Storage, CS137 - With occasional controlled exposure.	Drain down and flush system prior to equipment break-in or maintenance.	
Storage	No specific measures identified.	

**2.2 Contributing scenario controlling environmental exposure (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7)**

ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC3	Formulation in materials
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC6c	Industrial use of monomers for manufacture of thermo-plastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7	Industrial use of substances in closed systems
Assessment method	Used EUSES model 2.1.1

**Product characteristics**

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable


**Operational conditions**

Amount used	Annual amount used in the EU	3000000 t/yr
	Regional use tonnage (tons/year):	300000
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
	Environmental factors not influenced by risk management	
Other given operational conditions affecting environmental exposure	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,0001
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from process (initial release prior to RMM):	0,00001

**Risk management measures**

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 90
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m³/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

**3. Exposure estimation and reference to its source**

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### 3.1. Health

Information for contributing exposure scenario	
2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 03

#### Use as an intermediate

ES Ref.: 03
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 SU3, SU8, SU9 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. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

### 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	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

##### Other risk management measures:

General exposures (closed systems)	No specific measures identified.
General exposures (closed systems), CS56 - with sample collection, CS137 - With occasional controlled exposure.	No specific measures identified.
General exposures (closed systems), CS37 - Use in contained batch processes	No specific measures identified.
CS16 - General exposures (open systems), CS55 - Batch process, CS56 - with sample collection	No specific measures identified.
CS2 - Process sampling	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS36 - Laboratory activities	No specific measures identified.
CS14 - Bulk transfers, CS108 - (open systems), With	Provide a good standard of general ventilation (not





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potential for aerosol generation	less than 3 to 5 air changes per hour),or,Operate activity away from sources of substance emission or release,, alternatively:G16 - If technical measures not practical:PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.	
CS14 - Bulk transfers,CS107 - (closed systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),or,Operate activity away from sources of substance emission or release,, alternatively:G16 - If technical measures not practical:PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.	
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance.	
Storage,CS137 - With occasional controlled exposure.	No specific measures identified.	

### 2.2 Contributing scenario controlling environmental exposure (ERC6a)

ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Assessment method	Used EUSES model 2.1.1

#### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable


#### Operational conditions

Amount used	Annual amount used in the EU	120000 t/yr
	Regional use tonnage (tons/year):	12000
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,002
	Release fraction to wastewater from process (initial release prior to RMM):	0,003
	Release fraction to soil from process (initial release prior to RMM):	0,001

#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 80
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
	Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	This substance is consumed during use and no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated.	

### 3. Exposure estimation and reference to its source

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### 3.1. Health

Information for contributing exposure scenario	
2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

### 4.1. Health

Guidance - Health	Not applicable
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### 4.2. Environment

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 04

#### Road and construction applications

ES Ref.: 04
ES Type: Worker

Use descriptors	PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13 SU22 ERC8d, ERC8f
Processes, tasks activities covered	Application of surface coatings and binders in road and construction activities, including paving uses, manual mastic and in the application of roofing and water-proofing membranes. Professional use
Assessment method	Used ECETOC TRA model Used EUSES model

### 2. Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling worker exposure (PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13)

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 preparation 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

#### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

CS8 - Drum/batch transfers, CS82 - Non-dedicated facility	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour), or, G16 - If technical measures not practical: PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS8 - Drum/batch transfers, CS81 - Dedicated facility	Ensure material transfers are under containment or extract ventilation, or, G16 - If technical measures not practical: PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS34 - Manual, Roller application or brushing	Ensure operation is undertaken outdoors.
CS25 - Spraying/ fogging by machine application	Ensure operation is undertaken outdoors, Wear a respirator conforming to EN140 with Type A filter or better.
CS4 - Dipping, immersion and pouring	Ensure operation is undertaken outdoors.

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CS39 - Equipment cleaning and maintenance	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour), Retain drain downs in sealed storage pending disposal or for subsequent recycle.	
Storage	No specific measures identified.	
Storage, CS137 - With occasional controlled exposure.	No specific measures identified.	

**2.2 Contributing scenario controlling environmental exposure (ERC8d, ERC8f)**

ERC8d	Wide dispersive outdoor use of processing aids in open systems
ERC8f	Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Assessment method	Used EUSES model 2.1.1

**Product characteristics**

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

**Operational conditions**

Amount used	Annual amount used in the EU	30000 t/yr
	Regional use tonnage (tons/year):	3000
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,95
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release prior to RMM):	0,04

**Risk management measures**

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**3.2. Environment**

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational

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Conditions outlined in Section 2 are implemented,Used EUSES model
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**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

**4.1. Health**

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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## 1. Exposure scenario 05

### Use in cleaning agents

ES Ref.: 05 ES Type: Worker
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Use descriptors	PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13 SU3, SU10 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	Used ECETOC TRA model Used EUSES model

## 2. Operational conditions and risk management measures

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

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	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

Other risk management measures:

CS14 - Bulk transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS93 - Automated process with (semi) closed systems, CS38 - Use in contained systems	No specific measures identified.
CS93 - Automated process with (semi) closed systems, CS38 - Use in contained systems, CS8 - Drum/batch transfers	No specific measures identified.
CS101 - Application of cleaning products in closed systems	No specific measures identified.
CS45 - Filling/ preparation of equipment from drums or containers, CS81 - Dedicated facility	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, G16 - If technical measures not practical: PPE21 - Wear suitable respiratory protection (conforming to EN140



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	with Type A filter or better) and gloves (type EN374) if regular skin contact likely.	
CS37 - Use in contained batch processes, Treatment by heating	Provide extract ventilation to points where emissions occur	
CS41 - Degreasing small objects in cleaning station	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS42 - Cleaning with low-pressure washers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS44 - Cleaning with high pressure washers	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour), OC17 - Limit the substance content in the product to 5 %.	
CS34 - Manual, CS48 - Surfaces, CS47 - Cleaning, CS60 - no spraying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance.	
Storage, CS137 - With occasional controlled exposure.	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
Assessment method	Used EUSES model 2.1.1

#### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable


#### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,3
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0

#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 70
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
	Soil emission controls are not applicable as there is no direct release to soil.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m³/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

### 3. Exposure estimation and reference to its source

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### 3.1. Health

Information for contributing exposure scenario	
2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model

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


### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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## 1. Exposure scenario 06

### Use in cleaning agents

ES Ref.: 06 ES Type: Worker
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Use descriptors	PROC1, PROC2, PROC3, 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	Used ECETOC TRA model Used EUSES model

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, 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
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring

### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

#### Other risk management measures:

CS45 - Filling/ preparation of equipment from drums or containers, CS81 - Dedicated facility	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
CS93 - Automated process with (semi) closed systems, CS38 - Use in contained systems	No specific measures identified.
CS93 - Automated process with (semi) closed systems, CS38 - Use in contained systems, CS8 - Drum/batch transfers	No specific measures identified.
CS76 - Semi Automated process. (e.g.: Semi automatic application of floor care and maintenance products)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS45 - Filling/ preparation of equipment from drums or	Ensure operation is undertaken outdoors, Avoid



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containers,outdoor	carrying out operation for more than 4 hours.	
CS34 - Manual,CS47 - Cleaning,CS48 - Surfaces,CS4 - Dipping, immersion and pouring	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS42 - Cleaning with low-pressure washers,CS51 - Rolling, Brushing,CS60 - no spraying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Wear a respirator conforming to EN140 with Type A filter or better.	
CS44 - Cleaning with high pressure washers,CS10 - Spraying,indoor	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Wear a respirator conforming to EN140 with Type A filter or better.	
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.	
CS34 - Manual,CS48 - Surfaces,CS47 - Cleaning,CS10 - Spraying	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.	
CS27 - Ad hoc manual application via trigger sprays, dipping, etc,CS51 - Rolling, Brushing	Provide extract ventilation to points where emissions occur	
CS27 - Ad hoc manual application via trigger sprays, dipping, etc,CS51 - Rolling, Brushing	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),Wear a respirator conforming to EN140 with Type A filter or better.	
CS101 - Application of cleaning products in closed systems,outdoor	Ensure operation is undertaken outdoors.	
CS74 - Cleaning of medical devices	Provide extract ventilation to points where emissions occur	
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance.	
Storage,CS137 - With occasional controlled exposure.	No specific measures identified.	

### 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
Assessment method	Used EUSES model 2.1.1

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,02
	Release fraction to wastewater from process (initial release prior to RMM):	0,000001
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3



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	Soil emission controls are not applicable as there is no direct release to soil.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
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#### 3.2. Environment

Information for contributing exposure scenario

2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model
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### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 07

#### Use as a fuel

ES Ref.: 07
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16 SU3, SU10 ERC7
Processes, tasks activities covered	Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

### 2. Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)

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
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

#### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

CS14 - Bulk transfers	No specific measures identified.
CS8 - Drum/batch transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
General exposures (closed systems)	No specific measures identified.
General exposures (closed systems), CS137 - With occasional controlled exposure.	No specific measures identified.
General exposures (closed systems), CS55 - Batch process	No specific measures identified.
CS16 - General exposures (open systems), CS107 - (closed systems)	No specific measures identified.
CS16 - General exposures (open systems), CS107 - (closed systems), CS55 - Batch process	No specific measures identified.
CS5 - Equipment maintenance	Drain down and flush system prior to equipment break-in or maintenance, PPE27 - Wear suitable coveralls to prevent exposure to the skin.
CS103 - Vessel and container cleaning	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

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Storage	No specific measures identified.
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## 2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems
Assessment method	Used EUSES model 2.1.1

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	150000 t/yr
	Regional use tonnage (tons/year):	15000
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,0025
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 95
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
	Soil emission controls are not applicable as there is no direct release to soil.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	This substance is consumed during use and no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated.	

## 3. Exposure estimation and reference to its source

### 3.1. Health

Information for contributing exposure scenario	
2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model

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

### 4.1. Health

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

### 4.2. Environment

Guidance - Environment

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

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## 1. Exposure scenario 08

### Use as a fuel

ES Ref.: 08 ES Type: Worker
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Use descriptors	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16 SU22 ERC9a, ERC9b
Processes, tasks activities covered	Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste. Professional use
Assessment method	Used ECETOC TRA model Used EUSES model

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)

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
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

Other risk management measures:

CS14 - Bulk transfers	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
CS8 - Drum/batch transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS4 - Dipping, immersion and pouring	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
General exposures (closed systems)	No specific measures identified.
General exposures (closed systems), CS137 - With occasional controlled exposure.	No specific measures identified.
CS16 - General exposures (open systems), CS107 - (closed systems)	E47 - Handle substance within a closed system, No specific measures identified.
CS16 - General exposures (open systems), CS107 - (closed systems), CS55 - Batch process	No specific measures identified.
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance.
CS103 - Vessel and container cleaning	Drain down and flush system prior to equipment opening or maintenance.

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Storage	E84 - Store substance within a closed system.
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**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
Assessment method	Used EUSES model 2.1.1

**Product characteristics**

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

**Operational conditions**

Amount used	Annual amount used in the EU	150000 t/yr
	Regional use tonnage (tons/year):	15000
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from process (initial release prior to RMM):	0,00001

**Risk management measures**

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	This substance is consumed during use and no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated.	

**3. Exposure estimation and reference to its source**

**3.1. Health**

Information for contributing exposure scenario	
2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**3.2. Environment**

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model

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

**4.1. Health**

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 09

#### Use as a fuel

ES Ref.: 09  
ES Type: Consumer

Use descriptors	PC13 SU21 ERC9a, ERC9b
Processes, tasks activities covered	Covers consumer uses in liquid fuels. Consumer use
Assessment method	Used ECETOC TRA model Used EUSES model

### 2. Operational conditions and risk management measures

#### 2.1 Contributing scenario consumer end-use (PC13)

PC13	Fuels
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#### Product characteristics

Physical form	liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	30,89 hPa

#### Operational conditions

Amount used	Unless otherwise stated,Covers use up to 37500g,Covers skin contact area up to 420 cm2	
Frequency and duration of use	Unless otherwise stated,Covers use up to	0,143 Uses per day
	Covers exposure up to	2 Hours/event
Other given operational conditions affecting workers exposure	Unless otherwise stated,Covers use at ambient temperatures.	
	Covers use in room size of 20 m3	
	Covers use under typical household ventilation.	
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use at ambient temperatures.	
	Covers use in room size of 20 m3	
	Covers use under typical household ventilation.	
	Fuels,Liquid: Automotive Refuelling	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 52. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 210 cm2. For each use event, covers use amounts up to: 37500 g. Covers outdoor use. Covers use in room size of 100 m3. Covers exposure up to 0,05. Hours/event
	Fuels,Liquid Scooter Refuelling	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 52. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 210 cm2. For each use event, covers use amounts up to: 3750 g. Covers outdoor use. Covers use in room size of 100 m3. Covers exposure up to 0,03. Hours/event



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	Fuels,Liquid, Garden equipment - Use	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 26. days/year. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 750 g. Covers outdoor use. Covers use in room size of 100 m3. Covers exposure up to 2,00. Hours/event
	Fuels,Liquid: Garden equipment - Refuelling	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 26. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 420 cm2. For each use event, covers use amounts up to: 750 g. Covers use in a one car garage (34m <sup>3</sup> ) under typical ventilation. Covers use in room size of 34m3. Covers exposure up to 0,03. Hours/event
	Fuels,Liquid: Lamp oil	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 52. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 210 cm2. For each use event, covers use amounts up to: 100 g. Covers use in room size of 20 m3. Covers exposure up to 0,01. Hours/event

### Risk management measures

Other risk management measures:

Fuels,Liquid: Automotive Refuelling	No specific risk management measure identified beyond those operational conditions stated.	
Fuels,Liquid Scooter Refuelling	No specific risk management measure identified beyond those operational conditions stated.	
Fuels,Liquid, Garden equipment - Use	No specific risk management measure identified beyond those operational conditions stated.	
Fuels,Liquid: Garden equipment - Refuelling	No specific risk management measure identified beyond those operational conditions stated.	
Fuels,Liquid: Lamp oil	No specific risk management measure identified beyond those operational conditions stated.	

### 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
Assessment method	Used EUSES model 2.1.1

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	150000 t/yr
	Regional use tonnage (tons/year):	15000
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk	Local freshwater dilution factor:	10

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management	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from wide dispersive use (regional only):	0,00001

#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
	Soil emission controls are not applicable as there is no direct release to soil.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils, Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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## 1. Exposure scenario 10

### Uses in coatings

ES Ref.: 10
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15 SU3, SU10 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, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, 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)
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
PROC15	Use as laboratory reagent

### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

Other risk management measures:

General exposures (closed systems)	No specific measures identified.
General exposures (closed systems), CS56 - with sample collection, CS38 - Use in contained systems	No specific measures identified.
Film formation - force drying (50-100°C). Stoving (>100°C). UV/EB radiation curing	No specific measures identified.
CS29 - Mixing operations (closed systems), General	No specific measures identified.



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exposures (closed systems)		
Film formation - air drying	No specific measures identified.	
Preparation of material for application,CS30 - Mixing operations (open systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
Spraying (automatic/robotic)	E57 - Carry out in a vented booth or extracted enclosure.	
CS34 - Manual,CS10 - Spraying	E57 - Carry out in a vented booth or extracted enclosure,or,Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour),Wear a respirator conforming to EN140 with Type A filter or better.	
CS3 - Material transfers,CS82 - Non-dedicated facility	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS3 - Material transfers,CS81 - Dedicated facility	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
Roller, spreader, flow application	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS4 - Dipping, immersion and pouring	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS36 - Laboratory activities	No specific measures identified.	
CS3 - Material transfers,CS8 - Drum/batch transfers,CS22 - Transfer from/pouring from containers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance.	
Storage,CS137 - With occasional controlled exposure.	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
Assessment method	Used EUSES model 2.1.1

### Product characteristics


Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	45000 t/yr
	Regional use tonnage (tons/year):	4500
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,98
	Release fraction to wastewater from process (initial release prior to RMM):	0,007
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 90
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
	Soil emission controls are not applicable as there is no direct release to soil.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment	Estimated substance removal from wastewater via	93,3

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plant	domestic sewage treatment (%):	
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 11

#### Uses in coatings

ES Ref.: 11
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, 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	Used ECETOC TRA model Used EUSES model

### 2. Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, 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 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
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	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

General exposures (closed systems)	No specific measures identified.
CS45 - Filling/ preparation of equipment from drums or containers.	No specific measures identified.
General exposures (closed systems), CS38 - Use in contained systems	No specific measures identified.





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Preparation of material for application	No specific measures identified.
Film formation - air drying,outdoor	Ensure operation is undertaken outdoors.
Film formation - air drying,indoor	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Preparation of material for application,indoor	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Preparation of material for application	Ensure operation is undertaken outdoors,Avoid carrying out activities involving exposure for more than 4 hours.
CS3 - Material transfers,CS8 - Drum/batch transfers	Use drum pumps or carefully pour from container.
CS3 - Material transfers,CS8 - Drum/batch transfers	Use drum pumps or carefully pour from container,Use container to collect drips
Roller, spreader, flow application,indoor	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Roller, spreader, flow application,outdoor	Ensure operation is undertaken outdoors,Wear a respirator conforming to EN140 with Type A filter or better.
CS34 - Manual,CS10 - Spraying,indoor	E57 - Carry out in a vented booth or extracted enclosure.
CS34 - Manual,CS10 - Spraying,outdoor	Ensure operation is undertaken outdoors,Wear a respirator conforming to EN140 with Type A filter or better.
CS4 - Dipping, immersion and pouring,indoor	Provide extract ventilation to points where emissions occur
CS4 - Dipping, immersion and pouring,outdoor	Ensure operation is undertaken outdoors,PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS36 - Laboratory activities	No specific measures identified.
CS72 - Hand application - fingerpaints, pastels, adhesives,indoor	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour),Ensure doors and windows are opened.
CS72 - Hand application - fingerpaints, pastels, adhesives,outdoor	Ensure operation is undertaken outdoors,PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance.
Storage,CS137 - With occasional controlled exposure.	No specific measures identified.

### 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
Assessment method	Used EUSES model 2.1.1

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	150000 t/yr
	Regional use tonnage (tons/year):	15000
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,98
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release	0,01

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	prior to RMM):	
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#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model

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

#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 12

#### Uses in coatings

ES Ref.: 12

ES Type: Consumer

Use descriptors	PC1, PC4, PC5, PC8, PC9a, PC9b, PC9c, PC10, PC15, PC18, PC23, PC24, PC31, PC34 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	Used ECETOC TRA model Used EUSES model

### 2. Operational conditions and risk management measures

#### 2.1 Contributing scenario consumer end-use (PC1, PC4, PC5, PC8, PC9a, PC9b, PC9c, PC10, PC15, PC18, PC23, PC24, PC31, PC34)

PC1	Adhesives, sealants
PC4	Anti-Freeze and De-icing products
PC5	Artists Supply and Hobby mixtures
PC8	Biocidal products (e.g. Disinfectants, pest control)
PC9a	Coatings and paints, thinners, paint removers
PC9b	Fillers, putties, plasters, modelling clay
PC9c	Finger paints
PC10	Building and construction mixtures not covered elsewhere
PC15	Non-metal-surface treatment products
PC18	Ink and Toners
PC23	Leather tanning, dye, finishing, impregnation and care products
PC24	Lubricants, Greases and Release Products
PC31	Polishes and Wax Blends
PC34	Textile dyes, finishing and impregnating products; including bleaches and other processing aids

#### Product characteristics

Physical form	liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	30,89 hPa

#### Operational conditions

Amount used	Unless otherwise stated,Covers use up to 13800g,Covers skin contact area up to 857,5 cm2	
Frequency and duration of use	Unless otherwise stated,Covers use up to	1 Uses per day
	Covers exposure up to	6 Hours/event
Other given operational conditions affecting workers exposure	Unless otherwise stated,Covers use at ambient temperatures.	
	Covers use in room size of 20 m3	
	Covers use under typical household ventilation.	
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use at ambient temperatures.	
	Covers use in room size of 20 m3	
	Covers use under typical household ventilation.	
	Anti-Freeze and De-icing products,Washing car window	Unless otherwise stated. Covers concentrations up to 1%. Covers use up to 365. days/year. covers use up to 1



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		time/on day of use. For each use event, covers use amounts up to: 0,5 g. Covers use in a one car garage (34m <sup>3</sup> ) under typical ventilation. Covers use in room size of 34 m3. Covers exposure up to 0,02. Hours/event
	Anti-Freeze and De-icing products,Pouring into radiator	Unless otherwise stated. Covers concentrations up to 10%. Covers use up to 365. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 428 cm2. For each use event, covers use amounts up to: 2000 g . Covers use in a one car garage (34m <sup>3</sup> ) under typical ventilation. Covers use in room size of 34 m3. Covers exposure up to 0,17. Hours/event
	Anti-Freeze and De-icing products,Lock de-icer	Unless otherwise stated. Covers concentrations up to 50%. Covers use up to 365. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 214,40 cm2 . For each use event, covers use amounts up to: 4 g . Covers use in a one car garage (34m <sup>3</sup> ) under typical ventilation. Covers use in room size of 34 m3. Covers exposure up to 0,25. Hours/event
	Biocidal products (e.g. Disinfectants, pest control),Laundry and dish washing products	Unless otherwise stated. Covers concentrations up to 5%. Covers use up to 365. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 857,50 cm2 . For each use event, covers use amounts up to: 15 g. Covers use in room size of 20 m3. Covers exposure up to 0,5. Hours/event
	Biocidal products (e.g. Disinfectants, pest control),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 128. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 857,50 cm2 . For each use event, covers use amounts up to: 27 g . Covers use in room size of 20 m3. Covers exposure up to 0,33. Hours/event
	Biocidal products (e.g. Disinfectants, pest control),Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)	Unless otherwise stated. Covers concentrations up to 15%. Covers use up to 128. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 428 cm2 . For each use event, covers use amounts up to: 35 g . Covers use in room size of 20 m3. Covers exposure up to 0,17. Hours/event
	Coatings and paints, thinners, paint	Unless otherwise stated.



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	removers,Waterborne latex wall paint	Covers concentrations up to 0,8%. Covers use up to 4. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 428,75 cm2 . For each use event, covers use amounts up to: 2760 g. Covers use in room size of 20 m3. Covers exposure up to 2,20. Hours/event
	Coatings and paints, thinners, paint removers,Solvent rich, high solid, water borne paint	Unless otherwise stated. Covers concentrations up to 2,5%. Covers use up to 6. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 428,75 cm2 . For each use event, covers use amounts up to: 744 g . Covers use in room size of 20 m3. Covers exposure up to 2,20. Hours/event
	Coatings and paints, thinners, paint removers,Removers (paint-, glue-, wall paper-, sealant-remover)	Unless otherwise stated. Covers concentrations up to 4%. Covers use up to 3. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 857,50 cm2 . For each use event, covers use amounts up to: 491 g . Covers use in room size of 20 m3. Covers exposure up to 2,00. Hours/event
	Fillers, putties, plasters, modelling clay,Fillers and putty	Unless otherwise stated. Covers concentrations up to 2%. Covers use up to 12. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 35,73 cm2 . For each use event, covers use amounts up to: 85 g . Covers use in room size of 20 m3. Covers exposure up to 4,00. Hours/event
	Fillers, putties, plasters, modelling clay,Plasters and floor equalizers	Unless otherwise stated. Covers concentrations up to 0,1%. Covers use up to 12. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 857,50 cm2 . For each use event, covers use amounts up to: 13800 g . Covers use in room size of 20 m3. Covers exposure up to 2,00. Hours/event
	Fillers, putties, plasters, modelling clay,Modelling clay	Unless otherwise stated. Covers concentrations up to 1%. Covers use up to 365. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 254,40 cm2. For each use event, covers use amounts up to: 1 g. Covers use in a one car garage (34m <sup>3</sup> ) under typical ventilation. Covers use in room size of 20 m3. Covers exposure up to 1,00. Hours/event



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	Finger paints,Finger paints	Unless otherwise stated. Covers concentrations up to 0,1%. Covers use up to 365. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 254,40 cm2. For each use event, covers use amounts up to: 1,35 g . Covers use in room size of 20 m3. Covers exposure up to 1,00. Hours/event
	Non-metal-surface treatment products,Waterborne latex wall paint	Unless otherwise stated. Covers concentrations up to 0,28%. Covers use up to 4. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 428,75 cm2 . For each use event, covers use amounts up to: 2760 g . Covers use in room size of 20 m3. Covers exposure up to 2,20. Hours/event
	Non-metal-surface treatment products,Solvent rich, high solid, water borne paint	Unless otherwise stated. Covers concentrations up to 1%. Covers use up to 6. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 428,75 cm2 . For each use event, covers use amounts up to: 744 g . Covers use in room size of 20 m3. Covers exposure up to 2,20. Hours/event
	Non-metal-surface treatment products,Aerosol spray can	Unless otherwise stated. Covers concentrations up to 4,5%. Covers use up to 2. days/year. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 215 g . Covers use in a one car garage (34m³) under typical ventilation. Covers use in room size of 34 m3. Covers exposure up to 0,33. Hours/event
	Non-metal-surface treatment products,Removers (paint-, glue-, wall paper-, sealant-remover)	Unless otherwise stated. Covers concentrations up to 1,5%. Covers use up to 3. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 857,50 cm2 . For each use event, covers use amounts up to: 491 g . Covers use in room size of 20 m3. Covers exposure up to 2,00. Hours/event
	Ink and toners,Ink and Toners	Unless otherwise stated. Covers concentrations up to 10%. Covers use up to 365. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 71,40 cm2 . For each use event, covers use amounts up to: 40 g . Covers use in room size of 20 m3. Covers exposure up to 2,20. Hours/event
	Leather tanning, dye, finishing, impregnation and	Unless otherwise stated.



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	care products,Polishes, wax/cream (floor, furniture, shoes)	Covers concentrations up to 11%. Covers use up to 29. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 430 cm2 . For each use event, covers use amounts up to: 56 g . Covers use in room size of 20 m3. Covers exposure up to 1,23. Hours/event
	Leather tanning, dye, finishing, impregnation and care products,Polishes, spray (furniture, shoes)	Unless otherwise stated. Covers concentrations up to 8%. Covers use up to 8. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 430 cm2 . For each use event, covers use amounts up to: 56 g . Covers use in room size of 20 m3. Covers exposure up to 0,33. Hours/event
	Lubricants, greases, release products,Liquids	Unless otherwise stated. Covers concentrations up to 35%. Covers use up to 4. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 468 cm2 . For each use event, covers use amounts up to: 2200 g. Covers use in a one car garage (34m <sup>3</sup> ) under typical ventilation. Covers use in room size of 34 m3. Covers exposure up to 0,17. Hours/event
	Lubricants, greases, release products,Pastes	Unless otherwise stated. Covers concentrations up to 20%. Covers use up to 10. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 468 cm2 . For each use event, covers use amounts up to: 34 g . Covers use in a one car garage (34m <sup>3</sup> ) under typical ventilation. Covers use in room size of 34 m3
	Lubricants, greases, release products,Sprays	Unless otherwise stated. Covers concentrations up to 5%. Covers use up to 6. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 428,75 cm2. For each use event, covers use amounts up to: 73 g . Covers use in room size of 20 m3. Covers exposure up to 0,17. Hours/event
	Polishes and wax blends,Polishes, wax/cream (floor, furniture, shoes)	Unless otherwise stated. Covers concentrations up to. Covers use up to 29. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 430 cm2. For each use event, covers use amounts up to: 142 g. Covers use in room size of 20 m3. Covers exposure up to 1,23. Hours/event
	Polishes and wax blends,Polishes, spray (furniture,	Unless otherwise stated.



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	shoes)	Covers concentrations up to 14%. Covers use up to 8. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 430 cm2 . For each use event, covers use amounts up to: 35 g . Covers use in room size of 20 m3. Covers exposure up to 0,33. Hours/event
	Textile dyes, finishing and impregnating products; including bleaches and other processing aids	Unless otherwise stated. Covers concentrations up to 5%. Covers use up to 365. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 857,50 cm2 (Max). For each use event, covers use amounts up to: 115 g (Max). Covers use in room size of 20 m3. Covers exposure up to 1,00. Hours/event

### Risk management measures

Other risk management measures:

Anti-freeze and de-icing products,Washing car window	No specific risk management measure identified beyond those operational conditions stated.	
Anti-freeze and de-icing products,Pouring into radiator	No specific risk management measure identified beyond those operational conditions stated.	
Anti-freeze and de-icing products,Lock de-icer	No specific risk management measure identified beyond those operational conditions stated.	
Biocidal products (e.g. Disinfectants, pest control),Laundry and dish washing products	No specific risk management measure identified beyond those operational conditions stated.	
Biocidal products (e.g. Disinfectants, pest control),Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)	No specific risk management measure identified beyond those operational conditions stated.	
Biocidal products (e.g. Disinfectants, pest control),Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)	No specific risk management measure identified beyond those operational conditions stated.	
Coatings and paints, fillers, putties, thinners,Waterborne latex wall paint	No specific risk management measure identified beyond those operational conditions stated.	
Coatings and paints, fillers, putties, thinners,Solvent rich, high solid, water borne paint	No specific risk management measure identified beyond those operational conditions stated.	
Coatings and paints, fillers, putties, thinners,Removers (paint-, glue-, wall paper-, sealant-remover)	No specific risk management measure identified beyond those operational conditions stated.	
Fillers, putties, plasters, modelling clay,Fillers and putty	No specific risk management measure identified beyond those operational conditions stated.	
Fillers, putties, plasters, modelling clay,Plasters and floor equalizers	No specific risk management measure identified beyond those operational conditions stated.	
Fillers, putties, plasters, modelling clay,Modelling clay	No specific risk management measure identified beyond those operational conditions stated.	
Finger paints,Finger paints	No specific risk management measure identified beyond those operational conditions stated.	
Non-metal-surface treatment products,Waterborne latex wall paint	No specific risk management measure identified beyond those operational conditions stated.	
Non-metal-surface treatment products,Solvent rich, high solid, water borne paint	No specific risk management measure identified beyond those operational conditions stated.	
Non-metal-surface treatment products,Aerosol spray can	No specific risk management measure identified beyond those operational conditions stated.	
Non-metal-surface treatment products,Removers (paint-, glue-, wall paper-, sealant-remover)	No specific risk management measure identified beyond those operational conditions stated.	
Ink and toners,Ink and Toners	No specific risk management measure identified beyond those operational conditions stated.	
Leather tanning, dye, finishing, impregnation and care	No specific risk management measure identified	



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products,Polishes, wax/cream (floor, furniture, shoes)	beyond those operational conditions stated.	
Leather tanning, dye, finishing, impregnation and care products,Polishes, spray (furniture, shoes)	No specific risk management measure identified beyond those operational conditions stated.	
Lubricants, greases, release products,liquids	No specific risk management measure identified beyond those operational conditions stated.	
Lubricants, greases, release products,Pastes	No specific risk management measure identified beyond those operational conditions stated.	
Lubricants, greases, release products,Sprays	No specific risk management measure identified beyond those operational conditions stated.	
Polishes and Wax Blends,Polishes, wax/cream (floor, furniture, shoes)	No specific risk management measure identified beyond those operational conditions stated.	
Polishes and Wax Blends,Polishes, spray (furniture, shoes)	No specific risk management measure identified beyond those operational conditions stated.	
Textile dyes, finishing and impregnating products; including bleaches and other processing aids	No specific risk management measure identified beyond those operational conditions stated.	

## 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
Assessment method	Used EUSES model 2.1.1

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable


### Operational conditions

Amount used	Annual amount used in the EU	150000 t/yr
	Regional use tonnage (tons/year):	15000
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from wide dispersive use (regional only):	0,985
	Release fraction to wastewater from wide dispersive use:(regional only)	0,01
	Release fraction to soil from wide dispersive use (regional only):	0,005

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by the freshwater.	
	Treat air emission to provide a typical removal efficiency of (%):	> 0
Organizational measures to prevent/limit release from the site	Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m³/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

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### 3.1. Health

Information for contributing exposure scenario	
2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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## 1. Exposure scenario 13

### Use in oil and gas field drilling and production operations

ES Ref.: 13
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b SU3, SU10 ERC4
Processes, tasks activities covered	Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

## 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	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

Other risk management measures:

CS14 - Bulk transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, Operate activity away from sources of substance emission or release., alternatively: G16 - If technical measures not practical: PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS45 - Filling/ preparation of equipment from drums or containers.	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
CS116 - Drill floor operations	No specific measures identified.
CS116 - Drill floor operations	Ensure operation is undertaken outdoors.
Operation of solids filtering equipment - vapour exposures	Ensure material transfers are under containment or extract ventilation.
Operation of solids filtering equipment - aerosol exposures	Ensure material transfers are under containment or extract ventilation.

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CS117 - Operation of solids filtering equipment	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
Treatment and disposal of filtered solids	No specific measures identified.	
CS2 - Process sampling	No specific measures identified.	
General exposures (closed systems)	No specific measures identified.	
Pouring from small containers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), PPE15 - Wear suitable gloves tested to EN374.	
CS16 - General exposures (open systems)	Ensure operation is undertaken outdoors.	
CS39 - Equipment cleaning and maintenance	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), PPE15 - Wear suitable gloves tested to EN374.	
CS55 - Batch process	No specific measures identified.	
CS55 - Batch process, CS137 - With occasional controlled exposure.	Provide extract ventilation to points where emissions occur	

### 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment Qualitative approach used to conclude safe use

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	30000 t/yr
	Regional use tonnage (tons/year):	3000
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	Not applicable
Environmental factors not influenced by risk management	Local freshwater dilution factor:	Not applicable
	Local marine water dilution factor:	Not applicable
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	Not applicable
	Release fraction to wastewater from process (initial release prior to RMM):	Not applicable
	Release fraction to soil from process (initial release prior to RMM):	Not applicable


### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Discharge to aquatic environment is restricted (see Section 4.2).	
Organizational measures to prevent/limit release from the site	Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Not applicable	
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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### 3.2. Environment

Information for contributing exposure scenario	
2.2	Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment, Qualitative approach used to conclude safe use


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

### 4.1. Health

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

Guidance - Environment	Discharge to aquatic environment is restricted by law and industry prohibits release.
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### 1. Exposure scenario 14

#### Use as binders and release agents

ES Ref.: 14
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8b, PROC10, PROC13, PROC14 SU3, SU8, SU9 ERC4
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application (including spraying and brushing), mould forming and casting and handling of waste. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

### 2. Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8b, PROC10, PROC13, PROC14)

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
PROC6	Calendering operations
PROC7	Industrial spraying
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
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

#### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

CS3 - Material transfers	No specific measures identified.
CS3 - Material transfers, CS137 - With occasional controlled exposure.	No specific measures identified.
CS3 - Material transfers, CS55 - Batch process, CS107 - (closed systems)	No specific measures identified.
CS8 - Drum/batch transfers	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
CS29 - Mixing operations (closed systems)	No specific measures identified.
CS30 - Mixing operations (open systems)	No specific measures identified.
CS31 - Mold forming	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

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CS32 - Casting operations	Provide extract ventilation to points where emissions occur	
CS10 - Spraying, CS33 - Machine	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
CS34 - Manual, Roller application or brushing	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
Storage, CS137 - With occasional controlled exposure.	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
Assessment method	Used EUSES model 2.1.1

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,2
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 80
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
	Soil emission controls are not applicable as there is no direct release to soil.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario	
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2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented,Used EUSES model
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#### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES


##### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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## 1. Exposure scenario 15

### Use as binders and release agents

ES Ref.: 15
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14 SU22 ERC8a, ERC8d
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste. Professional use
Assessment method	Used ECETOC TRA model Used EUSES model

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14)

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
PROC6	Calendering operations
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
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

#### Other risk management measures:

CS3 - Material transfers, CS107 - (closed systems)	No specific measures identified.
CS3 - Material transfers, CS107 - (closed systems), CS137 - With occasional controlled exposure.	No specific measures identified.
CS3 - Material transfers, CS107 - (closed systems), CS55 - Batch process	No specific measures identified.
CS8 - Drum/batch transfers	Transfer materials directly to mixing vessels.
CS29 - Mixing operations (closed systems)	No specific measures identified.
CS30 - Mixing operations (open systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).



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CS31 - Mold forming	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS32 - Casting operations, CS108 - (open systems)	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS10 - Spraying, CS34 - Manual	E57 - Carry out in a vented booth or extracted enclosure, Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS34 - Manual, Roller application or brushing	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS10 - Spraying, CS34 - Manual	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), Wear a respirator conforming to EN140 with Type A filter or better.	
Storage	No specific measures identified.	
Storage, CS137 - With occasional controlled exposure.	No specific measures identified.	

### 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
Assessment method	Used EUSES model 2.1.1

### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,95
	Release fraction to wastewater from process (initial release prior to RMM):	0,025
	Release fraction to soil from process (initial release prior to RMM):	0,025


### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Not applicable	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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
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2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
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### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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## 1. Exposure scenario 16

### Use as laboratory reagent

ES Ref.: 16
ES Type: Worker

Use descriptors	PROC10, PROC15 SU3, SU10 ERC2, ERC4
Processes, tasks activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

## 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	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

CS36 - Laboratory activities, small scale, Handling small quantities (<1000ml) for more than 4 hours/day - inside fume cupboard.	No specific measures identified.
CS47 - Cleaning, CS51 - Rolling, Brushing, CS103 - Vessel and container cleaning, Cleaning equipment, glassware etc under general ventilation for 15 min - 1 hour/day	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

### 2.2 Contributing scenario controlling environmental exposure (ERC2, ERC4)


ERC2	Formulation of preparations
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	Used EUSES model 2.1.1

#### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

#### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	1

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Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,025
	Release fraction to wastewater from process (initial release prior to RMM):	0,02
	Release fraction to soil from process (initial release prior to RMM):	0,0001

#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 17

#### Use as laboratory reagent

ES Ref.: 17
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. Professional use
Assessment method	Used ECETOC TRA model Used EUSES model

### 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	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

CS36 - Laboratory activities, small scale, Handling small quantities (<1000ml) for more than 4 hours/day - inside fume cupboard.	No specific measures identified.
CS47 - Cleaning, CS51 - Rolling, Brushing, CS103 - Vessel and container cleaning, Cleaning equipment, glassware etc under general ventilation for 15 min - 1 hour/day	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

#### 2.2 Contributing scenario controlling environmental exposure (ERC8a)


ERC8a	Wide dispersive indoor use of processing aids in open systems
Assessment method	Used EUSES model 2.1.1

#### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

#### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365

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Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,5
	Release fraction to wastewater from process (initial release prior to RMM):	0,5
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
	Soil emission controls are not applicable as there is no direct release to soil.	
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 18

#### Functional fluids

ES Ref.: 18
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 SU3, SU8, SU9 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	Used ECETOC TRA model Used EUSES model

### 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 preparation into small containers (dedicated filling line, including weighing)

#### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

CS14 - Bulk transfers	No specific measures identified.
CS14 - Bulk transfers, CS137 - With occasional controlled exposure.	No specific measures identified.
CS14 - Bulk transfers, CS55 - Batch process	No specific measures identified.
CS8 - Drum/batch transfers, CS81 - Dedicated facility	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
CS53 - Pelletizing, CS107 - (closed systems)	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.	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
General exposures (closed systems)	No specific measures identified.
CS16 - General exposures (open systems)	No specific measures identified.





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CS19 - Remanufacture of reject articles	Drain down and flush system prior to equipment opening or maintenance.	
CS5 - Equipment maintenance	Drain down and flush system prior to equipment opening or maintenance.	
Storage	No specific measures identified.	
Storage,CS137 - With occasional controlled exposure.	No specific measures identified.	

### 2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems
Assessment method	Used EUSES model 2.1.1

#### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

#### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,0003
	Release fraction to soil from process (initial release prior to RMM):	0,001

#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented,The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented,Used EUSES model

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

##### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 19

#### Functional fluids

ES Ref.: 19
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC8a, PROC9, 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	Used ECETOC TRA model Used EUSES model

### 2. Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8a, PROC9, 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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC20	Heat and pressure transfer fluids in dispersive use but closed systems

#### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.


#### Risk management measures

Other risk management measures:

CS8 - Drum/batch transfers, CS82 - Non-dedicated facility	Use drum pumps or carefully pour from container.
CS22 - Transfer from/pouring from containers	Use drum pumps or carefully pour from container.
CS45 - Filling/ preparation of equipment from drums or containers.	Use drum pumps or carefully pour from container.
General exposures (closed systems)	No specific measures identified.
CS16 - General exposures (open systems), Elevated temperature 80°C	E49 - Handle substance within a predominantly closed system provided with extract ventilation.
CS19 - Remanufacture of reject articles	Drain down and flush system prior to equipment opening or maintenance.
CS5 - Equipment maintenance, CS82 - Non-dedicated facility	Drain down and flush system prior to equipment opening or maintenance.
Storage, CS137 - With occasional controlled exposure.	No specific measures identified.

#### 2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
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ERC9b	Wide dispersive outdoor use of substances in closed systems
Assessment method	Used EUSES model 2.1.1

#### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

#### Operational conditions

Amount used	Annual amount used in the EU	15000 t/yr
	Regional use tonnage (tons/year):	1500
	Fraction of the main local source	0,002
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,05
	Release fraction to wastewater from process (initial release prior to RMM):	0,025
	Release fraction to soil from process (initial release prior to RMM):	0,025

#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.


#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model

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


#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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## 1. Exposure scenario 20

### Rubber production and processing

ES Ref.: 20
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC13, PROC14, PROC15, PROC21 SU3, SU8, SU9, SU10 ERC4, ERC6d
Processes, tasks activities covered	Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC13, PROC14, PROC15, PROC21)

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)
PROC6	Calendering operations
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
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC21	Low energy manipulation of substances bound in materials and/or articles

### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

### Risk management measures

#### Other risk management measures:

CS3 - Material transfers, CS137 - With occasional controlled exposure.	No specific measures identified.
CS3 - Material transfers, CS81 - Dedicated facility	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Bulk weighing	No specific measures identified.
Bulk weighing, CS137 - With occasional controlled	No specific measures identified.



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exposure.		
Small scale weighing	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS3 - Material transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
Additive premixing, CS55 - Batch process	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS64 - Calendering (including Banburys)	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
CS73 - Pressing uncured rubber blanks	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS70 - Vulcanisation	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS71 - Cooling cured articles	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS36 - Laboratory activities	No specific measures identified.	
CS5 - Equipment maintenance	E81 - Drain or remove substance from equipment prior to break-in or maintenance.	

### 2.2 Contributing scenario controlling environmental exposure (ERC4, ERC6d)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
Assessment method	Used EUSES model 2.1.1

### Product characteristics


Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	60000 t/yr
	Regional use tonnage (tons/year):	6000
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
	Environmental factors not influenced by risk management	
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,003
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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### 3. Exposure estimation and reference to its source

#### 3.1. Health

Information for contributing exposure scenario

2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
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#### 3.2. Environment

Information for contributing exposure scenario

2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model
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### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES


#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 21

#### Formulation

ES Ref.: 21 ES Type: Worker
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Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15 SU3, SU10 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, large and small scale packing, maintenance and associated laboratory activities Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

### 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 preparation into small containers (dedicated filling line, including weighing)
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent

#### Product characteristics

Physical form	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

Other risk management measures:

General exposures (closed systems)	No specific measures identified.
General exposures (closed systems), CS56 - with sample collection, CS137 - With occasional controlled exposure.	No specific measures identified.
General exposures (closed systems), CS37 - Use in contained batch processes	No specific measures identified.
CS16 - General exposures (open systems), CS55 - Batch process, CS56 - with sample collection, With potential for aerosol generation	No specific measures identified.

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CS136 - Batch processes at elevated temperatures	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur	
CS2 - Process sampling	No specific measures identified.	
CS36 - Laboratory activities	No specific measures identified.	
CS14 - Bulk transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, Operate activity away from sources of substance emission or release, alternatively: G16 - If technical measures not practical: PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.	
CS30 - Mixing operations (open systems), With potential for aerosol generation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS34 - Manual, CS22 - Transfer from/pouring from containers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS8 - Drum/batch transfers	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS6 - Drum and small package filling	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance.	
Storage, CS137 - With occasional controlled exposure.	No specific measures identified.	

## 2.2 Contributing scenario controlling environmental exposure (ERC2)

ERC2	Formulation of preparations
Assessment method	Used EUSES model 2.1.1

### Product characteristics


Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

### Operational conditions

Amount used	Annual amount used in the EU	150000 t/yr
	Regional use tonnage (tons/year):	15000
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,025
	Release fraction to wastewater from process (initial release prior to RMM):	0,002
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 0
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000

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Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	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	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model


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

#### 4.1. Health

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

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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### 1. Exposure scenario 01

#### Manufacture of substance

ES Ref.: 01
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 SU3, SU8, SU9 ERC1
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. Industrial use
Assessment method	Used ECETOC TRA model Used EUSES model

### 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	OC4 - Liquid, vapour pressure 0.5 - 10 kPa
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).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, Assumes a good basic standard of occupational hygiene is implemented, Users are advised to consider national Occupational Exposure Limits or other equivalent values.

#### Risk management measures

##### Other risk management measures:

General exposures (closed systems)	No specific measures identified.
General exposures (closed systems), CS56 - with sample collection, CS137 - With occasional controlled exposure.	No specific measures identified.
General exposures (closed systems), CS37 - Use in contained batch processes	No specific measures identified.
CS16 - General exposures (open systems), CS55 - Batch process, CS56 - with sample collection	No specific measures identified.
CS2 - Process sampling	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or, PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.
CS36 - Laboratory activities	No specific measures identified.
CS14 - Bulk transfers, CS108 - (open systems), With	Provide a good standard of general ventilation (not

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potential for aerosol generation	less than 3 to 5 air changes per hour),or,Operate activity away from sources of substance emission or release,, alternatively:G16 - If technical measures not practical:PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.	
CS14 - Bulk transfers,CS107 - (closed systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour),or,Operate activity away from sources of substance emission or release,, alternatively:G16 - If technical measures not practical:PPE21 - Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.	
CS39 - Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance.	
Storage,CS137 - With occasional controlled exposure.	No specific measures identified.	

### 2.2 Contributing scenario controlling environmental exposure (ERC1)

ERC1	Manufacture of substances
Assessment method	Used EUSES model 2.1.1

#### Product characteristics

Vapour pressure	40,30 hPa
Volatility	Medium volatile liquid
Other product characteristics	Water solubility 0,573, Log Kow 2,73, Readily biodegradable

#### Operational conditions

Amount used	Annual amount used in the EU	3000000 t/yr
	Regional use tonnage (tons/year):	300000
	Fraction of the main local source	1
Frequency and duration of use	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	40
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Conditions given in SPERC fact sheet give rise to following releases fractions:	
	Release fraction to air from process (initial release prior to RMM):	0,005
	Release fraction to wastewater from process (initial release prior to RMM):	0,0001
	Release fraction to soil from process (initial release prior to RMM):	0,0001


#### Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of (%):	> 90
	Typical onsite wastewater treatment technology provides removal efficiency of (%):	93,3
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.	
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%):	93,3
	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d):	2000
Conditions and measures related to external treatment of waste for disposal	During manufacturing no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	During manufacturing no waste of the substance is generated.	

### 3. Exposure estimation and reference to its source

#### 3.1. Health

Information for contributing exposure scenario
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2.1	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
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### 3.2. Environment

Information for contributing exposure scenario	
2.2	Predicted exposures are not expected to exceed the PNECs when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented, Used EUSES model

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

### 4.1. Health

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

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