Cyclohexane

Version 5.0 Revision Date 2017-02-01

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

Product information

Product Name : Cyclohexane
Material : 1015388, 1098296, 1080331, 1059057, 1026806, 1025303, 1026803, 1026805

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
Cyclohexane	110-82-7 203-806-2 601-017-00-1	Chevron Phillips Chemical Company LP 01-2119463273-41-0001

Relevant Identified Uses Supported : Manufacture
Use as an intermediate
Use in coatings – industrial
Distribution
Formulation
Use as a cleaning agent – industrial
Use in coatings – professional

Company : Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Local : Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vincilaan 19
1831 Diegem
Belgium

SDS Requests: (800) 852-5530
Technical Information: (832) 813-4862
Responsible Party: Product Safety Group
Email:sds@cpchem.com

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: +800 CHEMCALL (+800 2436 2255) China:+86-21-22157316
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department	:	Product Safety and Toxicology Group
E-mail address	:	SDS@CPChem.com
Website	:	www.CPChem.com

SECTION 2: Hazards identification

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable liquids, Category 2	H225: Highly flammable liquid and vapor.
Skin irritation, Category 2	H315: Causes skin irritation.
Specific target organ systemic toxicity - single exposure, Category 3	H336: May cause drowsiness or dizziness.
Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.
Chronic aquatic toxicity, Category 1	H410: Very toxic to aquatic life with long lasting effects.
Acute aquatic toxicity, Category 1	H400: Very toxic to aquatic life.

Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal Word : Danger

Hazard Statements	:	H225 Highly flammable liquid and vapor.
		H304 May be fatal if swallowed and enters airways.
		H315 Causes skin irritation.
		H336 May cause drowsiness or dizziness.
		H410 Very toxic to aquatic life with long lasting effects.
Precautionary Statements	:	**Prevention:**
		P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
		P243 Take precautionary measures against static discharge.
		P273 Avoid release to the environment.
		P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P331	Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

Storage:

P403 + P235	Store in a well-ventilated place. Keep cool.

Hazardous ingredients which must be listed on the label:
- 110-82-7 Cyclohexane

SECTION 3: Composition/information on ingredients

Synonyms : Not Established

Molecular formula : C6H12

Mixtures

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
Cyclohexane	110-82-7 203-806-2 601-017-00-1	Flam. Liq. 2; H225 Skin Irrit. 2; H315 STOT SE 3; H336 Asp. Tox. 1; H304 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	99,9 - 100

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Symptoms of poisoning may appear several hours later. Do not leave the victim unattended.

If inhaled : Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.

In case of skin contact : If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Flush eyes with water as a precaution.

If swallowed	:	Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point	:	-18,3 °C (-0,9 °F) Method: closed cup
Autoignition temperature	:	260 °C (500 °F)
Suitable extinguishing media	:	Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.
Fire and explosion protection	:	Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	Carbon Dioxide. Carbon oxides.

SECTION 6: Accidental release measures

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods for cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to

local / national regulations (see section 13).
For additional details, see the Exposure Scenario in the Annex portion

SECTION 7: Handling and storage

Handling

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations.
Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary, but may not by themselves be sufficient. Review all operations, which have the potential to generating and accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106 "Flammable and Combustible Liquids"; National Fire Protection Association (NFPA 77), "Recommended Practice on Static Electricity"; and/or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising Out of Static, Lightning, and stray Currents".

Advice on protection against fire and explosion : Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

Storage

Requirements for storage areas and containers : No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

German storage class : Flammable liquids

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

SK

Zložka	Podstata	Hodnota	Kontrolné parametre	Poznámka
Cyclohexane	SK OEL	NPEL priemerný	200 ppm, 700 mg/m3	

SI

Sestavine	Osnova	Vrednost	Parametri nadzora	Pripomba

Cyclohexane	SI OEL	MV	200 ppm, 700 mg/m3	EU**, BAT,

BAT Biološka mejna vrednost - določena je biološka mejna vrednost, ki pomeni opozorilno raven nevarne kemične snovi in njenih metabolitov v tkivih, telesnih tekočinah ali izdihanem zraku, ne glede na to, ali je nevarna kemična snov vnesena v organizem z vdihavanjem, zaužitjem ali skozi kožo.
EU** Mejna vrednost, določena z Direktivo Komisije 2006/15/ES z dne 7. februarja 2006 o določitvi drugega seznama indikativnih mejnih vrednosti za poklicno izpostavljenost pri izvajanju Direktive Sveta 98/24/ES ter o spremembi Direktive 91/322/EGS in Direktive 2000/39/ES (UL L, št. 38, z dne 9. februarja 2006, str. 36).

SE

Beståndsdelar	Grundval	Värde	Kontrollparametrar	Anmärkning
Cyclohexane	SE AFS	NGV	200 ppm, 700 mg/m3	

RO

Componente	Bază	Valoare	Parametri de control	Notă
Cyclohexane	RO OEL	TWA	200 ppm, 700 mg/m3	

PT

Componentes	Bases	Valor	Parâmetros de controlo	Nota
Cyclohexane	PT OEL	VLE-MP	100 ppm,	(1), afeção do SNC,
	PT DL 305/2007	oito horas	200 ppm, 700 mg/m3	

(1) Abrangido por legislação nacional específica ou por legislação comunitária não transposta
afeção do SNC afeção do sistema nervoso central

PL

Składniki	Podstawa	Wartość	Parametry dotyczące kontroli	Uwaga
Cyclohexane	PL NDS	NDS	300 mg/m3	
	PL NDS	NDSch	1.000 mg/m3	

NO

Komponenter	Grunnlag	Verdi	Kontrollparametrer	Nota
Cyclohexane	FOR-2011-12-06-1358	TWA	150 ppm, 525 mg/m3	E,

E EU har en veiledende grenseverdi for stoffet

NL

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
Cyclohexane	NL WG	TGG-8 uur	700 mg/m3	
	NL WG	TGG-15 min	1.400 mg/m3	

MT

Ingredients	Basis	Value	Control parameters	Note
Cyclohexane	MT OEL	TWA	200 ppm, 700 mg/m3	

LV

Sastāvdaļas	Bāze	Vērtība	Pārvaldības parametri	Piezīme
Cyclohexane	LV OEL	AER 8 st	23 ppm, 80 mg/m3	

LU

Composants	Base	Valeur	Paramètres de contrôle	Note
Cyclohexane	LU OEL	TWA	200 ppm, 700 mg/m3	

LT

Komponentai	Pagrindas, bazė	Vertė	Kontrolės parametrai	Pastaba
Cyclohexane	LT OEL	IPRD	200 ppm, 700 mg/m3	

IT

Componenti	Base	Valore	Parametri di controllo	Nota
Cyclohexane	IT OEL	TWA	100 ppm, 350 mg/m3	

IE

Ingredients	Basis	Value	Control parameters	Note
Cyclohexane	IE OEL	OELV - 8 hrs (TWA)	200 ppm, 700 mg/m3	IOELV,

IOELV Indicative Occupational Exposure Limit Value

HU

Komponensek	Bázis	Érték	Ellenőrzési paraméterek	Megjegyzés
Cyclohexane	HU OEL	AK-érték	700 mg/m3	EU2,
	HU OEL	CK-érték	2.800 mg/m3	EU2,

EU2 2006/15/EK irányelvben közölt érték

GR

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
Cyclohexane	GR OEL	TWA	200 ppm, 700 mg/m3	

GB

Ingredients	Basis	Value	Control parameters	Note
Cyclohexane	GB EH40	TWA	100 ppm, 350 mg/m3	
	GB EH40	STEL	300 ppm, 1.050 mg/m3	

FR

Composants	Base	Valeur	Paramètres de contrôle	Note
Cyclohexane	FR VLE	VME	200 ppm, 700 mg/m3	noir,
	FR VLE	VLCT (VLE)	375 ppm, 1.300 mg/m3	(11), normal,

(11) La VLE n'est pas réglementaire et provient d'une circulaire du ministère chargé du travail
noir Valeurs limites réglementaires contraignantes
normal Valeurs limites indicatives

FI

Aineosat	Peruste	Arvo	Valvontaa koskevat muuttujat	Huomautus
Cyclohexane	FI OEL	HTP-arvot 8h	100 ppm, 350 mg/m3	
	FI OEL	HTP-arvot 15 min	250 ppm, 875 mg/m3	

ES

Componentes	Base	Valor	Parámetros de control	Nota
Cyclohexane	ES VLA	VLA-ED	200 ppm, 700 mg/m3	r, VLI,

r Esta sustancia tiene establecidas restricciones a la fabricación, la comercialización o el uso en los términos especificados en el 'Reglamento CE 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.
VLI Agente químico para el que la U.E. estableció en su día un valor límite indicativo. Todos estos agentes químicos figuran al menos en una de las directivas de valores límite indicativos publicadas hasta ahora (ver Anexo C. Bibliografía). Los estados miembros disponen de un tiempo fijado en dichas directivas para su transposición a los valores límites de cada país miembro. Una vez adoptados, estos valores tienen la misma validez que el resto de los valores adoptados por el país.

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
Cyclohexane	EE OEL	Piirnorm	200 ppm, 700 mg/m3	

DK

Komponenter	Basis	Værdi	Kontrolparametre	Note
Cyclohexane	DK OEL	GV	50 ppm, 172 mg/m3	E,

E At stoffet har en EF-grænseværdi

DE

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Cyclohexane	DE TRGS 900	AGW	200 ppm, 700 mg/m3	DFG, EU,

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.)

CZ

Složky	Základ	Hodnota	Kontrolní parametry	Poznámka
Cyclohexane	CZ OEL	PEL	700 mg/m3	I,
	CZ OEL	NPK-P	2.000 mg/m3	I,

I dráždí sliznice (oči, dýchací cesty) resp. kůži

CY

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
Cyclohexane	CY OEL	TWA	200 ppm, 700 mg/m3	

CH

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Cyclohexane	CH SUVA	MAK-Wert	200 ppm, 700 mg/m3	NIOSH,
	CH SUVA	KZGW	800 ppm, 2.800 mg/m3	NIOSH,

NIOSH National Institute for Occupational Safety and Health

BG

Съставки	Основа	Стойност	Параметри на контрол	Бележка
Cyclohexane	BG OEL	TWA	200 ppm, 700 mg/m3	-,

- Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност. Граничните стойности на тези химични агенти във въздуха на работната среда, определени с наредбата, са съобразени със съответните стойности, приети за Европейската общност, като могат да бъдат равни или по-ниски от тях.

BE

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking

Cyclohexane	BE OEL	TGG 8 hr	100 ppm, 350 mg/m3	

AT

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Cyclohexane	AT OEL	TMW	200 ppm, 700 mg/m3	
	AT OEL	KZW	800 ppm, 2.800 mg/m3	

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Acute effects, Systemic effects
Value: 700 mg/m3

DNEL : Routes of exposure: Inhalation
Potential health effects: Acute effects, Local effects
Value: 700 mg/m3

DNEL : Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 700 mg/m3

DNEL : Routes of exposure: Inhalation
Potential health effects: Chronic effects, Local effects
Value: 700 mg/m3

DNEL : Routes of exposure: Skin contact
Potential health effects: Chronic effects, Systemic effects
Value: 2016 mg/kg

PNEC : Fresh water
Value: 0,207 mg/l

PNEC : Sea water
Value: 0,207 mg/l

PNEC : Fresh water sediment
Value: 3,267 mg/kg

PNEC : Sea sediment
Value: 3,267 mg/kg

PNEC : Soil
Value: 2,99 mg/kg

Personal protective equipment

Respiratory protection : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Eye protection	:	Eye wash bottle with pure water. Tightly fitting safety goggles.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Physical state	:	Liquid
Color	:	Colorless
Odor	:	chlorform-like,irritating

Safety data

Flash point	:	-18,3 °C (-0,9 °F) Method: closed cup
Lower explosion limit	:	1,3 %(V)
Upper explosion limit	:	8 %(V)
Oxidizing properties	:	no
Autoignition temperature	:	260 °C (500 °F)
Molecular formula	:	C6H12
Molecular weight	:	84,18 g/mol
pH	:	Not applicable
Pour point	:	No data available
Melting point/range		6,59 °C (43,86 °F)
Boiling point/boiling range	:	80,7 °C (177,3 °F)

Vapor pressure	:	3,26 PSI at 37,8 °C (100,0 °F)
Relative density	:	0,78 at 15,6 °C (60,1 °F)
Density	:	0,8 g/cm3
Water solubility	:	Soluble in hydrocarbon solvents, natural oils, fats, and waxes; insoluble in water.
Partition coefficient: n-octanol/water	:	No data available
Viscosity, kinematic	:	0,953 cSt at 37,8 °C (100,0 °F)
Relative vapor density	:	2,9 (Air = 1.0)
Evaporation rate	:	1,95
Percent volatile	:	> 99 %

Other information

Conductivity	:	< 5 pSm

SECTION 10: Stability and reactivity

Chemical stability	:	This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Conditions to avoid	:	Heat, flames and sparks.
Materials to avoid	:	May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous decomposition products	:	Carbon Dioxide Carbon oxides
Other data	:	No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity

Cyclohexane	:	LD50: > 5.000 mg/kg Species: Rat Sex: male and female Method: OECD Test Guideline 401

Acute inhalation toxicity

Cyclohexane : LC50: >32,880 mg/m3Exposure time: 4 h
Species: Rat
Sex: male and female
Test atmosphere: vapor
Method: OECD Test Guideline 403

Cyclohexane
Skin irritation : May cause skin irritation in susceptible persons.

Cyclohexane
Eye irritation : No adverse effects expected.
Vapors may cause irritation to the eyes, respiratory system and the skin.

Sensitization

Cyclohexane : Did not cause sensitization on laboratory animals.

Repeated dose toxicity

Cyclohexane : Species: Rat
Application Route: Inhalation
Dose: 0, 500, 2000, 7000 ppm
Exposure time: 90 day
Number of exposures: 6 h/d, 5 d/wk
NOEL: 2000 ppm

Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0, 500, 2,000, 7000 ppm
Exposure time: 13-14 wk
Number of exposures: 6 hr/d, 5 d/wk
NOEL: 7000 ppm

Species: Mouse, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0, 500, 2000, 7000 ppm
Exposure time: 13-14 wk
Number of exposures: 6 hr/d, 5 d/wk
NOEL: 2000 ppm
Target Organs: Blood

Reproductive toxicity

Cyclohexane : Species: Rat
Application Route: Inhalation
Dose: 0, 500, 2000, 7000 ppm
Number of exposures: 6 hr/d, 5 d/wk
Method: OECD Test Guideline 416
NOAEL Parent: 500 ppm
NOAEL F1: 7000 ppm
NOAEL F2: 7000 ppm

Developmental Toxicity

Cyclohexane : Species: Rat
Application Route: Inhalation
Dose: 0, 500, 2,000, 7,000 PPM
Number of exposures: 6 hr/d
Test period: GD 6-15
Method: OECD Guideline 414
NOAEL Teratogenicity: 7,000 ppm
NOAEL Maternal: 500 ppm

Species: Rabbit
Application Route: Inhalation
Dose: 0, 500, 2,000, 7,000 PPM
Number of exposures: 6 hr/d
Test period: GD 6-18
Method: OECD Guideline 414
NOAEL Teratogenicity: 7,000 ppm
NOAEL Maternal: 500 ppm

Cyclohexane
Aspiration toxicity : May be fatal if swallowed and enters airways.
Substances known to cause human aspiration toxicity hazards or to be regarded as if they cause human aspiration toxicity hazard.

CMR effects

Cyclohexane : Carcinogenicity: Not classifiable as a human carcinogen.
Mutagenicity: Did not show mutagenic effects in animal experiments.
Teratogenicity: Did not show teratogenic effects in animal experiments.
Reproductive toxicity: No toxicity to reproduction

Cyclohexane
Further information : Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Concentrations substantially above the TLV value may cause narcotic effects. Solvents may degrease the skin.

SECTION 12: Ecological information

Toxicity to fish

Cyclohexane : LC50: 4,53 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

Cyclohexane : EC50: 0,9 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 202

Toxicity to algae

Cyclohexane	:	EbC50: 3,4 mg/l Exposure time: 72 h Species: Selenastrum capricornutum (algae) NOEC: 0,925 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (microalgae) Method: OECD Test Guideline 201
M-Factor cyclohexane	:	1

Bioaccumulation

Cyclohexane	:	Bioconcentration factor (BCF): 167 This material is not expected to bioaccumulate.

Biodegradability

Cyclohexane	:	77 % Testing period: 28 d Method: OECD Test Guideline 301 This material is expected to be readily biodegradable.

Ecotoxicology Assessment

Acute aquatic toxicity Cyclohexane	:	Very toxic to aquatic life.
Chronic aquatic toxicity Cyclohexane	:	Very toxic to aquatic life with long lasting effects.
Results of PBT assessment Cyclohexane	:	Non-classified PBT substance, Non-classified vPvB substance
Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product	:	The product should not be allowed to enter drains, water

courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.

Contaminated packaging : Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN1145, CYCLOHEXANE, 3, II, RQ (CYCLOHEXANE)

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN1145, CYCLOHEXANE, 3, II, (-18,3 °C), MARINE POLLUTANT, (CYCLOHEXANE)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN1145, CYCLOHEXANE, 3, II

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN1145, CYCLOHEXANE, 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS, (CYCLOHEXANE)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN1145, CYCLOHEXANE, 3, II, ENVIRONMENTALLY HAZARDOUS, (CYCLOHEXANE)

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN1145, CYCLOHEXANE, 3, II, ENVIRONMENTALLY HAZARDOUS, (CYCLOHEXANE)

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

Other information	**: Cyclohexane, S.T. 2, Cat. Y**

SECTION 15: Regulatory information

National legislation

Chemical Safety Assessment

Ingredients	:	cyclohexane	A Chemical Safety Assessment has been carried out for this substance.	203-806-2

Major Accident Hazard Legislation : 96/82/EC Update: 2003
Highly flammable
7b
Quantity 1: 5.000 t
Quantity 2: 50.000 t

: 96/82/EC Update: 2003
Dangerous for the environment
9a
Quantity 1: 100 t
Quantity 2: 200 t

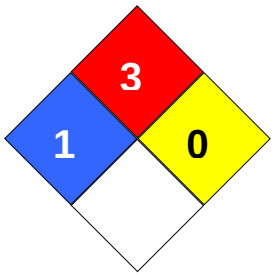
Water contaminating class (Germany) : WGK 2 water endangering
List with water hazardous substances (Class 1 till 3) in VwVwS

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	:	On the inventory, or in compliance with the inventory
Canada DSL	:	On the inventory, or in compliance with the inventory
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	On the inventory, or in compliance with the inventory
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 1
Fire Hazard: 3
Reactivity Hazard: 0



Further information

Legacy SDS Number : 895

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

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

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Annex

1. Short title of Exposure Scenario: **Manufacture**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3:** Industrial Manufacturing (all)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC1, ERC4, ERC6a:** Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in manufacture of another substance (use of intermediates)
Further information	:	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	40
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Continuous use/release		
Number of emission days per year	:	300
Emission or Release Factor: Air	:	5 %
Emission or Release Factor: Water	:	0,015 %
Emission or Release Factor: Soil	:	0 %

Technical conditions and measures / Organizational measures

Soil	:	Treat soil emission to provide the required removal efficiency of (%): (Effectiveness: > 90 %)

Remarks : Soil emission controls are not applicable as there is no direct release to soil.

Conditions and measures related to external treatment of waste for disposal
Waste treatment : During manufacturing no waste of the substance is generated.
Conditions and measures related to external recovery of waste
Recovery Methods : During manufacturing no waste of the substance is generated.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3: Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Drain down system prior to equipment opening or maintenance.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is

implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC1, ERC4	EUSES		Freshwater		0,0652 mg/L	0,315
			Marine water		0,0260 mg/L	0,126
			Freshwater sediment		1,14 mg/kg	0,315
			Marine sediment		0,456 mg/kg	0,578
			Soil		0,0308 mg/kg	0,0105
			Air		1,39 mg/m3	

ERC1: Manufacture of substances
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,00
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,00
PROC3, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50

			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC2, CS15, CS56, CS137, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25
PROC4, CS16, CS55, CS56, CS2	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC8a, CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25
PROC8b, CS14, CS108, CS107, CS138	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,75
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,75
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS56: with sample collection
CS137: With occasional controlled exposure.
CS67: Storage

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS16: General exposures (open systems)
CS55: Batch process
CS56: with sample collection
CS2: Process sampling

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

CS14: Bulk transfers
CS108: (open systems)
CS107: (closed systems)
CS138: With potential for aerosol generation.

PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1
Confirm that RMMs and OCs are as described or of equivalent efficiency.

1. Short title of Exposure Scenario: **Use as an intermediate**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3:** Industrial Manufacturing (all)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)
Further information	:	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

2.1 Contributing scenario controlling environmental exposure for:ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics

Viscosity, dynamic	:	0,894 mPa.s

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	300
Emission or Release Factor: Air	:	0,2 %
Emission or Release Factor: Water	:	0,03 %
Emission or Release Factor: Soil	:	0,1 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 90 %)
Remarks	:	Soil emission controls are not applicable as there is no direct release to soil.
Remarks	:	Do not apply industrial sludge to natural soils.

Conditions and measures related to municipal sewage treatment plant

Effectiveness (of a measure)	:	96,6 %
Remarks	:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	During manufacturing no waste of the substance is generated.

Conditions and measures related to external recovery of waste

Recovery Methods	:	During manufacturing no waste of the substance is generated.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3: Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)

Product characteristics

Physical Form (at time of use)	:	Liquid substance
Vapor pressure	:	> 10 kPa

Amount used

Remarks	:	Not applicable

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Outdoor
Remarks	:	Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures

Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour)

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Physical Form (at time of use) : Liquid substance
Vapor pressure : > 10 kPa

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Outdoor / Indoor : Outdoor
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour), Avoid dip sampling.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Physical Form (at time of use) : Liquid substance
Vapor pressure : > 10 kPa

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor, Outdoor
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour)

Organizational measures to prevent /limit releases, dispersion and exposure
Ensure operatives are trained to minimize exposures.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at

non-dedicated facilities

Product characteristics
Physical Form (at time of use) : Liquid substance
Vapor pressure : > 10 kPa

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor, Outdoor
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Retain drain downs in sealed storage pending disposal or for subsequent recycle., Drain down system prior to equipment opening or maintenance., Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour)

Organizational measures to prevent /limit releases, dispersion and exposure
Clear spills immediately.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Physical Form (at time of use) : Liquid mixture
Vapor pressure : > 10 kPa

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour), Clear transfer lines prior to de-coupling.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Physical Form (at time of use) : Liquid substance

Vapor pressure : > 10 kPa

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC6a	EUSES		Freshwater		0,166 mg/L	0,804
			Marine water		0,0166 mg/L	0,0804
			Freshwater sediment		2,92 mg/kg	0,805
			Marine sediment		0,292 mg/kg	0,370
			Soil		0,0043 mg/kg	0,00144

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,00
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,00
PROC3, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC2, CS15, CS56, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50 ppm	0,25
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25

PROC4, CS2, CS16	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100 ppm	0,5
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC8a, CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50 ppm	0,25
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,26
PROC8b, CS14, CS107, CS108	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	150 ppm	0,75
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,75
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50 ppm	0,25
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS56: with sample collection
CS67: Storage

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS2: Process sampling
CS16: General exposures (open systems)

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers
CS107: (closed systems)
CS108: (open systems)

PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

Confirm that RMMs and OCs are as described or of equivalent efficiency.
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: **Use in coatings – industrial**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3:** Industrial Manufacturing (all)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC5:** Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting; **PROC7:** Industrial spraying **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC10:** Roller application or brushing **PROC13:** Treatment of articles by dipping and pouring **PROC14:** Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting; **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC4:** Industrial use of processing aids in processes and products, not becoming part of articles
Further information	:	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.

2.1 Contributing scenario controlling environmental exposure for:ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Continuous use/release		
Number of emission days per year	:	100
Emission or Release Factor: Air	:	0,098 %

Emission or Release Factor: Soil : 0 %
Remarks : Emission or Release Factor: Air : < 0.001 %

Technical conditions and measures / Organizational measures
Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 90 %)
Remarks : Do not apply industrial sludge to natural soils.

Conditions and measures related to external treatment of waste for disposal
Waste treatment : During manufacturing no waste of the substance is generated.
Conditions and measures related to external recovery of waste
Recovery Methods : During manufacturing no waste of the substance is generated.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is

implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide extraction ventilation at points where emissions occur.

2.2 Contributing scenario controlling worker exposure for: PROC7: Industrial spraying

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide extraction ventilation at points where emissions occur., Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Ensure material transfers are under containment or extract ventilation.

2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC10: Roller application or brushing

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above

ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC13: Treatment of articles by dipping and pouring

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC4	EUSES		Freshwater		0,0003 mg/L	0,00145
			Marine water		0,023 µg/L	0,000111
			Freshwater sediment		0,005 mg/kg	0,00135
			Marine sediment		0,0004 mg/kg	0,000514
			Soil		0,0013 mg/kg	0,000445
			Air		0,154 mg/m3	

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

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,00
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,00
PROC2, CS15, CS56, CS38, CS94, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25
PROC3, CS15, CS29	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC4, CS94	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term –		0,50

			systemic Combined routes		
PROC5, CS96, CS30	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	25,00 ppm	0,13
			Worker – dermal, long-term – systemic	0,07 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,13
PROC7, CS97	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	25,00 ppm	0,13
			Worker – dermal, long-term – systemic	2,14 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,13
CS34, CS10			Worker – inhalation, long-term – systemic	150,00 ppm	0,75
			Worker – dermal, long-term – systemic	42,86 mg/kg/d	0,02
			Worker – long-term – systemic Combined routes		0,77
PROC8a, CS3, CS82	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	25,00 ppm	0,13
			Worker – dermal, long-term – systemic	0,14 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,13
CS39			Worker – inhalation, long-term – systemic	35,00 ppm	0,18
			Worker – dermal, long-term – systemic	13,71 mg/kg	0,01
			Worker – long-term – systemic Combined routes		0,18
PROC8b, CS3, CS81	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	4,50 ppm	0,02
			Worker – dermal, long-term – systemic	0,69 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,02
PROC9, CS3, CS8, CS22	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	140,00 ppm	0,70
			Worker – dermal, long-term – systemic	0,69 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,70
PROC10, CS98	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	175,00 ppm	0,88
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,88
PROC13, CS4	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	175,00 ppm	0,88
			Worker – dermal, long-term – systemic	0,69 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,88
PROC14, CS100	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	175,00 ppm	0,88
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,88

PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	35,00 ppm	0,18
			Worker – dermal, long-term – systemic	0,03 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,18

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS56: with sample collection
CS38: Use in contained systems
CS94: Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing
CS67: Storage

PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)
CS29: Mixing operations (closed systems)

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS94: Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing

PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
CS96: Preparation of material for application
CS30: Mixing operations (open systems)

PROC7: Industrial spraying
CS97: Spraying (automatic/robotic)

CS34: Manual
CS10: Spraying

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS3: Material transfers
CS82: Non-dedicated facility

CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS3: Material transfers
CS81: Dedicated facility

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS3: Material transfers
CS8: Drum/batch transfers
CS22: Transfer from/pouring from containers

PROC10: Roller application or brushing
CS98: Roller, spreader, flow application

PROC13: Treatment of articles by dipping and pouring
CS4: Dipping, immersion and pouring

PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;

CS100: Production or preparation or articles by tabletting, compression, extrusion or pelletization

PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

Confirm that RMMs and OCs are as described or of equivalent efficiency.
1. Short title of Exposure Scenario: **Distribution**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU8, SU9:** Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC1, ERC2:** Manufacture of substances, Formulation of preparations
Further information	:	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.

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC2: Manufacture of substances, Formulation of preparations

Technical conditions and measures / Organizational measures

Remarks	:	Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes use at not more than 20°C above ambient temperature, unless stated differently., Assumes a good basic standard of occupational hygiene is implemented.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Drain down and flush system prior to equipment opening or maintenance.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide extraction ventilation at points where emissions occur.

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

3. Exposure estimation and reference to its source

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,00
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,00
PROC2, CS15, CS56, CS137, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25
PROC3, CS15, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC4, CS16, CS55, CS56	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
CS2	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC8a, CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	25,00 ppm	0,13
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,13
PROC8b, CS14, CS108, CS107	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	150,00 ppm	0,75
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,75
PROC9, CS6	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	20,00 ppm	0,10
			Worker – dermal, long-term – systemic	0,69 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,10
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25

			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,34
			Worker – long-term – systemic Combined routes		0,25

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS56: with sample collection
CS137: With occasional controlled exposure.
CS67: Storage

PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)
CS37: Use in contained batch processes

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS16: General exposures (open systems)
CS55: Batch process
CS56: with sample collection

CS2: Process sampling

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers
CS108: (open systems)
CS107: (closed systems)

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS6: Drum and small package filling

PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.
Confirm that RMMs and OCs are as described or of equivalent efficiency.

1. Short title of Exposure Scenario: **Formulation**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU 10:** Industrial Manufacturing (all), Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional

controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;
PROC15: Use as laboratory reagent

Environmental release category : **ERC2:** Formulation of preparations

Further information :

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for:ERC2: Formulation of preparations

Amount used

EU tonnage (tonnes/year): : 17142
Annual amount per site : 1714

Environment factors not influenced by risk management

Flow rate : 18.000 m3/d
Dilution Factor (River) : 10
Dilution Factor (Coastal Areas) : 100

Other given operational conditions affecting environmental exposure

Continuous use/release
Number of emission days per year : 300
Emission or Release Factor: Air : 2,5 %
Emission or Release Factor: Water : 0,02 %
Emission or Release Factor: Soil : 0,01 %

Technical conditions and measures / Organizational measures

Remarks : Do not apply industrial sludge to natural soils.

Conditions and measures related to municipal sewage treatment plant

Remarks : Estimated substance removal from wastewater via domestic sewage treatment is 96.6%

Conditions and measures related to external treatment of waste for disposal

Waste treatment : External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods : External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics

Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used

Remarks : Not applicable

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure

No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics

Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used

Remarks : Not applicable

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure

No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics

Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used

Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide extraction ventilation at points where emissions occur.

2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide extraction ventilation at points where emissions occur.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Drain down and flush system prior to equipment opening or maintenance.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC2	EUSES		Air		0,0396 mg/m3	
			Freshwater		0,0046 mg/L	0,022
			Marine water		0,411 µg/L	0,00199
			Freshwater sediment		0,0806 mg/kg	0,0222
			Marine sediment		0,0072 mg/kg	0,00918
			Soil		0,0372 mg/kg	0,0126

ERC2: Formulation of preparations

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,00
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,00
PROC2, CS15, CS56, CS137, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25
PROC3, CS136, CS2, CS15, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC4, CS16, CS55, CS56	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC5, CS30	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	25,00 ppm	0,13
			Worker – dermal, long-term – systemic	0,07 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,13
PROC8a, CS22, CS34	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	25,00 ppm	0,13
			Worker – dermal, long-term – systemic	0,14 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,13
CS39	ECETOC TRA		Worker – inhalation,	25,00 ppm	0,13

	Modified		long-term – systemic		
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,13
PROC8b, CS8, CS14	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	150,00 ppm	0,75
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,75
PROC9, CS6	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	14,00 ppm	0,70
			Worker – dermal, long-term – systemic	0,69 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,70
PROC14, CS100	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	175,00 ppm	0,88
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,88
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS56: with sample collection
CS137: With occasional controlled exposure.
CS67: Storage

PROC3: Use in closed batch process (synthesis or formulation)
CS136: Batch processes at elevated temperatures
CS2: Process sampling
CS15: General exposures (closed systems)
CS37: Use in contained batch processes

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS16: General exposures (open systems)
CS55: Batch process
CS56: with sample collection

PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
CS30: Mixing operations (open systems)

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS22: Transfer from/pouring from containers
CS34: Manual

CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large

containers at dedicated facilities
CS8: Drum/batch transfers
CS14: Bulk transfers

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS6: Drum and small package filling

PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;
CS100: Production or preparation or articles by tabletting, compression, extrusion or pelletization

PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1
Confirm that RMMs and OCs are as described or of equivalent efficiency.

1. Short title of Exposure Scenario: **Use as a cleaning agent – industrial**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3:** Industrial Manufacturing (all)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC7:** Industrial spraying **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC10:** Roller application or brushing **PROC13:** Treatment of articles by dipping and pouring
Environmental release category	:	**ERC4:** Industrial use of processing aids in processes and products, not becoming part of articles
Further information	:	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.

3. Exposure estimation and reference to its source

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

1. Short title of Exposure Scenario: **Use in coatings – professional**

Main User Groups	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sector of use	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC5:** Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting; **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC10:** Roller application or brushing **PROC11:** Non industrial spraying **PROC13:** Treatment of articles by dipping and pouring
Environmental release category	:	**ERC8a, ERC8d:** Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems
Further information	:	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.

2.1 Contributing scenario controlling environmental exposure for:ERC8a, ERC8d: Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems

Amount used

EU tonnage (tonnes/year): : 1900
Regional use tonnage (tonnes/year): : 190

Environment factors not influenced by risk management
Flow rate : 18.000 m3/d
Dilution Factor (River) : 10
Dilution Factor (Coastal Areas) : 100

Other given operational conditions affecting environmental exposure
Continuous use/release
Number of emission days per year : 365
Emission or Release Factor: Air : 98 %
Emission or Release Factor: Water : 1 %
Emission or Release Factor: Soil : 1,00 %

Conditions and measures related to municipal sewage treatment plant
Remarks : Estimated substance removal from wastewater via domestic sewage treatment is 96.6%

Conditions and measures related to external treatment of waste for disposal
Waste treatment : External treatment and disposal of waste should comply with applicable local and/or national regulations.

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

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used

Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Ensure operation is undertaken outdoors., 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.

2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour), Ensure operation is undertaken outdoors.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Use drum pumps.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Use drum pumps.

2.2 Contributing scenario controlling worker exposure for: PROC10: Roller application or brushing

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour), Ensure operation is undertaken outdoors.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator conforming to EN140 with Type A filter or better.

2.2 Contributing scenario controlling worker exposure for: PROC11: Non industrial spraying

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures

Carry out in a vented booth or extracted enclosure.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator conforming to EN140 with Type A filter or better.

2.2 Contributing scenario controlling worker exposure for: PROC13: Treatment of articles by dipping and pouring

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Carry out in a vented booth or extracted enclosure.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator conforming to EN140 with Type A filter or better.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC8a, ERC8d	EUSES		Air		0,276 µg/m3	
			Freshwater		0,309 µg/m3	0,00149
			Marine water		0,0256 µg/L	0,000123
			Freshwater sediment		0,0054 mg/kg	0,00149
			Marine sediment		0,448 µg/kg	0,000568
			Soil		0,343 µg/kg	0,000116

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

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS15	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,10 ppm	0,00
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,00
PROC2, CS45, CS15, CS38, CS67, CS137	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00

			Worker – long-term – systemic Combined routes		0,25
PROC3, CS96	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	100,00 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC4, CS95	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	175,00 ppm	0,88
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,88
PROC5, CS96	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	150,00 ppm	0,75
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,76
CS98		Outdoor	Worker – inhalation, long-term – systemic	70,00 ppm	0,35
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,36
PROC8a, CS3, CS8	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	150,00 ppm	0,75
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,76
CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,26
PROC8b, CS3, CS8	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	25,00 ppm	0,13
			Worker – dermal, long-term – systemic	0,69 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,13
PROC10, CS98	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	150,00 ppm	0,75
			Worker – dermal, long-term – systemic	27,43 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,76
CS98		Outdoor	Worker – inhalation, long-term – systemic	35,00 ppm	0,18
			Worker – dermal, long-term – systemic	27,43 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,19
PROC11, CS10, CS34	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	2,14 mg/kg/d	0,00
			Worker – long-term – systemic Combined		0,25

			routes		
CS34, CS10	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	70,00 ppm	0,35
			Worker – dermal, long-term – systemic	107,14 mg/kg/d	0,05
			Worker – long-term – systemic Combined routes		0,40
PROC11, CS10, CS34	ECETOC TRA Modified	Indoor	Worker – inhalation, long-term – systemic	50,00 ppm	0,25
			Worker – dermal, long-term – systemic	2,14 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,25
CS34, CS10	ECETOC TRA Modified	Outdoor	Worker – inhalation, long-term – systemic	70,00 ppm	0,35
			Worker – dermal, long-term – systemic	107,14 mg/kg/d	0,05
			Worker – long-term – systemic Combined routes		0,40

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS45: Filling/ preparation of equipment from drums or containers.
CS15: General exposures (closed systems)
CS38: Use in contained systems
CS67: Storage
CS137: With occasional controlled exposure.

PROC3: Use in closed batch process (synthesis or formulation)
CS96: Preparation of material for application

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS95: Film formation - air drying

PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
CS96: Preparation of material for application

CS98: Roller, spreader, flow application

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS3: Material transfers
CS8: Drum/batch transfers

CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS3: Material transfers
CS8: Drum/batch transfers

PROC10: Roller application or brushing
CS98: Roller, spreader, flow application

CS98: Roller, spreader, flow application

PROC11: Non industrial spraying
CS10: Spraying
CS34: Manual

CS34: Manual
CS10: Spraying

PROC11: Non industrial spraying
CS10: Spraying
CS34: Manual

CS34: Manual
CS10: Spraying

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