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

1.1. Product identifier

Product form : Substance
Trade name/designation : Toluene
EC Index : 601-021-00-3
EC-No. : 203-625-9
CAS-No. : 108-88-3
REACH registration No. : 01-2119471310-51-0049
Formula : C7H8
Synonyms : 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 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
Use in 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	SU22, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ERC9a, ERC9b

(ES Ref.: 08)	
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
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 additional information 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
REACHNIS@nis.rs

Only Representative
BENS Consulting d.o.o.
Špruha 19
1236 Trzin
Slovenija
T +386 41 979 800
info@bens-consulting.eu

1.4. Emergency telephone number

Emergency number : + 381 (0) 21 481 1111
Only available during office hours.

Country/Area	Organisation/Company	Address	Emergency number	Comment
Ireland	National Poisons Information Centre Beaumont Hospital	PO Box 1297 Beaumont Road 9 Dublin	+353 1 809 2566 (Healthcare professionals-24/7) +353 1 809 2166 (public, 8am - 10pm, 7/7)	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flammable liquids, Category 2	H225
Skin corrosion/irritation, Category 2	H315
Reproductive toxicity, Category 2	H361d
Specific target organ toxicity – Single exposure, Category 3, Narcosis	H336
Specific target organ toxicity – Repeated exposure, Category 2	H373
Aspiration hazard, Category 1	H304

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS02 GHS07 GHS08

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 vapours.
P280 - Wear protective gloves, protective clothing, eye protection, face protection.
P301+P310+P331 - IF SWALLOWED: Immediately call a doctor, a POISON CENTER. Do NOT induce vomiting.
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water .
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P403+P235 - Store in a well-ventilated place. Keep cool.
P501 - Dispose of contents and container to an approved waste disposal plant.

Listed on CLP Annex VI : EC Index-No.: 601-021-00-3

2.3. Other hazards

Other hazards : Vapours can form explosive mixtures with air. Results of PBT and vPvB assessment : This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance name : Toluene

CAS-No. : 108-88-3

EC-No. : 203-625-9
EC Index : 601-021-00-3

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 REACH-no: 01-2119471310-51-0049	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- and EUH-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

Additional advice : First aider: Pay attention to self-protection!. Concerning personal protective equipment to use, see section 8. Never give anything by mouth to an unconscious person. In case of doubt or persistent symptoms, consult always a physician. Show this safety data sheet to the doctor in attendance.

Inhalation : Remove casualty to fresh air and keep warm and at rest. Give oxygen or artificial respiration if necessary. In case of doubt or persistent symptoms, consult always a physician.

Skin contact : Remove contaminated clothing and shoes. Gently wash with plenty of soap and water. In case of doubt or persistent symptoms, consult always a physician.

Eyes contact : Rinse immediately carefully and thoroughly with eye-bath or water. Remove contact lenses, if present and easy to do. Continue rinsing. In case of doubt or persistent symptoms, consult always a physician.

Ingestion : Rinse mouth thoroughly with water. Do NOT induce vomiting. Get immediate medical advice/attention.

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

Inhalation : May cause drowsiness or dizziness. Harmful: danger of serious damage to health by prolonged exposure through inhalation. Cough. The following symptoms may occur: . sore throat. Unconsciousness. Headache. Nausea.

Skin contact : Causes skin irritation. The following symptoms may occur: Redness, pain. Repeated exposure may cause skin dryness or cracking.

Eyes contact : Contact with eyes may cause irritation. The following symptoms may occur: Redness, pain.

Ingestion : May be fatal if swallowed and enters airways. 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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : carbon dioxide (CO2), powder, alcohol-resistant foam, water spray.

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. Heating will cause a rise in pressure with a risk of bursting.

Hazardous decomposition products in case of fire : Carbon oxides (CO, CO2).

5.3. Advice for firefighters

Firefighting instructions : Evacuate area. Use water spray or fog for cooling exposed containers. Contain the extinguishing fluids by bunding. Prevent fire fighting water from entering the environment.

Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus.

Other information : Do not allow run-off from fire-fighting to enter drains or water courses. Dispose of waste in accordance with environmental legislation.

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 unnecessary personnel. Keep upwind. Provide adequate ventilation. Do not breathe vapours. Avoid contact with skin, eyes and clothing. Wear recommended personal protective equipment. Concerning personal protective equipment to use, see section 8. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ensure equipment is adequately earthed. Use explosion-proof equipment. Use only non-sparking tools.

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. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Stop leak if safe to do so. Dam up the liquid spill. Small quantities of liquid spill: take up in non-combustible absorbent material and shovel into container for disposal. Recover large spills by pumping (use an explosion proof or hand pump). Place in a suitable container for disposal in accordance with the waste regulations (see Section 13). This material and its container must be disposed of in a safe way, and as per local legislation. Cover the spilled liquid product with foam to slow down evaporation.

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. Do not breathe vapours. Avoid contact with skin, eyes and clothing. Use personal protective equipment as required. Concerning personal protective equipment to use, see section 8. Take any precaution to avoid mixing with Incompatible materials, Refer to Section 10 on Incompatible Materials. Ensure proper process control to avoid excess waste discharge (temperature, concentration, pH, time). Avoid release to the environment. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use explosion-proof equipment. Use only non-sparking tools. After use replace the closing cap immediately.

Hygiene measures : Keep good industrial hygiene. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not eat, drink or smoke when using this product. Keep away from food, drink and animal feedingstuffs. Remove contaminated clothes. Separate working clothes from town clothes. Launder separately. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Storage of flammable liquids. Keep container tightly closed. Store in a dry, cool and well-ventilated place. Do not store near or with any of the incompatible materials listed in section 10. Bund storage facilities to prevent soil and water pollution in the event of spillage. Take precautionary measures against static discharge.

Incompatible materials : Oxidising substances. Strong acids.

Heat and ignition sources : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Protect from sunlight.

Special rules on packaging : Containers which are opened should be properly resealed and kept upright to prevent leakage. Do not pierce or burn, even after use. Keep in properly labelled containers.

Packaging materials : Keep only in the original container. Suitable material: Stainless steel, Mild steel.

Germany

German storage class (LGK) : LGK 3 - Flammable liquids

Switzerland

Storage class (LK) : LK 3 - Flammable liquids

7.3. Specific end use(s)

see attached exposure scenario.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

toluene (108-88-3)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Toluene
IOEL TWA	192 mg/m³
	50 ppm
IOEL STEL	384 mg/m³
	100 ppm
Remark	Possibility of significant uptake through the skin
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
Albania - Occupational Exposure Limits	
Local name	Toluen
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	Lëkurë (tregon mundësinë e një marrjeje të rëndësishme nëpërmjet lëkurës)
Regulatory reference	VENDIM Nr. 522, datë 6.8.2014 PËR MIRATIMIN E RREGULLORES "PËR MBROJTJEN E SIGURISË DHE SHËNDETIT TË PUNËMARRËSVE NGA RISQET E LIDHURA ME AGJENTËT KIMIKË NË PUNË"
Austria - Occupational Exposure Limits	
Local name	Toluol
MAK (OEL TWA)	190 mg/m³
	50 ppm
MAK (OEL STEL)	380 mg/m³
	100 ppm
Remark	H. Fortpflanzungsgefährdend: d
OEL chemical category	Skin notation
Regulatory reference	BGBl. II Nr. 156/2021
Austria - Biological limit values	
Local name	Toluol

toluene (108-88-3)	
BLV	10 g/dl Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Frauen 12 g/dl Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Männer 250 µg/l Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Probenahmezeitpunkt: Bei wiederholt erhöhten o-Cresolwerten ist zusätzlich Toluol im Blut am Ende eines Arbeitstages zu bestimmen (der Zeitpunkt der Untersuchung ist anzugeben) 0,8 mg/l Parameter: o-Cresol - Untersuchungsmaterial: Harn
Remark	Eignung: Blut: Erythrozyten: 3,2 Millionen/µl für Frauen, 3,8 Millionen/µl für Männer; Leukozyten: unterer Grenzwert: 4.000/µl (davon 2.000 Granulozyten) bzw. 3.700/µl bei nicht pathologischem Differentialblutbild, oberer Grenzwert: 13.000/µl; Thrombozyten: 150.000 bzw. 130.000/µl bei nicht pathologischem Differentialblutbild Eignung mit vorzeitiger Folgeuntersuchung: Bei Unterschreiten bzw. Überschreiten der Grenzwerte im Blut (ausgenommen Differentialblutbild) oder im Harn sowie bei atypischen Morphologien im Blut. Der Zeitabstand zwischen den Untersuchungen beträgt bei Eignung: ein Jahr; bei Eignung mit vorzeitiger Folgeuntersuchung: drei Monate.
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
Belgium - Occupational Exposure Limits	
Local name	Toluène # Tolueen
OEL TWA	77 mg/m³
	20 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	D: la mention “D” signifie que la résorption de l’agent, via la peau, les muqueuses ou les yeux, constitue une partie importante de l’exposition totale. Cette résorption peut se faire tant par contact direct que par présence de l’agent dans l’air. # D: de vermelding “D” betekent dat de opname van het agens via de huid, de slijmvliezen of de ogen een belangrijk deel van de totale blootstelling vormt. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.
OEL chemical category	Skin, Skin notation
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	Толуен
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	Кожа (възможна е значителна резорбция чрез кожата); • (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)

toluene (108-88-3)	
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 47 от 2021 г., в сила от 04.06.2021 г.)
Bulgaria - Biological limit values	
Local name	Толуен
BLV	1,6 mmol/mmol Creatinine Parameter: Hippuric acid - Medium: urine - Sampling time: at the end of exposure or end of work shift
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 47 от 2021 г., в сила от 04.06.2021 г.)
Croatia - Occupational Exposure Limits	
Local name	Toluen
GVI (OEL TWA)	192 mg/m³
	50 ppm
KGVI (OEL STEL)	384 mg/m³
	100 ppm
Remark	Direktiva: 2006/15/EZ. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315))
OEL chemical category	Skin notation
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Croatia - Biological limit values	
Local name	Toluen
BLV	1 mg/l Parameter: Toluene - Medium: blood - Sampling time: at the end of the work shift 20 ppm Parameter: Toluene - Medium: final exhaled air - Sampling time: during exposure 2,5 g/g creatinine Parameter: Hippuric acid - Medium: urine - Sampling time: at the end of the work shift (calculated on the average Creatinine value of 1.2 g/L urine) 1 mg/g creatinine Parameter: o-Cresol - Medium: urine - Sampling time: at the end of the work shift (calculated on the average Creatinine value of 1.2 g/L urine)
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Cyprus - Occupational Exposure Limits	
Local name	Τολουόλιο
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm

toluene (108-88-3)	
OEL chemical category	Skin-potential for cutaneous absorption
Remark	δέρμα
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	Toluen (Methylbenzen)
PEL (OEL TWA)	200 mg/m³
	50 ppm
NPK-P (OEL C)	384 mg/m³
	100 ppm
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůží, I - dráždí sliznice (oči, dýchací cesty) resp. kůži, P - u látky nelze vyloučit závažné pozdní účinky (s větou H372, H373).
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Czech Republic - Biological limit values	
Local name	Toluen (Methylbenzen)
BLV	1,6 µmol/mmol Creatinine Parameter: o-Cresol - Medium: urine - Sampling time: end of shift (after hydrolysis) 1000 µmol/mmol Creatinine Parameter: Hippuric acid - Medium: urine - Sampling time: end of shift (exposure testing using the o-Cresol parameter to precisely measure Toluene exposure is needed if the value of Hippuric acid is between 1600 and 2500 mg/g of Creatinine, no additional testing is needed if the Hippuric acid value is >2500 mg/g of Creatinine as work exposure to Toluene will have highly exceeded the PEL value.) 1,5 mg/g creatinine Parameter: o-Cresol - Medium: urine - Sampling time: end of shift (after hydrolysis) 1600 mg/g creatinine Parameter: Hippuric acid - Medium: urine - Sampling time: end of shift (exposure testing using the o-Cresol parameter to precisely measure Toluene exposure is needed if the value of Hippuric acid is between 1600 and 2500 mg/g of Creatinine, no additional testing is needed if the Hippuric acid value is >2500 mg/g of Creatinine as work exposure to Toluene will have highly exceeded the PEL value.)
Remark	Je-li hodnota při nálezu kyseliny hippurové vyšší než 1600 mg/g, av šak nepřesahuje 2500 mg/g kreatininu, použije se ke zpřesnění expozice toluenu biologický expoziční test podle ukazatele o-Kresol. Je-li hodnota při nálezu kyseliny hippurové vyšší než 2500 mg/g, považuje se za hodnotu prokazující, že jde o pracovní expozici toluenu, jehož hodnota PEL je překračována a biologický expoziční test podle ukazatele o-Kresol se již neprovádí.
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Toluen (Methylbenzen; Phenylmethan)
OEL TWA	94 mg/m³

toluene (108-88-3)	
	25 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi); H (betyder, at stoffet kan optages gennem huden)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	BEK nr 202 af 21/02/2023
Estonia - Occupational Exposure Limits	
Local name	Tolueen (metüülbenseen)
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	A (Naha kaudu kergesti imenduv aine)
OEL chemical category	Skin notation
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 21.12.2022, 3)
Finland - Occupational Exposure Limits	
Local name	Tolueeni
HTP (OEL TWA)	81 mg/m³
	25 ppm
HTP (OEL STEL)	380 mg/m³
	100 ppm
Remark	Iho, melu
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
Finland - Biological limit values	
Local name	Tolueeni
BLV	500 nmol/L Parameter: Toluene - Medium: blood - Sampling time: in the morning after a working day
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Toluène
VME (OEL TWA)	76,8 mg/m³ (restrictive limit)
	20 ppm (restrictive limit)
VLE (OEL C/STEL)	384 mg/m³ (restrictive limit)
	100 ppm (restrictive limit)

toluene (108-88-3)	
Remark	Valeurs règlementaires contraignantes. Toxique pour la reproduction de catégorie 2, Risque de pénétration percutanée
OEL chemical category	Reproductive Toxin category 2, Risk of cutaneous absorption
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
France - Biological limit values	
BLV	20 µg/l Parameter: Toluene - Medium: blood - Sampling time: end of workweek (Semi-quantitative (ambiguous interpretation)) Parameter: Hippuric acid - Medium: urine - Sampling time: end of shift (per the Authority, the values for this substance must be decided and/or determined on a case by case basis. Guidance for the calculation of and interpretation of values is provided in the source)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Toluol
Occupational exposure limit value (mg/m³) (TRGS900)	190 mg/m³ (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Occupational exposure limit value (ppm) (TRGS900)	50 ppm (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Peak exposure limitation factor	2(II)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); H - hautresorptiv; Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden
Chemical category	Skin notation
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Local name	Toluol
Biological limit value	600 µg/l Parameter: Toluene - Medium: whole blood - Sampling time: immediately after exposure 75 µg/l Parameter: Toluene - Medium: urine - Sampling time: end of shift 1,5 mg/l Parameter: o-Cresol (after hydrolysis) - Medium: urine - Sampling time: for long-term exposures: at the end of the shift after several shifts 1,5 mg/l Parameter: o-Cresol (after hydrolysis) - Medium: urine - Sampling time: end of shift
Regulatory reference	TRGS 903
Gibraltar - Occupational Exposure Limits	
Local name	Toluene
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³

toluene (108-88-3)	
	100 ppm
Remark	Skin
OEL chemical category	Skin notation
Regulatory reference	Factories (Control of Chemical Agents at Work) Regulations 2003 (LN. 2018/181)
Greece - Occupational Exposure Limits	
Local name	Τολουόλιο
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
OEL chemical category	skin - potential for cutaneous absorption
Remark	Η ένδειξη «δέρμα» στις οριακές τιμές επαγγελματικής έκθεσης επισημαίνει το ενδεχόμενο σημαντικής διείσδυσης μέσω του δέρματος.
Regulatory reference	Π.Δ. 162/2007 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Hungary - Occupational Exposure Limits	
Local name	TOLUOL
AK (OEL TWA)	190 mg/m³
CK (OEL STEL)	384 mg/m³
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat); BEM (biológiai expozíciós mutató); EU2 (2006/15/EK irányelvben közölt érték); R+T (Azok az anyagok, amelyek RÖVID és TARTÓS expozíciója is egészségkárosodást okoz)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Hungary - Biological Exposure Indices	
Local name	Toluol
BEI	1 mg/g creatinine Biológiai expozíciós (hatás) mutató: o-krezol - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 1 µmol/mmol Creatinine Biológiai expozíciós (hatás) mutató: o-krezol - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	Toluene
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³

toluene (108-88-3)	
	100 ppm
Remark	Sk (Substances which have the capacity to penetrate intact skin when they come in contact with it, and be absorbed into the body), IOELV (Indicative Occupational Exposure Limit Values)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Chemical Agents Code of Practice 2021
Ireland - Biological limit values	
Local name	Toluene
BMGV	0,02 mg/l Parameter: toluene - Medium: blood - Sampling time: Prior to last shift of workweek 0,03 mg/l Parameter: toluene - Medium: urine - Sampling time: End of shift 0,3 mg/g creatinine Parameter: o-cresol - Medium: urine - Sampling time: End of shift - Notations: B (Background)
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Italy - Occupational Exposure Limits	
Local name	Toluene
OEL TWA	192 mg/m³
	50 ppm
Remark	Cute
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Allegato XXXVIII del D.Lgs. 9 aprile 2008, n. 81 e s.m.i.
Latvia - Occupational Exposure Limits	
Local name	Toluols (metilbenzols)
OEL TWA	50 mg/m³
	14 ppm
OEL STEL	150 mg/m³
	40 ppm
Remark	Āda, ietekme uz dzirdi
OEL chemical category	skin - potential for cutaneous exposure
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2015. gada 7. aprīlī noteikumiem Nr. 163)
Latvia - Biological Exposure Indices	
Local name	Toluolam
BEI	1,6 g/g creatinine Parameter: Hippuric acid - Medium: urine - Sampling time: end of shift 0,05 mg/l Parameter: Toluene - Medium: blood - Sampling time: end of shift
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2021. gada 18. februārī noteikumiem Nr. 110)

toluene (108-88-3)	
Lithuania - Occupational Exposure Limits	
Local name	Toluenas
IPRV (OEL TWA)	192 mg/m³
	50 ppm
TPRV (OEL STEL)	384 mg/m³
	100 ppm
Remark	R (reprodukcijai toksiškas poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
OEL chemical category	Reproductive toxin, Skin notation
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	Toluène
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
OEL chemical category	Possibility of significant uptake through the skin
Remark	Peau
Regulatory reference	Mémorial A N° 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	Toluene
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	Skin # Ġilda
OEL chemical category	Possibility of significant uptake through the skin
Regulatory reference	S.L.424.24 - Chemical Agents at Work Regulations (L.N.356 of 2021)
Netherlands - Occupational Exposure Limits	
Local name	Tolueen
TGG-8u (OEL TWA)	150 mg/m³
	39 ppm
TGG-15min (OEL STEL)	384 mg/m³
	100 ppm
Regulatory reference	Arbeidsomstandighedenregeling 2024

toluene (108-88-3)	
Poland - Occupational Exposure Limits	
Local name	Toluen
NDS (OEL TWA)	100 mg/m³
NDSCh (OEL STEL)	200 mg/m³
Remark	Skóra (Oznakowanie substancji notacją „skóra” oznacza, że wchłanianie substancji przez skórę może być tak samo istotne jak przy narażeniu drogą oddechową).
Regulatory reference	Dz. U. 2018 poz. 1286 wraz z późn. zm.
Portugal - Indicative Occupational Exposure Limit (IOEL)	
Local name	Tolueno
IOEL TWA	192 mg/m³
	50 ppm
IOEL STEL	384 mg/m³
	100 ppm
Remark	Cutânea.
Regulatory reference	Decreto-Lei n.º 1/2021 de 6 de janeiro
Portugal - Occupational Exposure Limits	
Local name	Tolueno
OEL TWA	192 mg/m³ (indicative limit value)
	50 ppm (indicative limit value)
OEL STEL	384 mg/m³ (indicative limit value)
	100 ppm (indicative limit value)
OEL chemical category	A4 - Not Classifiable as a Human Carcinogen, skin - potential for cutaneous exposure indicative limit value
Remark	A4 (Agente não classificável como carcinogénico no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Tolueno
BEI	0,02 mg/l Parâmetro: Tolueno - Meio: sangue - Momento da amostragem: Antes do último turno da semana de trabalho 0,03 mg/l Parâmetro: Tolueno - Meio: urina - Momento da amostragem: Fim do turno 0,3 mg/g creatinine Parâmetro: o-Cresol - Meio: urina - Momento da amostragem: Fim do turno - Notaçao: Vb (Valor basal), Com hidrólise
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	Toluen
OEL TWA	192 mg/m³

toluene (108-88-3)	
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
OEL chemical category	Skin notation
Remark	P - posibilitatea unei penetrări cutanate importante; R2 - susceptibil de a dăuna fertilității
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
Romania - Biological limit values	
Local name	Toluen
BLV	2 g/l Parameter: Hippuric acid - Medium: urine - Sampling time: end of shift 3 mg/l Parameter: o-Cresol - Medium: urine - Sampling time: end of shift
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 584/2018)
Serbia - Occupational Exposure Limits	
Local name	толуен
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	ЕУ** – напомена да се ради о хемијским материјама за које су утврђене индикативне граничне вредности изложености према Директиви 2006/15/ЕЗ (друга листа); К – напомена да хемијска материја може штетно деловати на кожу
Regulatory reference	ПРАВИЛНИК о превентивним мерама за безбедан и здрав рад при излагању хемијским материјама („Службени гласник РС”, бр. 106/09, 117/17 и 107/21)
Slovakia - Occupational Exposure Limits	
Local name	Toluén
NPHV (OEL TWA)	192 mg/m³
	50 ppm
NPHV (OEL STEL)	384 mg/m³
	100 ppm
NPHV (OEL C)	384 mg/m³
Remark	K - znamená, že faktor môže byť ľahko absorbovaný kožou
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
Slovakia - Biological limit values	
Local name	Toluén

toluene (108-88-3)	
BLV	600 µg/l Parameter: Toluene - Medium: blood - Sampling time: end of exposure or work shift 1,5 mg/l Parameter: o-Cresol - Medium: urine - Sampling time: after all work shifts (for long-term exposure) 1,5 mg/l Parameter: o-Cresol - Medium: urine - Sampling time: end of exposure or work shift 1600 mg/g creatinine Parameter: Hippuric acid - Sampling time: end of exposure or work shift
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (Zmena: 471/2011 Z.z.)
Slovenia - Occupational Exposure Limits	
Local name	toluen
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Remark	K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), Y (Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in bat vrednosti), BAT (Biološka mejna vrednost), EU
OEL chemical category	Category 2, Potential for cutaneous absorption
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Slovenia - Biological limit values	
Local name	toluen
BLV	600 µg/l Parameter: toluen - Biološki vzorec: kri - Čas vzorčenja: takoj po izpostavljenosti ob koncu delovne izmene 1,5 mg/l Parameter: o-krezol (po hidrolizi) - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene, pri dolgotrajni izpostavljenosti: ob koncu delovne izmene po več zaporednih delavnikih 75 µg/l Parameter: toluen - Biološki vzorec: urin - Čas vzorčenja: takoj po izpostavljenosti ob koncu delovne izmene
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Spain - Occupational Exposure Limits	
Local name	Tolueno
VLA-ED (OEL TWA)	192 mg/m³ (indicative limit value)
	50 ppm (indicative limit value)
VLA-EC (OEL STEL)	384 mg/m³
	100 ppm

toluene (108-88-3)	
Remark	Vía dérmica (Indica que, en las exposiciones a esta sustancia, la aportación por la vía cutánea puede resultar significativa para el contenido corporal total si no se adoptan medidas para prevenir la absorción. En estas situaciones, es aconsejable la utilización del control biológico para poder cuantificar la cantidad global absorbida del contaminante), VLB® (Agente químico que tiene Valor Límite Biológico), VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo), r (Esta sustancia tiene establecidas restricciones a la fabricación, la comercialización o el uso en los términos especificados en el "Reglamento (CE) nº 1907/2006 sobre Registro, Evaluación, Autorización y Restricción de sustancias y preparados químicos" (REACH) de 18 de diciembre de 2006 (DOUE L 369 de 30 de diciembre de 2006). Las restricciones de una sustancia pueden aplicarse a todos los usos o sólo a usos concretos. El anexo XVII del Reglamento REACH contiene la lista de todas las sustancias restringidas y especifica los usos que se han restringido).
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2023. INSHT
Spain - Biological limit values	
Local name	Tolueno
BLV	0,6 mg/l Parameter: o-Cresol - Medium: urine - Sampling time: end of shift 0,05 mg/l Parameter: Toluene - Medium: blood - Sampling time: start of last shift of workweek 0,08 mg/l Parameter: Toluene - Medium: urine - Sampling time: end of shift
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2023. INSHT
Sweden - Occupational Exposure Limits	
Local name	Toluen
NGV (OEL TWA)	192 mg/m³
	50 ppm
KGV (OEL STEL)	384 mg/m³
	100 ppm
Remark	B (Ämnet kan orsaka hörselskada. Exponering för ämnet nära det befintliga yrkeshygieniska gränsvärdet och vid samtidig exponering för buller nära insatsvärdet 80 dB kan orsaka hörselskada); H (Ämnet kan lätt upptas genom huden. Det föreskrivna gränsvärdet bedöms ge tillräckligt skydd endast under förutsättning att huden är skyddad mot exponering för ämnet ifråga)
OEL chemical category	Skin notation
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Toluene
WEL TWA (OEL TWA)	191 mg/m³
	50 ppm

toluene (108-88-3)	
WEL STEL (OEL STEL)	384 mg/m³
	100 ppm
Remark	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity)
WEL chemical category	Potential for cutaneous absorption
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Iceland - Occupational Exposure Limits	
Local name	Tólúen (fenýlmetan, metýlbensen)
OEL TWA	94 mg/m³
	25 ppm
OEL STEL	188 mg/m³
	50 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	Toluen
Grenseverdi (OEL TWA)	94 mg/m³
	25 ppm
Korttidsverdi (OEL STEL)	141 mg/m³ (value calculated)
	37,5 ppm (value calculated)
Remark	H: Kjemikalier som kan tas opp gjennom huden; E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet.
OEL chemical category	Skin notation
Regulatory reference	FOR-2023-12-18-2278
North Macedonia - Occupational Exposure Limits	
Local name	Толуен
OEL TWA	192 mg/m³
	50 ppm
KTV	2
Short time value [mg/m³]	384 mg/m³
Short time value	100 ppm

toluene (108-88-3)	
Remark	(KTV) краткотрајна вредност (КТВ) значи концентрација на опасни хемиски супстанци во воздухот на работното место внатре во зона на дишење, на која работникот без опасност по здравјето може да е изложен на покусо време. Изложеноста на краткотрајни вредности може да трае највеќе 15 минути и не смее да се повтори повеќе од четирипати во работната смена, при што меѓу две изложености на оваа концентрација мора да измине најмалку 60 минути. Краткотрајната вредност е изразена во mg/m3 или во ml/m3(ppm) а е дадена како многукратни дозволени пречекорувања на граничната вредност; (K) својство на полесно пренесување на супстанците во организмот преку кожата; (BAT) биолошка гранична вредност – праг на биолошка гранична вредност, што значи предупредување на опасна хемиска супстанца и нејзини метаболити во ткивата, телесните течности или издишувањето на воздухот, без оглед на тоа, дали опасната хемиска супстанца е внесена во организмот со вдишување, голтање или преку кожата; (EU) European Union – гранична вредност, определена на ниво на Европската унија
Regulatory reference	Правилник за минималните барања за безбедност и здравје при работа на вработени од ризици поврзани со изложување на хемиски супстанци („Службен весник на Република Македонија” бр.46/10)
Switzerland - Occupational Exposure Limits	
Local name	Toluène / Toluol
MAK (OEL TWA)	190 mg/m³
	50 ppm
KZGW (OEL STEL)	760 mg/m³
	200 ppm
Notation	R, R2, SS_C, O^B, B / H, R2, SS_C, O^L, B
Remark	INRS, HSE, NIOSH, DFG
OEL chemical category	Skin notation, Category 2 reproductive toxin
Regulatory reference	www.suva.ch, 01.01.2024
Switzerland - BAT	
Local name	Toluène / Toluol
BAT	600 µg/l Parameter: Toluene - Medium: whole blood - Sampling time: end of shift 6,48 µmol/l Parameter: Toluene - Medium: whole blood - Sampling time: end of shift 2 g/g creatinine Parameter: Hippuric acid - Medium: urine - Sampling time: end of shift, and after several shifts (for long-term exposures) Parameter: Hippuric acid - Medium: urine - Sampling time: end of shift, and after several shifts (for long-term exposures) 0,5 mg/l Parameter: o-Cresol - Medium: urine - Sampling time: end of shift, and after several shifts (for long-term exposures) 4,62 µmol/l Parameter: o-Cresol - Medium: urine - Sampling time: end of shift, and after several shifts (for long-term exposures) 75 µg/l Parameter: Toluol - Medium: urine - Sampling time: end of shift
Regulatory reference	Ordonnance 832.30 (OPA), article 50 al. 3, www.suva.ch/valeurs-limites / Verordnung 832.30 (VUV), Art. 50 Abs. 3, www.suva.ch/grenzwerte

toluene (108-88-3)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Toluene
ACGIH® TLV® TWA	20 ppm
Remark (ACGIH)	TLV® Basis: CNS, visual & hearing impair; female repro system eff; pregnancy loss. Notations: OTO; A4 (Not classifiable as a Human Carcinogen); BEI
ACGIH chemical category	Not Classifiable as a Human Carcinogen
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Toluene
BEI	0,02 mg/l Parameter: Toluene - Medium: blood - Sampling time: prior to last shift of workweek 0,03 mg/l Parameter: Toluene - Medium: urine - Sampling time: end of shift 0,3 mg/g creatinine Parameter: o-Cresol with hydrolysis - Medium: urine - Sampling time: end of shift (background)
Regulatory reference	ACGIH 2024

8.1.2. Recommended monitoring procedures

Monitoring methods	
Monitoring methods	Concentration measurement in air. Personal air monitoring . Personal air monitoring. Room air monitoring.

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

Toluene (108-88-3)	
DNEL/DMEL (workers)	
Acute - systemic effects, inhalation	384 mg/m³
Acute - local effects, inhalation	384 mg/m³
Long-term - systemic effects, dermal	384 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	192 mg/m³
Long-term - local effects, inhalation	192 mg/m³
DNEL/DMEL (general population)	
Acute - systemic effects, inhalation	226 mg/kg bodyweight/day
Acute - local effects, inhalation	226 mg/m³
Long-term - systemic effects,oral	8,13 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	56,5 mg/m³
Long-term - systemic effects, dermal	226 mg/kg bodyweight/day

Toluene (108-88-3)	
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. Personal air monitoring. Room air monitoring

8.1.5. Control banding

No additional information available

8.2. Exposure controls

Engineering measure(s) : Closed system. Provide adequate ventilation. 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 Section 7 for information on safe handling. Use only outdoors or in a well-ventilated area. Take precautionary measures against static discharges. Ensure equipment is adequately earthed. Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.

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 : Wear chemically resistant gloves (tested to EN374) . Suitable material: Polyvinylalcohol (PVA). Breakthrough time : >360 minutes. Thickness of the glove material: Not determined. The quality of the protective gloves resistant to chemicals must be chosen as a function of the specific working place concentration and quantity of hazardous substances.

Eye protection : Use suitable eye protection (EN166): Safety glasses. goggles

Body protection : Wear suitable protective clothing. Wear chemical resistant apron.

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment. full face mask (DIN EN 136). Half-face mask (DIN EN 140). Filter type: A (EN 14387). Use self-contained respiratory apparatus for rescue and maintenance work in storage vessels. The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, self-contained breathing apparatus must be used. (EN 137)

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

Environmental exposure controls : Comply with applicable Community environmental protection legislation. Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Colour	:	clear.
Appearance	:	Liquid.
Odour	:	Characteristic.
Odour threshold	:	No data available
Melting / freezing point	:	-95 °C
Freezing point	:	Not available
Initial boiling point and boiling range	:	110,6 °C
Flammability	:	Highly flammable liquid and vapour.
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.
Lower explosion limit	:	1,2 vol %
Upper explosion limit	:	7 vol %
Flash point	:	5 °C Closed cup
Auto-ignition temperature	:	480 °C
Decomposition temperature	:	No data available
pH	:	Not applicable
Kinematic viscosity	:	No data available
Dynamic viscosity	:	0,56 mPa·s (25°C)
Solubility	:	Water: 573 – 587 mg/l (20°C)
Partition coefficient n-octanol/water (Log Kow)	:	2,73
Vapour pressure	:	36 mmHg (20°C)
Vapour pressure at 50°C	:	Not available
Density	:	Not available
Relative density	:	0,846 – 0,873 g/cm³ (15°C)
Vapour density	:	3,4 (Air=1)
Particle characteristics	:	Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

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: 10.4 & 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

Avoid the build-up of electrostatic charge. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Protect from sunlight. See Section 7 for information on safe handling.

10.5. Incompatible materials

oxidising substances. Strong acids. See Section 7 for information on safe handling.

10.6. Hazardous decomposition products

Carbon oxides (CO, CO2). Reference to other sections 5.2.

SECTION 11: Toxicological information

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

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

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

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

toluene (108-88-3)	
LD50/oral/rat	2600 mg/kg (Source: JAPAN_GHS)
LD50/dermal/rabbit	12000 mg/kg (Source: JAPAN_GHS)
LC50/inhalation/4h/rat	12,5 mg/l/4h

Skin corrosion/irritation : Causes skin irritation.
pH: Not applicable

Additional information : Test Method EU B.4

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)

Additional information : NOAEC, Inhalation, Rat: 4522 mg/m³

toluene (108-88-3)	
IARC group	3 - Not classifiable

Reproductive toxicity : Suspected of damaging the unborn child.
Additional information : NOAEC, Inhalation, Rat: 2261 mg/m³

STOT-single exposure : May cause drowsiness or dizziness.

toluene (108-88-3)	
STOT-single exposure	May cause drowsiness or dizziness.

STOT-repeated exposure : May cause damage to organs through prolonged or repeated exposure.
Additional information : Inhalation of high vapour concentrations can cause CNS-depression and narcosis.
OECD Test Guideline 453
Test Method EU B.29

toluene (108-88-3)	
STOT-repeated exposure	May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard : May be fatal if swallowed and enters airways.

Toluene (108-88-3)	
Kinematic viscosity	No data available

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties : The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

11.2.2. Other information

Other information : Symptoms related to the physical, chemical and toxicological characteristics,For further information see section 4

SECTION 12: Ecological information

12.1. Toxicity

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

Hazardous to the aquatic environment, short–term (acute) : Not classified

Hazardous to the aquatic environment, long–term (chronic) : Not classified

toluene (108-88-3)	
LC50 - Fish [1]	15,22 – 19,05 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through] Source: EPA)

toluene (108-88-3)	
LC50 - Fish [2]	12,6 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: EPA)
LC50 - Other aquatic organisms [1]	3,78 mg/l after 2 days
EC50 - Crustacea [1]	5,46 – 9,83 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 - Crustacea [2]	11,5 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 72h - Algae [1]	12,5 mg/l (Species: Pseudokirchneriella subcapitata [static])
EC50 96h - Algae [1]	> 433 mg/l (Species: Pseudokirchneriella subcapitata)
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.

toluene (108-88-3)	
Persistence and degradability	Readily biodegradable.

12.3. Bioaccumulative potential

Toluene (108-88-3)	
Partition coefficient n-octanol/water (Log Kow)	2,73
Bioaccumulative potential	No additional information available.

toluene (108-88-3)	
Partition coefficient n-octanol/water	2,73 (at 20 °C (at pH 7)
Bioaccumulative potential	No bioaccumulation.

12.4. Mobility in soil

Toluene (108-88-3)	
Mobility in soil	No data available
Ecology - soil	No data available.

12.5. Results of PBT and vPvB assessment

Toluene (108-88-3)	
Results of PBT assessment	This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties : The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

12.7. Other adverse effects

Other adverse effects : No data available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Avoid release to the environment. Dispose of empty containers and wastes safely. See Section 7 for information on safe handling. Refer to manufacturer/supplier for information on recovery/recycling. Recycling is preferred to disposal or incineration. If recycling is not possible, eliminate in accordance with local valid waste disposal regulations. Handle contaminated packages in the same way as the substance itself. Dispose of contaminated materials in accordance with current regulations. Packaging contaminated by the product : Do not pierce or burn, even after use. Never use pressure to empty container.

European waste catalogue (2001/573/EC, 75/442/EEC, 91/689/EEC) : This material and its container must be disposed of as hazardous waste
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* - solvents

SECTION 14: Transport information

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

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
1294	1294	1294	1294	1294
14.2. UN proper shipping name				
TOLUENE	TOLUENE	Toluene	TOLUENE	TOLUENE
Transport document description				
UN 1294 TOLUENE, 3, II, (D/E)	UN 1294 TOLUENE, 3, II (7°C c.c.)	UN 1294 Toluene, 3, II	UN 1294 TOLUENE, 3, II	UN 1294 TOLUENE, 3, II
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
II	II	II	II	II
14.5. Environmental hazards				
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

ADR	IMDG	IATA	ADN	RID
No supplementary information available				

14.6. Special precautions for user

Special precautions for user : No data available

- Overland transport

Classification code (ADR) : F1

Limited quantities (ADR) : 1l

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

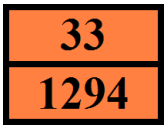
Vehicle for tank carriage : FL

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
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. Maritime transport in bulk according to IMO instruments

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

REACH Annex XVII (Restriction List)

EU restriction list (REACH Annex XVII)		
Reference code	**Applicable on**	**Entry title or description**
3(a)	Toluene ; toluene	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
3(b)	Toluene ; toluene	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

EU restriction list (REACH Annex XVII)		
Reference code	**Applicable on**	**Entry title or description**
40.	Toluene ; toluene	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.
48.	Toluene ; toluene	Toluene

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Contains no substance(s) listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)

POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

Ozone Regulation (2024/590)

Not listed on the Ozone Depletion list (Regulation EU 2024/590)

Council Regulation (EC) for the control of dual-use items

Contains no substance subject to the COUNCIL REGULATION (EC) for the control of dual-use items

VOC Directive (2004/42)

VOC content :100 %

Explosives Precursors Regulation (EU 2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (EC 273/2004)

Contains substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

Name	CN designation	CAS-No.	CN code	Category, Subcategory	Threshold	Annex
Toluene		108-88-3	2902 30 00	Category 3		Annex I

Detergent Regulation (648/2004/EC): Labelling of contents

Labelling for contents according to regulation (EC) No. 648/2004 : Not applicable

15.1.2. National regulations

France

Occupational diseases	
Code	Description
RG 4 BIS	Gastrointestinal disorders caused by benzene, toluene, xylenes and all products containing them
RG 84	Conditions caused by liquid organic solvents for professional use: saturated or unsaturated aliphatic or cyclic liquid hydrocarbons and mixtures thereof; liquid halogenated hydrocarbons; nitrated derivatives of aliphatic hydrocarbons; alcohols; glycols, glycol ethers; ketones; aldehydes; aliphatic and cyclic ethers, including tetrahydrofuran; esters; dimethylformamide and dimethylacetamine; acetonitrile and propionitrile; pyridine; dimethylsulfone and dimethylsulfoxide

Installations classées			
No ICPE	Désignation de la rubrique	Code Régime	Rayon
4331.text	Liquides inflammables de catégorie 2 ou catégorie 3 à l'exclusion de la rubrique 4330. La quantité totale susceptible d'être présente dans les installations y compris dans les cavités souterraines étant :		
4331.1	1. Supérieure ou égale à 1000 t Quantité seuil bas au sens de l'article R. 511-10 : 5 000 t. Quantité seuil haut au sens de l'article R. 511-10 : 50 000 t.	A	2
4331.2	2. Supérieure ou égale à 100 t mais inférieure à 1000 t Quantité seuil bas au sens de l'article R. 511-10 : 5 000 t. Quantité seuil haut au sens de l'article R. 511-10 : 50 000 t.	E	
4331.3	3. Supérieure ou égale à 50 t mais inférieure à 100 t Quantité seuil bas au sens de l'article R. 511-10 : 5 000 t. Quantité seuil haut au sens de l'article R. 511-10 : 50 000 t.	DC	

Germany

Water hazard class (WGK) : WGK 3, Highly hazardous to water (Classification according to AwSV; ID No. 194).

Major Accidents Ordinance (12. BImSchV) : Listed in the 12. BImSchV (Annex I) under: 1.2.5.2
- Quantity threshold for operational area under § 1 para. 1
  - Sentence 1 :50000 kg
  - Sentence 2 :200000 kg

Netherlands

Waterbezwaarlijkheid : B (5) - Weinig schadelijk voor in het water levende organismen
SZW-lijst van kankerverwekkende stoffen : The substance is not listed
SZW-lijst van mutagene stoffen : The substance is not listed
SZW-lijst van reprotoxische stoffen – Borstvoeding : The substance is not listed
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : The substance is not listed
SZW-lijst van reprotoxische 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

Danish National Regulations : 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

Indication of changes:

1.3	Details of the supplier of the safety data sheet	Modified	
2.2	Precautionary statements (CLP)	Update	
16	Other information	Added	

Abbreviations and acronyms:

	ABM = Algemene beoordelingsmethodiek
	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
	BTT = Breakthrough time (maximum wearing time)
	DMEL = Derived Minimal Effect level
	DNEL = Derived No Effect 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
	EWC = European waste catalogue
	LC50 = Median lethal concentration
	LD50 = Median lethal dose
	LL50 = Median lethal level
	NA = Not applicable
	NOEC = No observed effect concentration
	NOEL: no-observed-effect level
	NOELR = No observed effect loading rate
	NOAEC = No observed adverse effect concentration
	NOAEL = No observed adverse effect level
	N.O.S. = Not Otherwise Specified
	OEL = Occupational Exposure Limits - Short Term Exposure Limits (STELs)
	PNEC = Predicted No Effect Concentration
	Quantitative structure-activity relationship (QSAR)
	STOT = Specific Target Organ Toxicity
	TWA = time weighted average
	VOC = Volatile organic compounds
	WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water Management Act)

Sources of key data used to compile the datasheet : ECHA (European Chemicals Agency). CSR = Chemical Safety Report. Supplier information.

Training advice : Training staff on good practice. Manipulations are to be done only by qualified and authorised persons.

Other information : Hazard classification and labeling of petroleum substances in the European Economic Area, Concawe – 2025 (http://www.concawe.eu).

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, 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.

Full text of use descriptors

ERC1	Manufacture of the substance
ERC2	Formulation into mixture
ERC3	Formulation into solid matrix
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
ERC6a	Use of intermediate
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC6c	Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC6d	Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC7	Use of functional fluid at industrial site
ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
PC1	Adhesives, sealants
PC10	Building and construction preparations not covered elsewhere
PC13	Fuels
PC15	Non-metal-surface treatment products
PC18	Ink and Toners
PC23	Leather treatment products

PC24	Lubricants, greases, release products
PC31	Glansmiddelen en wasmengsels
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 preparations
PC8	Biocidal products
PC9a	Coatings and paints, thinners, paint removers
PC9b	Fillers, putties, plasters, modelling clay
PC9c	Finger paints
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
PROC15	Use as laboratory reagent
PROC16	Use of fuels
PROC19	Manual activities involving hand contact
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC20	Use of functional fluids in small devices
PROC21	Low energy manipulation and handling of substances bound in/on materials or articles
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC6	Calendering operations
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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

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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,		ERC9a, ERC9b	

			PROC3, PROC8a, PROC8b, PROC16			
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,		ERC8a, ERC8d	

			PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14			
Use as laboratory reagent	SU3, SU10		PROC10, PROC15		ERC2, ERC4	
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	
Use in 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, distribution and associated laboratory activities. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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 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 the substance
ERC2	Formulation into mixture
ERC3	Formulation into solid matrix
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
ERC6a	Use of intermediate
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC6c	Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC6d	Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC7	Use of functional fluid at industrial site
Assessment method	EUSES 2.1.1

Product characteristics

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:	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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

Risk management measures

Technical onsite conditions and measures to reduce or	Treat air emission to provide a typical removal efficiency of (%):	> 90

limit discharges, air emissions and releases to soil	Typical onsite wastewater treatment technology provides removal efficiency of	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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 potential for aerosol generation	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.	
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	Use of intermediate
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
	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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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

4.1. Health

Guidance - Health	Not applicable

4.2. Environment

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

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. Widespread use by professional workers (PW)
Assessment method	Used ECETOC TRA model EUSES

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 mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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.	

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	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

1. Exposure scenario 05

Use in cleaning agents

ES Ref.: 05 ES Type: Worker	

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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 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	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	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	
	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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

1. Exposure scenario 06

Use in cleaning agents

ES Ref.: 06 ES Type: Worker	

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). Widespread use by professional workers (PW)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	

products)		
CS45 - Filling/ preparation of equipment from drums or containers,outdoor	Ensure operation is undertaken outdoors,Avoid 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	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	0

Risk management measures

Technical onsite conditions and measures to reduce or	Treat air emission to provide a typical removal efficiency of (%):	> 0

limit discharges, air emissions and releases to soil	Typical onsite wastewater treatment technology provides removal efficiency of	
	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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC16	Use of fuels

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).	
Storage	No specific measures identified.	

2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Use of functional fluid at industrial site
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	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	
	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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

1. Exposure scenario 08

Use as a fuel

ES Ref.: 08 ES Type: Worker	

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. Widespread use by professional workers (PW)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC16	Use of fuels

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.	
Storage	E84 - Store substance within a closed system.	

2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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 (C)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC13)

PC13	Fuels

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	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

	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 (34m³) 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	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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	Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from wide dispersive use (regional only):	

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	
	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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

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	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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 exposures (closed systems)	No specific measures identified.	
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 or articles by tabletting, compression, extrusion or pelletisation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
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	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	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	
	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	

plant	domestic sewage treatment (%):	
	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

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,EUSES

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.

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.

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. Widespread use by professional workers (PW)
Assessment method	Used ECETOC TRA model EUSES

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	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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	Manual activities involving hand contact

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	No specific measures identified.	

contained systems		
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	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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):	
	Release fraction to wastewater from process (initial release prior to RMM):	

	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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 (C)
Assessment method	Used ECETOC TRA model EUSES

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 preparations
PC8	Biocidal products
PC9a	Coatings and paints, thinners, paint removers
PC9b	Fillers, putties, plasters, modelling clay
PC9c	Finger paints
PC10	Building and construction preparations not covered elsewhere
PC15	Non-metal-surface treatment products
PC18	Ink and Toners
PC23	Leather treatment products
PC24	Lubricants, greases, release products
PC31	Glansmiddelen en wasmengsels
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

		time/on day of use. For each use event, covers use amounts up to: 0,5 g. Covers use in a one car garage (34m³) under typical ventilation. Covers use in room size of 34 m3. Covers exposure up to 0,02. 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 (34m³) 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 (34m³) 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 removers,Waterborne latex wall paint	Unless otherwise stated. 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 (34m³) under typical ventilation. Covers use in room size of 20 m3. Covers

		exposure up to 1,00. Hours/event
	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 care products,Polishes, wax/cream (floor, furniture, shoes)	Unless otherwise stated. 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 (34m³) 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 (34m³) 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, shoes)	Unless otherwise stated. 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	No specific risk management measure identified	

(paint-, glue-, wall paper-, sealant-remover)	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 products,Polishes, wax/cream (floor, furniture, shoes)	No specific risk management measure identified 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.	
Glansmiddelen en wasmengsels,Polishes, wax/cream (floor, furniture, shoes)	No specific risk management measure identified beyond those operational conditions stated.	
Glansmiddelen en wasmengsels,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	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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):	
	Release fraction to wastewater from wide dispersive use:(regional only)	
	Release fraction to soil from wide dispersive use (regional only):	

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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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.	
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	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
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

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

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.

4.2. Environment

Guidance - Environment	Discharge to aquatic environment is restricted by law and industry prohibits release.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

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	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC6	Calendering operations
PROC7	Industrial spraying
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

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).	
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	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	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	
	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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Widespread use by professional workers (PW)
Assessment method	Used ECETOC TRA model EUSES

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	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC6	Calendering operations
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

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).	
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	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

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 into mixture
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES 2.1.1

Product characteristics

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	Release fraction to air from process (initial release prior to RMM):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Widespread use by professional workers (PW)
Assessment method	Used ECETOC TRA model EUSES

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	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
Frequency and duration of use	Number of emission days per year	365
Environmental factors not influenced by risk	Local freshwater dilution factor:	10

management	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	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	
	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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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.	
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	Use of functional fluid at industrial site
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Widespread use by professional workers (PW)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC20	Use of functional fluids in small devices

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	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
Assessment method	EUSES 2.1.1

Product characteristics

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	
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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

1. Exposure scenario 20

Use in 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 Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

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	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC6	Calendering operations
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC13	Treatment of articles by dipping and pouring
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
PROC15	Use as laboratory reagent
PROC21	Low energy manipulation and handling of substances bound in/on materials 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 exposure.	No specific measures identified.	
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	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC6d	Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)
Assessment method	EUSES 2.1.1

Product characteristics

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	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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

1. Exposure scenario 21

Formulation

ES Ref.: 21 ES Type: Worker	

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 Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

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	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
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	No specific measures identified.	

potential for aerosol generation		
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 or articles by tabletting, compression, extrusion or pelletisation	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
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 into mixture
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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,EUSES

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.

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.

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. Use at industrial sites (IS)
Assessment method	Used ECETOC TRA model EUSES

2. Operational conditions and risk management measures

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

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) 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 potential for aerosol generation	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.	
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 the substance
Assessment method	EUSES 2.1.1

Product characteristics

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):	
	Release fraction to wastewater from process (initial release prior to RMM):	
	Release fraction to soil from process (initial release prior to RMM):	

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	
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 (%):	
	Assumed domestic sewage treatment plant flow (m^3/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	
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,EUSES

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.

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.