Isooctane (Pure Grade)

Version 2.5 Revision Date 2023-02-07

According to Regulation (EC) No. 1907/2006, Regulation (EC) No. 2020/878

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

1.1 Product identifier

Product information

Product Name : Isooctane (Pure Grade)
Material : 1119534, 1074222, 1029592, 1029591, 1029593, 1031448, 1029590

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
2,2,4-Trimethylpentane (Isooctane)	540-84-1 208-759-1 601-009-00-8	Chevron Phillips Chemicals International NV 01-2119457965-22-0002
2,2,4-Trimethylpentane (Isooctane)	540-84-1 208-759-1 601-009-00-8	Chevron Phillips Chemical Company LP 01-2119457965-22-0013

1.2

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

Relevant Identified Uses Supported : Manufacture
Formulation
Use as a fuel - industrial
Use as a fuel – professional
Use as a fuel – consumer
Use in coatings – industrial
Use in coatings – professional
Use in Coatings - Consumer
Use as a cleaning agent – industrial
Use as a cleaning agent – professional
Use as a cleaning agent – consumer
Use as a laboratory agent – industrial
Use as a laboratory agent – professional

1.3

Details of the supplier of the safety data sheet

Company : Chevron Phillips Chemical Company LP
Specialty Chemicals

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
Responsible Party: Product Safety Group
Email:sds@cpchem.com

1.4

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: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Austria: VIZ +43 1 406 43 43 (24 hours/day, 7 days/week)
Belgium: 070 245 245 (24 hours/day, 7 days/week)
Bulgaria: +359 2 9154 233
Croatia: +3851 2348 342 (24 hours/day, 7 days/week)
Cyprus: 1401
Czech Republic: Toxicological Information Center +420 224 919 293, +420 224 915 402
Denmark: Danish Poison Center (Giftlinjen): +45 8212 1212
Estonia: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Finland: 0800 147 111 09 471 977 (24 hours/day)
France: ORFILA number (INRS): + 33 (0) 1 45 42 59 59 (24 hours/day, 7 days/week)
Germany: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Greece: (0030) 2107793777 (24 hours/day, 7 days/week)
Hungary: +36-80-201-199 (24 hours/day, 7 days/week)
Iceland: 543 2222 (24 hours/day, 7 days/week)
Ireland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Italy: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Latvia: State Fire and Rescue Service, phone number: 112; Toxicology and Sepsis Clinic Poisoning and Drug Information Center, Hipokrāta 2, Riga, Latvia, LV-1038, phone number +371 67042473. (24 hours.)
Liechtenstein: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Lithuania: +370 (85) 2362052
Luxembourg: (+352) 8002 5500 (24 hours/day, 7 days/week)
Malta: +356 2395 2000
The Netherlands: NVIC: +31 (0)88 755 8000
Norway: 22 59 13 00 (24 hours/day, 7 days/week)
Poland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Portugal: CIAV phone number: +351 800 250 250
Romania: +40213183606
Slovakia: +421 2 5477 4166
Slovenia: Phone number: 112

Spain: National Emergency Telephone Number of Spanish Poison Centre: +34 91 562 04 20 (24 hours/day, 7 days/week)
Sweden: 112 – ask for Poisons Information

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

SECTION 2: Hazards identification

2.1

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 toxicity - single exposure, Category 3, Central nervous system	H336: May cause drowsiness or dizziness.
Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.
Short-term (acute) aquatic hazard, Category 1	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, Category 1	H410: Very toxic to aquatic life with long lasting effects.

2.2

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, hot surfaces, sparks, open flames and other ignition sources. No smoking.
		P273 Avoid release to the environment.
		Response:
		P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
		P331 Do NOT induce vomiting.
		P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
		P391 Collect spillage.

Hazardous ingredients which must be listed on the label:
- 540-84-1 2,2,4-Trimethylpentane (Isooctane)

2.3

Other hazards

Results of PBT and vPvB assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 - 3.2

Substance or Mixture

Synonyms : 2,2,4-Trimethylpentane
ASTM Isooctane Knock Test Reference Fuel
Isooctane (ASTM Grade)
Isooctane
Primary Reference Fuel

Molecular formula : C8H18

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]	Specific Conc. Limits, M-factors and ATEs
2,2,4-Trimethylpentane (Isooctane)	540-84-1 208-759-1 601-009-00-8	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 - 100	

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

SECTION 4: First aid measures

4.1

Description of first-aid measures

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

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. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

4.2 Most important symptoms and effects, both acute and delayed
Notes to physician

Symptoms	:	No data available.
Risks	:	No data available.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment	:	No data available.

SECTION 5: Firefighting measures

Flash point	:	-12,22°C (10,00°F) estimated
Autoignition temperature	:	411°C (772°F)

5.1
Extinguishing media

Suitable extinguishing media	:	Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.
Unsuitable extinguishing media	:	High volume water jet.

5.2
Special hazards arising from the substance or mixture

Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.

5.3
Advice for firefighters

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 a naked flame or any 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	:	Hydrocarbons. Carbon oxides.

SECTION 6: Accidental release measures

6.1

Personal precautions, protective equipment and emergency procedures

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.

6.2

Environmental precautions

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.

6.3

Methods and materials for containment and cleaning up

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).

6.4

Reference to other sections

Reference to other sections : For personal protection see section 8. For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1

Precautions for safe handling
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.

Advice on protection against fire and explosion : Do not spray on a naked flame or any 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.

7.2

Conditions for safe storage, including any incompatibilities

Storage

Requirements for storage : No smoking. Keep container tightly closed in a dry and well-

areas and containers | 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.

7.3

Specific End Use

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

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

SK

Zložky	Podstata	Hodnota	Kontrolné parametre	Poznámka
2,2,4-Trimethylpentane (Isooctane)	SK OEL	NPEL krátkodobý	300 ppm, 1.400 mg/m3	
	SK OEL	NPEL priemerný	200 ppm, 900 mg/m3	

SI

Sestavine	Osnova	Vrednost	Parametri nadzora	Pripomba
2,2,4-Trimethylpentane (Isooctane)	SI OEL	MV	500 ppm, 2.400 mg/m3	
	SI OEL	KTV	1.000 ppm, 4.800 mg/m3	

SE

Beståndsdelar	Grundval	Värde	Kontrollparametrar	Anmärkning
2,2,4-Trimethylpentane (Isooctane)	SE AFS	NGV	200 ppm, 900 mg/m3	
	SE AFS	KGV	300 ppm, 1.400 mg/m3	V,

V Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör överskridas

MK

Съставки	Основа	Стойност	Параметри на контрол	Бележка
2,2,4-Trimethylpentane (Isooctane)	MK OEL	MV	500 ppm, 2.400 mg/m3	

LV

Sastāvdaļas	Bāze	Vērtība	Pārvaldības parametri	Piezīme
2,2,4-Trimethylpentane (Isooctane)	LV OEL	AER 8 st	100 mg/m3	
	LV OEL	AER īslaicīgā	300 mg/m3	

LT

Komponentai	Šaltinis	Vertė	Kontrolės parametrai	Pastaba
2,2,4-Trimethylpentane (Isooctane)	LT OEL	IPRD	200 ppm, 900 mg/m3	
	LT OEL	TPRD	300 ppm, 1.400 mg/m3	

HU

Komponensek	Bázis	Érték	Ellenőrzési paraméterek	Megjegyzés
2,2,4-Trimethylpentane (Isooctane)	HU OEL	AK-érték	2.350 mg/m3	R, i,
	HU OEL	CK-érték	4.700 mg/m3	R, i,

i Ingerlő anyag (izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat)
R Azok az anyagok, amelyek egészségkárosító hatása RÖVID expozíció hatására jelentkezik. Korrigált ÁK = ÁK x 8/a napi óraszám

FR

Composants	Base	Valeur	Paramètres de contrôle	Note
2,2,4-Trimethylpentane (Isooctane)	FR VLE	VME	1.000 mg/m3	Valeurs limites indicatives, Vapeur
	FR VLE	VLCT (VLE)	1.500 mg/m3	Valeurs limites indicatives, Vapeur

Valeurs limites indicatives Valeurs limites indicatives

FI

Aineosat	Peruste	Arvo	Valvontaa koskevat muuttujat	Huomautus
2,2,4-Trimethylpentane (Isooctane)	FI OEL	HTP-arvot 8h	300 ppm, 1.400 mg/m3	
	FI OEL	HTP-arvot 15 min	380 ppm, 1.800 mg/m3	

ES

Componentes	Base	Valor	Parámetros de control	Nota
2,2,4-Trimethylpentane (Isooctane)	ES VLA	VLA-ED	300 ppm, 1.420 mg/m3	

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
2,2,4-Trimethylpentane (Isooctane)	EE OEL	Piirnorm	200 ppm, 900 mg/m3	
	EE OEL	Lühiajalise kokkupuute piirnorm	300 ppm, 1.400 mg/m3	

CH

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
2,2,4-Trimethylpentane (Isooctane)	CH SUVA	MAK-Wert	300 ppm, 1.400 mg/m3	NIOSH,
	CH SUVA	KZGW	600 ppm, 2.800 mg/m3	NIOSH,
	CH SUVA	MAK-Wert	100 ppm, 470 mg/m3	
	CH SUVA	KZGW	200 ppm, 940 mg/m3	

NIOSH National Institute for Occupational Safety and Health

AT

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
2,2,4-Trimethylpentane (Isooctane)	AT OEL	MAK-TMW	300 ppm, 1.400 mg/m3	
	AT OEL	MAK-KZW	1.200 ppm, 5.600 mg/m3	

DNEL : End Use: Workers
Routes of exposure: Skin contact
Potential health effects: Chronic effects, Systemic effects
Value: 773 mg/kg

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 2035 mg/m3

8.2

Exposure controls
Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection : If ventilation or other engineering controls are not adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure, a supplied-air NIOSH approved respirator may be appropriate. If exposure to harmful levels of airborne material may occur, a NIOSH approved respirator that provides protection may be appropriate, such as:. Air-Purifying Respirator for Organic Vapors. A positive pressure, air-supplying respirator may be appropriate if there is potential for uncontrolled release, aerosolization, 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

9.1

Information on basic physical and chemical properties

Appearance

Form	:	liquid
Physical state	:	liquid
Color	:	Colorless
Odor	:	Mild

Safety data

Flash point	:	-12,22°C (10,00°F) estimated
Lower explosion limit	:	1 %(V)
Upper explosion limit	:	7 %(V)
Oxidizing properties	:	No
Autoignition temperature	:	411°C (772°F)
Molecular formula	:	C8H18
Molecular weight	:	114,26 g/mol
pH	:	Not applicable
Pour point	:	No data available
Boiling point/boiling range	:	99°C (210°F)
Vapor pressure	:	1,70 PSI at 37,8°C (100,0°F)
Relative density	:	0,69 at 15,6 °C (60,1 °F)

Water solubility	:	negligible
Partition coefficient: n-octanol/water	:	No data available
Viscosity, kinematic	:	0,503 cSt at 20°C (68°F)
Relative vapor density	:	1 (Air = 1.0)
Evaporation rate	:	1
Percent volatile	:	> 99 % 0,04 %

9.2

Other information

Conductivity	:	No data available

SECTION 10: Stability and reactivity

10.1

Reactivity : Stable under recommended storage conditions.

10.2

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

10.3

Possibility of hazardous reactions

Hazardous reactions : Hazardous reactions: Hazardous polymerization does not occur.

Further information: No decomposition if stored and applied as directed.

Hazardous reactions: Vapors may form explosive mixture with air.

10.4

Conditions to avoid : Heat, flames and sparks.

10.5

Materials to avoid : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

10.6

Hazardous decomposition products : Hydrocarbons
Carbon oxides

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1

Information on toxicological effects

Acute oral toxicity

2,2,4-Trimethylpentane (Isooctane)	: LD50: > 5.000 mg/kg Species: Rat Sex: male and female Method: OECD Test Guideline 401 Symptoms: Salivation

Acute inhalation toxicity

2,2,4-Trimethylpentane (Isooctane)	: LC50: > 33,52 mg/l Exposure time: 4 h Species: Rat Sex: male and female Test atmosphere: vapor Method: OECD Test Guideline 403

Acute dermal toxicity

2,2,4-Trimethylpentane (Isooctane)	: LD50: > 2.000 mg/kg Species: Rabbit Sex: male and female Method: OECD Test Guideline 402

Skin irritation

2,2,4-Trimethylpentane (Isooctane)	: Skin irritation

Eye irritation

2,2,4-Trimethylpentane (Isooctane)	: No eye irritation

Sensitization

2,2,4-Trimethylpentane (Isooctane)	: Did not cause sensitization on laboratory animals.

Repeated dose toxicity

2,2,4-Trimethylpentane (Isooctane)	: Species: Rat, Male and female Sex: Male and female Application Route: Inhalation Dose: 0, 668, 2220, 6646 ppm Exposure time: 13 weeks Number of exposures: 6 hr/day 5 d/wk NOEL: 8,117 mg/l 2220 ppm Method: OECD Guideline 413 Information given is based on data obtained from similar substances.

Genotoxicity in vitro

2,2,4-Trimethylpentane (Isooctane)	:	Test Type: Ames test Method: Mutagenicity (Escherichia coli - reverse mutation assay) Result: negative Test Type: Mouse lymphoma assay Method: OECD Guideline 476 Result: negative Test Type: Sister Chromatid Exchange Assay Result: negative Test Type: Unscheduled DNA synthesis assay Result: negative

Genotoxicity in vivo

2,2,4-Trimethylpentane (Isooctane)	:	Test Type: Unscheduled DNA synthesis assay Species: Mouse Dose: 500 mg/kg Result: negative Test Type: Unscheduled DNA synthesis assay Species: Rat Dose: 500 mg/kg Result: negative

Reproductive toxicity

2,2,4-Trimethylpentane (Isooctane)	:	Species: Rat Sex: male and female Application Route: Inhalation Dose: 0, 900, 3000, 9000 ppm Number of exposures: 6 h/d 5 d/wk Method: OECD Test Guideline 416 NOAEL Parent: 3000 ppm NOAEL F1: 3000 ppm NOAEL F2: 3000 ppm Information given is based on data obtained from similar substances.

Developmental Toxicity

2,2,4-Trimethylpentane (Isooctane)	:	Species: Rat Application Route: Inhalation Dose: 0, 400, 1200 ppm Number of exposures: 6h/d Test period: GD6-15 NOAEL Teratogenicity: 1200 ppm NOAEL Maternal: 1200 ppm Information given is based on data obtained from similar substances.

Species: Rat
Application Route: Inhalation
Dose: 0, 900, 3000, 9000 ppm
Number of exposures: 6h/d
Test period: GD6-15
Method: OECD Guideline 414
NOAEL Teratogenicity: 9000 ppm
NOAEL Maternal: 3000 ppm
Information given is based on data obtained from similar substances.

Isooctane (Pure Grade)
Aspiration toxicity : May be fatal if swallowed and enters airways.

CMR effects

2,2,4-Trimethylpentane (Isooctane) : Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: Animal testing did not show any effects on fertility.

11.2
Information on other hazards

Isooctane (Pure Grade)
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.

Endocrine disrupting properties : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 12: Ecological information

12.1
Toxicity

Toxicity to fish

2,2,4-Trimethylpentane (Isooctane) : LC50: 0,11 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
semi-static test Method: OECD Test Guideline 203
Information given is based on data obtained from similar substances.

Toxicity to daphnia and other aquatic invertebrates

2,2,4-Trimethylpentane : EC50: 0,4 mg/l

(Isooctane)		Exposure time: 48 h Species: Daphnia magna (Water flea) static test Information given is based on data obtained from similar substances.

Toxicity to algae

2,2,4-Trimethylpentane (Isooctane)	:	EL50: 2,943 mg/l Exposure time: 72 h Method: QSAR modeled data

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

2,2,4-Trimethylpentane (Isooctane)	:	NOEL: 0,17 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Method: OECD Test Guideline 211 Information given is based on data obtained from similar substances.

12.2
Persistence and degradability

Biodegradability

2,2,4-Trimethylpentane (Isooctane)	:	Result: Not readily biodegradable. Method: OECD Test Guideline 301 Expected to be inherently biodegradable. Information given is based on data obtained from similar substances.

12.3
Bioaccumulative potential

Bioaccumulation

2,2,4-Trimethylpentane (Isooctane)	:	Bioconcentration factor (BCF): 231 Method: QSAR modeled data This material is not expected to bioaccumulate.

12.4
Mobility in soil

Mobility

2,2,4-Trimethylpentane (Isooctane)	:	Medium: Air Method: Calculation, Mackay Level I Fugacity Model After release, disperses into the air.

12.5
Results of PBT and vPvB assessment

Results of PBT assessment	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6

Endocrine disrupting properties

Endocrine disrupting properties : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7

Other adverse effects

Additional ecological information : Very toxic to aquatic life with long lasting effects.

12.8

Additional Information

Ecotoxicology Assessment

Short-term (acute) aquatic hazard
2,2,4-Trimethylpentane (Isooctane) : Very toxic to aquatic life.

Long-term (chronic) aquatic hazard
2,2,4-Trimethylpentane (Isooctane) : Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1

Waste treatment methods

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

14.1 - 14.7

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)

UN1262, OCTANES, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE)), 3, II, MARINE POLLUTANT, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE)), RQ (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)

UN1262, OCTANES, 3, II, (-12,22 °C c.c.), MARINE POLLUTANT, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)

UN1262, OCTANES, 3, II

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))

UN1262, OCTANES, 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))

33,UN1262,OCTANES, 3, II, ENVIRONMENTALLY HAZARDOUS, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)

UN1262, OCTANES, 3, II, ENVIRONMENTALLY HAZARDOUS, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

Maritime transport in bulk according to IMO instruments

SECTION 15: Regulatory information

15.1

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

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

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

15.2

Chemical Safety Assessment

Components	:	2,2,4-trimethylpentane	A Chemical Safety Assessment has been carried out for this substance.	208-759-1

Major Accident Hazard Legislation

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

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

: ZEU_SEVES3 Update:
FLAMMABLE LIQUIDS
P5c
Quantity 1: 5.000 t
Quantity 2: 50.000 t

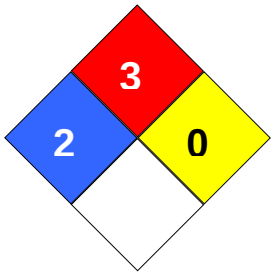
: ZEU_SEVES3 Update:
ENVIRONMENTAL HAZARDS
E1
Quantity 1: 100 t
Quantity 2: 200 t

Notification status

Europe REACH	:	This product is in full compliance according to REACH regulation 1907/2006/EC.
Switzerland CH INV	:	On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	:	On or in compliance with the active portion of the TSCA inventory
Canada DSL	:	All components of this product are on the Canadian DSL
Other 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	:	All substances in this product were registered, notified to be registered, or exempted from registration by CPChem through an Only Representative according to K-REACH regulations. Importation of this product is permitted if the Korean Importer of Record was included on CPChem's notifications or if the Importer of Record themselves notified the substances.
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory
Taiwan TCSI	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 2
Fire Hazard: 3
Reactivity Hazard: 0



Further information

Legacy SDS Number : 26760

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%
AIIC	Australian Inventory of Industrial Chemicals	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	TSCA	Toxic Substance Control Act

	New Chemical Substances		
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%	ATE	Acute toxicity estimate

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: Exposure Scenarios

Table of Contents

ES 1: Manufacture (M); Industrial uses (SU3); Closed systems.

1.1. Title section

Exposure Scenario name	:	Manufacture
Structured Short Title	:	Manufacture (M); Industrial uses (SU3); Closed systems.
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Manufacture**	ERC1, ERC4
Worker		
CS 2	**General exposures (closed systems), Storage**	PROC1
CS 3	**General exposures (closed systems), Storage**	PROC2
CS 4	**General exposures (closed systems)**	PROC3
CS 5	**General exposures (open systems)**	PROC4
CS 6	**Equipment cleaning and maintenance**	PROC8a
CS 7	**Process sampling, Bulk transfers, (open systems), (closed systems)**	PROC8b
CS 8	**Laboratory activities**	PROC15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Manufacture of the substance (ERC1) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Fraction of EU tonnage used in region: : 0,1
Maximum allowable site tonnage (MSafe) : 3.000 tonnes/day
Technical and organisational conditions and measures
Risk from environmental exposure is driven by freshwater sediment. No wastewater treatment required. Air - minimum efficiency of 90 % Water - minimum efficiency of 0 % Soil - minimum efficiency of 0 %
Conditions and measures related to sewage treatment plant

STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	10.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	During manufacturing no waste of the substance is generated.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

1.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No other specific measures identified. Store substance within a closed system.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

1.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures		
Handle substance within a closed system. Store substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

1.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

1.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient

temperature.

1.2.6. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified. Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

1.2.8. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Manufacture of the substance (ERC1) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Release route	Release rate	Release estimation method
air	0,05 kg/day	
water	0 kg/day	
Soil	0 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,1 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,001 mg/l	0,026
Freshwater sediment	0,043 mg/kg wet weight	0,03
Sea water	0,0001 mg/l	0,003
Sea sediment	0,0043 mg/kg wet weight	0,003
Agricultural soil	0,95 mg/kg wet weight	0,002

1.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	0,05 mg/m³ (ECETOC TRA Worker v2.0)	0
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0

combined routes	systemic	Long-term		0

1.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	1,37 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,025

1.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³ (ECETOC TRA Worker v2.0)	0,057
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,058

1.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³ (ECETOC TRA Worker v2.0)	0,046
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,055

1.3.6. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115

dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,124

1.3.8. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,023

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 2: Formulation; Formulation [mixing] of preparations and/or re-packaging (SU10); Closed systems.

2.1. Title section

Exposure Scenario name	:	Formulation
Structured Short Title	:	Formulation; Formulation [mixing] of preparations and/or re-packaging (SU10); Closed systems.
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Formulation**	ERC2
Worker		
CS 2	**General exposures (closed systems), Storage**	PROC1
CS 3	**General exposures (closed systems), Storage**	PROC2
CS 4	**Process sampling, General exposures (closed systems)**	PROC3
CS 5	**Batch processes at elevated temperatures**	PROC3
CS 6	**General exposures (open systems)**	PROC4
CS 7	**Mixing operations (open systems)**	PROC5
CS 8	**Manual, Transfer from/pouring from containers**	PROC8a
CS 9	**Equipment cleaning and maintenance**	PROC8a
CS 10	**Drum/batch transfers**	PROC8b
CS 11	**Bulk transfers**	PROC8b
CS 12	**Drum and small package filling**	PROC9
CS 13	**Drum and small package filling**	PROC14
CS 14	**Laboratory activities**	PROC15

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Fraction of EU tonnage used in region:	:	0,1

Maximum allowable site tonnage (MSafe)	:	900.000 kg/day

Technical and organisational conditions and measures

Risk from environmental exposure is driven by freshwater sediment.
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Air - minimum efficiency of 0 %
Water - minimum efficiency of 0 %
Soil - minimum efficiency of 61,8 %

Conditions and measures related to sewage treatment plant

STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)

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

Other conditions affecting environmental exposure

Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

2.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Handle substance within a closed system.
Store substance within a closed system.
Transfer via enclosed lines.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Store substance within a closed system. Transfer via enclosed lines.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Formulate in enclosed or ventilated mixing vessels. Avoid dip sampling.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.5. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Formulate in enclosed or ventilated mixing vessels. Avoid dip sampling.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.6. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.7. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.8. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container. No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.9. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		

No other specific measures identified.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Use drum pumps or carefully pour from container.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
No other specific measures identified.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

2.2.12. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.13. Control of worker exposure: Production of preparations or articles by tabletting, compression, extrusion, pelletization (PROC14)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.2.14. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
air	2,5 kg/day	
water	0,002 kg/day	
Soil	0,01 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,5 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,003 mg/l	0,086
Freshwater sediment	0,14 mg/kg wet weight	0,097
Sea water	0,32 µg/l	0,008
Sea sediment	0,014 mg/kg wet weight	0,009
Agricultural soil	0,0046 mg/kg dry weight	0,01

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

2.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	0,05 mg/m³ (ECETOC TRA Worker v2.0)	0
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0

2.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	1,37 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,025

2.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³ (ECETOC TRA Worker v2.0)	0,057
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,058

2.3.5. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³ (ECETOC TRA Worker v2.0)	0,069
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,069

2.3.6. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³ (ECETOC TRA Worker v2.0)	0,046
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA	0,009

			Worker v2.0)	
combined routes	systemic	Long-term		0,055

2.3.7. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

2.3.8. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	23,36 mg/m³ (ECETOC TRA Worker v2.0)	0,011
dermal	systemic	Long-term	0,137 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,012

2.3.9. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	7,01 mg/m³	0,003

			(ECETOC TRA Worker v2.0)	
dermal	systemic	Long-term	0,686 mg/kg/d (ECETOC TRA Worker v2.0)	0,001
combined routes	systemic	Long-term		0,004

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	1,372 mg/kg/d (ECETOC TRA Worker v2.0)	0,002

2.3.12. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,124

2.3.13. Worker exposure: Production of preparations or articles by tabletting, compression, extrusion, pelletization (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	3,43 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,119

2.3.14. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure	Exposure	RCR

		indicator	**estimate**	
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,023

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 3: Use as a fuel - industrial; Industrial uses (SU3); Closed systems.

3.1. Title section

Exposure Scenario name	:	Use as a fuel - industrial
Structured Short Title	:	Use as a fuel - industrial; Industrial uses (SU3); Closed systems.
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a fuel - industrial**	ERC7
Worker		
CS 2	**General exposures (closed systems), Use in contained batch processes, Storage**	PROC1
CS 3	**General exposures (closed systems), Use in contained batch processes, Storage**	PROC2
CS 4	**General exposures (closed systems), Use in contained batch processes, Closed systems**	PROC3
CS 5	**Equipment cleaning and maintenance**	PROC8a
CS 6	**Bulk transfers, Drum/batch transfers**	PROC8b
CS 7	**Use as a fuel - industrial**	PROC16

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Industrial use of substances in closed systems (ERC7)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Fraction of EU tonnage used in region:	:	0,1
Maximum allowable site tonnage (MSafe)	:	1.800 tonnes/day
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater sediment. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Air - minimum efficiency of 95 % Water - minimum efficiency of 0 %		

Soil - minimum efficiency of 23,4 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.
Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

3.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Store substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

3.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Handle substance within a closed system.
Store substance within a closed system.
Transfer via enclosed lines.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

3.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Handle substance within a closed system.
No other specific measures identified.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

3.2.5. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

3.2.7. Control of worker exposure: Using material as fuel sources, limited exposure to unburned product to be expected (PROC16)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient

temperature.

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Industrial use of substances in closed systems (ERC7)

Release route	Release rate	Release estimation method
air	0,05 kg/day	
water	0 kg/day	
Soil	0 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,05 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0016 mg/l	0,043
Freshwater sediment	0,07 mg/kg wet weight	0,048
Sea water	0,16 µg/l	0,004
Sea sediment	0,007 mg/kg wet weight	0,005
Agricultural soil	0,46 mg/kg dry weight	0,001

3.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	0,05 mg/m³ (ECETOC TRA Worker v2.0)	0
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0

3.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	1,37 mg/kg/d (ECETOC TRA Worker v2.0)	0,002

combined routes	systemic	Long-term		0,025

3.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³ (ECETOC TRA Worker v2.0)	0,057
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,058

3.3.5. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	1,372 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,117

3.3.7. Worker exposure: Using material as fuel sources, limited exposure to unburned product to be expected (PROC16)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	23,36 mg/m³ (ECETOC TRA Worker v2.0)	0,011

dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,012

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 4: Use as a fuel – professional; Professional uses (SU22); Closed systems.

4.1. Title section

Exposure Scenario name	:	Use as a fuel – professional
Structured Short Title	:	Use as a fuel – professional; Professional uses (SU22); Closed systems.
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a fuel – professional**	ERC9a, ERC9b
Worker		
CS 2	**General exposures (closed systems), Storage**	PROC1
CS 3	**General exposures (closed systems)**	PROC2
CS 4	**General exposures (closed systems), Closed systems**	PROC2
CS 5	**Equipment cleaning and maintenance**	PROC8a
CS 6	**Bulk transfers, Drum/batch transfers, Refuelling**	PROC8b
CS 7	**Use as a fuel – professional**	PROC16

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Fraction of EU tonnage used in region:	:	0,1
Maximum allowable site tonnage (MSafe)	:	220.000 kg
Critical compartment for Msafe	:	Sewage treatment plant
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater. No wastewater treatment required. Water - minimum efficiency of 0 % Soil - minimum efficiency of 0 %		

Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

4.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Handle substance within a closed system. Store substance within a closed system.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

4.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature

		and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

4.2.4. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

4.2.5. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

4.2.7. Control of worker exposure: Using material as fuel sources, limited exposure to unburned product to be expected (PROC16)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Release route	Release rate	Release estimation method
air	0,001 kg/day	
water	0 kg/day	
Soil	0 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,074 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0058 mg/l	0,002
Freshwater sediment	0,0001 mg/kg wet weight	0
Sea water	0,066 µg/l	0
Sea sediment	0,0028 mg/kg wet weight	0
Agricultural soil	0,46 mg/kg dry weight	0

4.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	0,05 mg/m³ (ECETOC TRA Worker v2.0)	0
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0

4.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³ (ECETOC TRA Worker v2.0)	0,046
dermal	systemic	Long-term	1,37 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,048

4.3.4. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³ (ECETOC TRA Worker v2.0)	0,057
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,058

4.3.5. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³ (ECETOC TRA Worker v2.0)	0,046
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,049

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	1,372 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,025
inhalative	systemic	Long-term	163,51 mg/m³ (ECETOC TRA Worker v2.0)	0,080
combined routes	systemic	Long-term		0,082

4.3.7. Worker exposure: Using material as fuel sources, limited exposure to unburned product to be expected (PROC16)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR

inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,023

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 5: Use as a fuel – consumer; Consumer uses (SU21).

5.1. Title section

Exposure Scenario name	:	Use as a fuel – consumer
Structured Short Title	:	Use as a fuel – consumer; Consumer uses (SU21).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a fuel – consumer**	ERC8b, ERC8e, ERC9a, ERC9b
Consumer		
CS 2	**Use as a fuel – consumer**	PC13_1
CS 3	**Use as a fuel – consumer**	PC13_2
CS 4	**Use as a fuel – consumer**	PC13_3
CS 5	**Use as a fuel – consumer**	PC13_4
CS 6	**Use as a fuel – consumer**	PC13_5

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Wide dispersive indoor use of reactive substances in open systems (ERC8b) / Wide dispersive outdoor use of reactive substances in open systems (ERC8e) / Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Fraction of EU tonnage used in region:	:	0,1
Maximum allowable site tonnage (MSafe)	:	220.000 kg
Critical compartment for Msafe	:	Sewage treatment plant
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	Combustion emissions limited by required exhaust emission controls.

		Combustion emissions considered in regional exposure assessment.
Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

5.2.2. Control of consumer exposure: Automotive Refuelling (PC13_1)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	37,5 kg
Duration	:	Exposure duration 0,05 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Indoor or outdoor use	:	Outdoor Activities
Room size	:	100 M3
Ventilation rate	:	0,6

5.2.3. Control of consumer exposure: Scooter Refuelling (PC13_2)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	3,75 kg
Duration	:	Exposure duration 0,03 min
Use frequency	:	1 times/day
Use frequency	:	Use frequency 52 days/year

Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Indoor or outdoor use	:	Outdoor Activities
Room size	:	100 M3
Ventilation rate	:	0,6

5.2.4. Control of consumer exposure: Garden Equipment- Use (PC13_3)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	0,75 kg
Duration	:	Exposure duration 2 h
Use frequency	:	1 times/day
Use frequency	:	Use frequency 26 days/year
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Indoor or outdoor use	:	Outdoor Activities
Room size	:	100 M3
Ventilation rate	:	0,6

5.2.5. Control of consumer exposure: Garden Equipment- Refueling (PC13_4)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	0,75 kg
Duration	:	Exposure duration 0,03 h

Use frequency	:	1 times/day
Use frequency	:	Use frequency 26 days/year
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Indoor or outdoor use	:	Garage
Room size	:	34 M3
Ventilation rate	:	1,5

5.2.6. Control of consumer exposure: Lamp Oil (PC13_5)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	0,100 kg
Duration	:	Exposure duration 0,01 h
Use frequency	:	1 times/day
Use frequency	:	Use frequency 52 days/year
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Wide dispersive indoor use of reactive substances in open systems (ERC8b) / Wide dispersive outdoor use of reactive substances in open systems (ERC8e) / Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Release route	Release rate	Release estimation method

air	0,001 kg/day	
water	0 kg/day	
Soil	0 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,000074 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0000058 mg/l	0
Freshwater sediment	0,0001 mg/kg wet weight	0
Sea water	0,000066 µg/l	0
Sea sediment	0,0000028 mg/kg wet weight	0
Agricultural soil	0,000012 mg/kg dry weight	0

5.3.2. Consumer exposure: Automotive Refuelling (PC13_1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	35 mg/kg bw/day	0,05
inhalative	systemic	Long-term	0,15 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,05

5.3.3. Consumer exposure: Scooter Refuelling (PC13_2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	35 mg/kg bw/day	0,05
inhalative	systemic	Long-term	0,10 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,05

5.3.4. Consumer exposure: Garden Equipment- Use (PC13_3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	0,73 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0

5.3.5. Consumer exposure: Garden Equipment- Refueling (PC13_4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	70 mg/kg bw/day	0,10
inhalative	systemic	Long-term	0,08 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,10

5.3.6. Consumer exposure: Lamp Oil (PC13_5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	35 mg/kg bw/day	0,05
inhalative	systemic	Long-term	0,01 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,05

5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 6: Use in coatings – industrial; Industrial uses (SU3).

6.1. Title section

Exposure Scenario name	:	Use in coatings – industrial
Structured Short Title	:	Use in coatings – industrial; Industrial uses (SU3).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use in coatings – industrial**	ERC4
Worker		
CS 2	**General exposures (closed systems), Storage**	PROC1
CS 3	**General exposures (closed systems), with sample collection, Use in contained systems, Film formation - force drying, stoving and other technologies**	PROC2
CS 4	**Mixing operations, General exposures (closed systems)**	PROC3
CS 5	**Film formation - air drying**	PROC4
CS 6	**Preparation of material for application, Mixing operations (open systems)**	PROC5
CS 7	**Spraying (automatic/robotic), Manual, Spraying**	PROC7
CS 8	**Material transfers, Equipment cleaning and maintenance**	PROC8a
CS 9	**Material transfers**	PROC8b
CS 10	**Material transfers, Drum/batch transfers, Transfer from/pouring from containers**	PROC9
CS 11	**Roller, spreader, flow application**	PROC10
CS 12	**Dipping, immersion and pouring**	PROC13
CS 13	**Production or preparation or articles by tabletting, compression, extrusion or pelletization**	PROC14
CS 14	**Laboratory activities**	PROC15

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Fraction of EU tonnage used in region:	:	0,1
Maximum allowable site tonnage (MSafe)	:	260.000 kg/day
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP effluent	:	2.000 m3/d
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

6.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

No other specific measures identified.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

6.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
No other specific measures identified.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

6.2.7. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
No other specific measures identified.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

6.2.8. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling. No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.10. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature

		and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.11. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.12. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.13. Control of worker exposure: Production of preparations or articles by tabletting, compression, extrusion, pelletization (PROC14)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.2.14. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Release route	Release rate	Release estimation method
air	98 kg/day	
water	0,007 kg/day	
Soil	0 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,015 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0013 mg/l	0,034
Freshwater sediment	0,056 mg/kg wet weight	0,039
Sea water	0,13 mg/l	0,003
Sea sediment	0,0056 mg/kg wet weight	0,004
Agricultural soil	0,14 µg/kg wet weight	0

6.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	0,05 mg/m³ (ECETOC TRA Worker v2.0)	0
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0

6.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	1,37 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,025
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
combined routes	systemic	Long-term		0,117

6.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³ (ECETOC TRA Worker v2.0)	0,057
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,058

6.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³ (ECETOC TRA Worker v2.0)	0,046
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,055

6.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

6.3.7. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	58,39 mg/m³ (ECETOC TRA Worker v2.0)	0,029
dermal	systemic	Long-term	0,686 mg/kg/d (ECETOC TRA	0,001

			Worker v2.0)	
combined routes	systemic	Long-term		0,031
inhalative	systemic	Long-term	350,37 mg/m³ (ECETOC TRA Worker v2.0)	0,172
dermal	systemic	Long-term	4,286 mg/kg/d (ECETOC TRA Worker v2.0)	0,006
combined routes	systemic	Long-term		0,178

6.3.8. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,124

6.3.10. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,124

6.3.11. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	5,486 mg/kg/d (ECETOC TRA Worker v2.0)	0,007
combined routes	systemic	Long-term		0,122

6.3.12. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

6.3.13. Worker exposure: Production of preparations or articles by tabletting, compression, extrusion, pelletization (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	0,686 mg/kg/d (ECETOC TRA Worker v2.0)	0,001
combined routes	systemic	Long-term		0,116

6.3.14. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0

combined routes	systemic	Long-term		0,023

6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 7: Use in coatings – professional; Professional uses (SU22).

7.1. Title section

Exposure Scenario name	:	Use in coatings – professional
Structured Short Title	:	Use in coatings – professional; Professional uses (SU22).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use in coatings – professional**	ERC8a, ERC8d
Worker		
CS 2	**General exposures (closed systems)**	PROC1
CS 3	**Filling/ preparation of equipment from drums or containers., Use in contained systems, General exposures (closed systems)**	PROC2
CS 4	**Preparation of material for application, Use in contained batch processes**	PROC3
CS 5	**Film formation - air drying**	PROC4
CS 6	**Preparation of material for application**	PROC5
CS 7	**Material transfers, Drum/batch transfers**	PROC8a
CS 8	**Material transfers, Drum/batch transfers, Dedicated facility**	PROC8b
CS 9	**Roller, spreader, flow application**	PROC10
CS 10	**Manual, Spraying**	PROC11
CS 11	**Manual**	PROC13
CS 12	**Laboratory activities**	PROC15
CS 13	**Hand application - finger-paints, pastels, adhesives**	PROC19

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	980 kg

Critical compartment for Msafe	:	Sewage treatment plant

Technical and organisational conditions and measures

Risk from environmental exposure is driven by freshwater.
No wastewater treatment required.
Water - minimum efficiency of 0 %
Soil - minimum efficiency of 0 %

Conditions and measures related to sewage treatment plant

STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed. Prevent environmental discharge consistent with regulatory requirements.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)

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

Other conditions affecting environmental exposure

Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

7.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

Handle substance within a closed system.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.7. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.9. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.10. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operation is undertaken outdoors.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.11. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

7.2.12. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No other specific measures identified.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

7.2.13. Control of worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
No other specific measures identified.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Release route	Release rate	Release estimation method
water	0,01 kg/day	
air	0,98 kg/day	
Soil	0,01 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,000074 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,000001 mg/l	0
Freshwater sediment	0,00022 mg/kg wet weight	0
Sea water	0,00051 µg/l	0

Sea sediment	0,022 µg/l	0
Agricultural soil	0,093 µg/l	0

7.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	0,05 mg/m³ (ECETOC TRA Worker v2.0)	0
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0

7.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³ (ECETOC TRA Worker v2.0)	0,046
dermal	systemic	Long-term	1,37 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,048

7.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³ (ECETOC TRA Worker v2.0)	0,057
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,058

7.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	163,51 mg/m³ (ECETOC TRA Worker v2.0)	0,080

dermal	systemic	Long-term	1,372 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,023
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,124

7.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³ (ECETOC TRA Worker v2.0)	0,069
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,072
inhalative	systemic	Long-term	372,01 mg/m³ (ECETOC TRA Worker v2.0)	0,161
combined routes	systemic	Long-term		0,164

7.3.7. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³ (ECETOC TRA Worker v2.0)	0,069
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,072

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³	0,115

			(ECETOC TRA Worker v2.0)	
dermal	systemic	Long-term	6,86 mg/kg/d (ECETOC TRA Worker v2.0)	0,009
combined routes	systemic	Long-term		0,124

7.3.9. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³ (ECETOC TRA Worker v2.0)	0,069
dermal	systemic	Long-term	2,743 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,072
inhalative	systemic	Long-term	327,01 mg/m³ (ECETOC TRA Worker v2.0)	0,161

7.3.10. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	280,29 mg/m³ (ECETOC TRA Worker v2.0)	0,138
dermal	systemic	Long-term	1,29 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,139
inhalative	systemic	Long-term	196,21 mg/m³ (ECETOC TRA Worker v2.0)	0,096
dermal	systemic	Long-term	6,428 mg/kg/d (ECETOC TRA Worker v2.0)	0,008
combined routes	systemic	Long-term		0,105
inhalative	systemic	Long-term	163,51 mg/m³ (ECETOC TRA Worker v2.0)	0,080
dermal	systemic	Long-term	5,357 mg/kg/d (ECETOC TRA Worker v2.0)	0,007
inhalative	systemic	Long-term	163,51 mg/m³ (ECETOC TRA	0,087

			Worker v2.0)	

7.3.11. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³ (ECETOC TRA Worker v2.0)	0,046
dermal	systemic	Long-term	0,686 mg/kg/d (ECETOC TRA Worker v2.0)	0,001
combined routes	systemic	Long-term		0,047
inhalative	systemic	Long-term	327,01 mg/m³ (ECETOC TRA Worker v2.0)	0,161
dermal	systemic	Long-term	2,742 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,164

7.3.12. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,023

7.3.13. Worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³ (ECETOC TRA Worker v2.0)	0,069
dermal	systemic	Long-term	2,83 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,073
inhalative	systemic	Long-term	196,21 mg/m³ (ECETOC TRA Worker v2.0)	0,096
combined routes	systemic	Long-term		0,100

inhalative	systemic	Long-term	32,70 mg/m³ (ECETOC TRA Worker v2.0)	0,016
combined routes	systemic	Long-term		0,020

7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 8: Use in Coatings - Consumer; Consumer uses (SU21).

8.1. Title section

Exposure Scenario name	:	Use in Coatings - Consumer
Structured Short Title	:	Use in Coatings - Consumer; Consumer uses (SU21).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use in Coatings - Consumer**	ERC8a, ERC8d
Consumer		
CS 2	**Use in Coatings - Consumer**	PC1
CS 3	**Use in Coatings - Consumer**	PC4
CS 4	**Use in Coatings - Consumer**	PC8
CS 5	**Use in Coatings - Consumer**	PC9
CS 6	**Use in Coatings - Consumer**	PC9b
CS 7	**Use in Coatings - Consumer**	PC15
CS 8	**Use in Coatings - Consumer**	PC18, PC23
CS 9	**Use in Coatings - Consumer**	PC24
CS 10	**Use in Coatings - Consumer**	PC31, PC34

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	980 kg
Critical compartment for Msafe	:	Sewage treatment plant
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

8.2.2. Control of consumer exposure: Adhesives, sealants (PC1)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	9 g
For each use event, covers use amounts up to	:	6390 g
For each use event, covers use amounts up to	:	85,05 g
For each use event, covers use amounts up to	:	75 g
Duration	:	Exposure duration 4 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 6 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 1 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

8.2.3. Control of consumer exposure: Anti-Freeze and de-icing products (PC4)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	0,5 g
For each use event, covers use amounts up to	:	2000 g
For each use event, covers use amounts up to	:	4 g
Duration	:	Exposure duration 4 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Garage
Room size	:	34 M3
Ventilation rate	:	1,5

8.2.4. Control of consumer exposure: Biocidal products (PC8)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	15 g
For each use event, covers use amounts up to	:	27 g
For each use event, covers use amounts up to	:	35 g
Duration	:	Exposure duration 0,5 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day

Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

8.2.5. Control of consumer exposure: Coatings and Paints, Fillers, Putties, Thinners (PC9)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	2760 g
For each use event, covers use amounts up to	:	744 g
For each use event, covers use amounts up to	:	215 g
For each use event, covers use amounts up to	:	491 g
Duration	:	Exposure duration 2,2 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3

Ventilation rate	:	0,6

8.2.6. Control of consumer exposure: Fillers, putties, plasters, modelling clay (PC9b)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	85 g
For each use event, covers use amounts up to	:	13800 g
For each use event, covers use amounts up to	:	1 g
For each use event, covers use amounts up to	:	1,35 g
Duration	:	Exposure duration 4 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 2 h
Use frequency	:	1 times/day
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

8.2.7. Control of consumer exposure: Non-metal-surface treatment products (PC15)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		

For each use event, covers use amounts up to	:	2760 g
For each use event, covers use amounts up to	:	744 g
For each use event, covers use amounts up to	:	215 g
For each use event, covers use amounts up to	:	491 g
Duration	:	Exposure duration 2,2 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 2 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

8.2.8. Control of consumer exposure: Ink and toners (PC18) / Leather tanning, dye, finishing, impregnation and care products (PC23)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	40 g
For each use event, covers use amounts up to	:	56 g
Duration	:	Exposure duration 2,2 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 1,23 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h

Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

8.2.9. Control of consumer exposure: Lubricants, greases, release products (PC24)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	2200 g
For each use event, covers use amounts up to	:	34 g
For each use event, covers use amounts up to	:	73 g
Duration	:	Exposure duration 0,17 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Garage
Room size	:	34 M3
Ventilation rate	:	1,5

8.2.10. Control of consumer exposure: Polishes and wax blends (PC31) / Textile dyes, finishing and impregnating products; including bleaches and other processing aids (PC34)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
For each use event, covers use amounts up to	:	142 g
For each use event, covers use amounts up to	:	35 g
For each use event, covers use amounts up to	:	115 g
Duration	:	Exposure duration 1,23 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 1 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Release route	Release rate	Release estimation method
air	0,985 kg/day	
water	0,01 kg/day	
Soil	0,005 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,000074 mg/m³ (Hydrocarbon Block Method (Petrorisk))	

Freshwater	0,00001 mg/l	0
Freshwater sediment	0,00022 mg/kg wet weight	0
Sea water	0,0000005 mg/l	0
Sea sediment	0,000022 mg/kg wet weight	0
Agricultural soil	0,000093 mg/kg dry weight	0

8.3.2. Consumer exposure: Adhesives, sealants (PC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	1,79 mg/kg bw/day	0
inhalative	systemic	Long-term	0,85 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0

8.3.3. Consumer exposure: Anti-Freeze and de-icing products (PC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	1,79 mg/kg bw/day	0
inhalative	systemic	Long-term	3,52 mg/m³	0,01
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,01

8.3.4. Consumer exposure: Biocidal products (PC8)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	0,07 mg/kg bw/day	0
inhalative	systemic	Long-term	0,07 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0
dermal	systemic	Long-term	7,15 mg/kg bw/day	0,01
inhalative	systemic	Long-term	0,08 mg/m³	0
combined routes	systemic	Long-term		0,01
dermal	systemic	Long-term	10,7 mg/kg bw/day	0,02
inhalative	systemic	Long-term	1,77 mg/m³	0
combined routes	systemic	Long-term		0,02

8.3.5. Consumer exposure: Coatings and Paints, Fillers, Putties, Thinners (PC9)

Exposure route	Health effect	Exposure	Exposure	RCR

		indicator	estimate	
dermal	systemic	Long-term	1,07 mg/kg bw/day	0
inhalative	systemic	Long-term	10,53 mg/m³	0,02
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,02
dermal	systemic	Long-term	19,65 mg/kg bw/day	0,03
inhalative	systemic	Long-term	52,06 mg/m³	0,09
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,11
dermal	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	34,29 mg/m³	0,06
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,06

8.3.6. Consumer exposure: Fillers, putties, plasters, modelling clay (PC9b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	0,12 mg/kg bw/day	0
inhalative	systemic	Long-term	0,54 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0
dermal	systemic	Long-term	2,86 mg/kg bw/day	0
oral	systemic	Long-term	1 mg/kg bw/day	0
combined routes	systemic	Long-term		0,01
dermal	systemic	Long-term	127,20 mg/kg bw/day	0,18
oral	systemic	Long-term	67,50 mg/kg bw/day	0
combined routes	systemic	Long-term		0,28

8.3.7. Consumer exposure: Non-metal-surface treatment products (PC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	1,07 mg/kg bw/day	0
inhalative	systemic	Long-term	10,53 mg/m³	0,02
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,02
dermal	systemic	Long-term	19,65 mg/kg bw/day	0,03

inhalative	systemic	Long-term	52,06 mg/m³	0,09
oral	systemic	Long-term	1 mg/kg bw/day	0
combined routes	systemic	Long-term		0,01
dermal	systemic	Long-term	0 mg/kg bw/day	0
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	34,29 mg/m³	0,06
combined routes	systemic	Long-term		0,06
dermal	systemic	Long-term	71,46 mg/kg bw/day	0,10
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	59,57 mg/m³	0,10
combined routes	systemic	Long-term		0,20

8.3.8. Consumer exposure: Ink and toners (PC18) / Leather tanning, dye, finishing, impregnation and care products (PC23)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	1,19 mg/kg bw/day	0
inhalative	systemic	Long-term	1,02 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0
dermal	systemic	Long-term	35,83 mg/kg bw/day	0,05
inhalative	systemic	Long-term	5,07 mg/m³	0,01
oral	systemic	Long-term	1 mg/kg bw/day	0
combined routes	systemic	Long-term		0,06
inhalative	systemic	Long-term	17,46 mg/m³	0,03
combined routes	systemic	Long-term		0,08

8.3.9. Consumer exposure: Lubricants, greases, release products (PC24)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	78 mg/kg bw/day	0,11
inhalative	systemic	Long-term	0,40 mg/m³	0
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,11
dermal	systemic	Long-term	15,6 mg/kg bw/day	0,02
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,02

dermal	systemic	Long-term	35,73 mg/kg bw/day	0,05
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	12,29 mg/m³	0,02
combined routes	systemic	Long-term		0,07

8.3.10. Consumer exposure: Polishes and wax blends (PC31) / Textile dyes, finishing and impregnating products; including bleaches and other processing aids (PC34)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	35,83 mg/kg bw/day	0,05
inhalative	systemic	Long-term	12,87 mg/m³	0,02
oral	systemic	Long-term	0 mg/kg bw/day	0
combined routes	systemic	Long-term		0,07
inhalative	systemic	Long-term	10,92 mg/m³	0,02
oral	systemic	Long-term	0 mg/kg bw/day	0
dermal	systemic	Long-term	0,14 mg/kg bw/day	0
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	1,80 mg/m³	0
combined routes	systemic	Long-term		0

8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 9: Use as a cleaning agent – industrial; Industrial uses (SU3).

9.1. Title section

Exposure Scenario name	:	Use as a cleaning agent – industrial
Structured Short Title	:	Use as a cleaning agent – industrial; Industrial uses (SU3).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a cleaning agent – industrial**	ERC4
Worker		
CS 2	**Storage**	PROC1
CS 3	**Automated process with (semi) closed systems, Use in contained systems, Application of cleaning products in closed systems**	PROC2
CS 4	**Automated process with (semi) closed systems, Drum/batch transfers**	PROC3
CS 5	**Laboratory activities**	PROC4
CS 6	**Cleaning with high pressure washers**	PROC7
CS 7	**Bulk transfers**	PROC8a
CS 8	**Filling of equipment from drums or containers**	PROC8b
CS 9	**Cleaning with low-pressure washers**	PROC10
CS 10	**Degreasing small objects in cleaning station**	PROC13

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	6,800 tonnes/day
Release type	:	Continuous release
Emission days	:	20
Technical and organisational conditions and measures		

Risk from environmental exposure is driven by freshwater. No wastewater treatment required. Air - minimum efficiency of 70 % Water - minimum efficiency of 0 % Soil - minimum efficiency of 0 %

Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

9.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.2.6. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.2.7. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.2.9. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.2.10. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Protection Target	Exposure estimate	RCR
Air	4,6 µg/m3 (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0057 µg/l	0
Freshwater sediment	0,099 µg/l	0
Sea water	0,000056 µg/l	0
Sea sediment	0,0024 µg/kg wet weight	0
Soil	0,042 µg/kg wet weight	0

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

9.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	0,05 mg/m³	0,00
dermal	systemic	Long-term	0,34 mg/kg/d	0,00
combined routes				0,00

9.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³ (ECETOC TRA Worker v2.0)	0,023

dermal	systemic	Long-term	1,37 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,025

9.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³ (ECETOC TRA Worker v2.0)	0,057
dermal	systemic	Long-term	0,34 mg/kg/d (ECETOC TRA Worker v2.0)	0
combined routes	systemic	Long-term		0,058

9.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	9,34 mg/m³ (ECETOC TRA Worker v2.0)	0,005
dermal	systemic	Long-term	0,686 mg/kg/d (ECETOC TRA Worker v2.0)	0,001
combined routes	systemic	Long-term		0,005

9.3.6. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	210,22 mg/m³ (ECETOC TRA Worker v2.0)	0,103
dermal	systemic	Long-term	4,286 mg/kg/d (ECETOC TRA Worker v2.0)	0,006
combined routes	systemic	Long-term		0,109
inhalative	systemic	Long-term	35,04 mg/m³ (ECETOC TRA Worker v2.0)	0,017
dermal	systemic	Long-term	4,286 mg/kg/d (ECETOC TRA Worker v2.0)	0,006
combined routes	systemic	Long-term		0,023

9.3.7. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,60 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	13,71 mg/kg/d (ECETOC TRA Worker v2.0)	0,018
combined routes	systemic	Long-term		0,133

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	1,372 mg/kg/d (ECETOC TRA Worker v2.0)	0,002
combined routes	systemic	Long-term		0,117

9.3.9. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³ (ECETOC TRA Worker v2.0)	0,115
dermal	systemic	Long-term	2,743 mg/kg/d (ECETOC TRA Worker v2.0)	0,004
combined routes	systemic	Long-term		0,118

9.3.10. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	23,86 mg/m³ (ECETOC TRA Worker v2.0)	0,011
dermal	systemic	Long-term	0,686 mg/kg/d (ECETOC TRA	0,001

			Worker v2.0)	
combined routes	systemic	Long-term		0

9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 10: Use as a cleaning agent – professional; Professional uses (SU22).

10.1. Title section

Exposure Scenario name	:	Use as a cleaning agent – professional
Structured Short Title	:	Use as a cleaning agent – professional; Professional uses (SU22).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a cleaning agent – professional**	ERC8a, ERC8d
Worker		
CS 2	**Storage**	PROC1
CS 3	**Automated process with (semi) closed systems, Use in contained systems**	PROC2
CS 4	**Automated process with (semi) closed systems, Drum/batch transfers, Use in contained systems**	PROC3
CS 5	**Application of cleaning products in closed systems, Cleaning of medical devices**	PROC4
CS 6	**Filling/ preparation of equipment from drums or containers.**	PROC8a
CS 7	**Filling/ preparation of equipment from drums or containers.**	PROC8b
CS 8	**Cleaning with low-pressure washers, Rolling, Brushing, No spraying, Manual, Surfaces, Cleaning, Spraying, Ad hoc manual application via trigger sprays, dipping, etc.**	PROC10
CS 9	**Cleaning with high pressure washers, Spraying**	PROC11
CS 10	**Manual, Surfaces, Cleaning, Dipping, immersion and pouring**	PROC13

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	190 kg/day

Release type	:	Continuous release
Emission days	:	365

Technical and organisational conditions and measures

Risk from environmental exposure is driven by freshwater.
No wastewater treatment required.
Water - minimum efficiency of 0 %
Soil - minimum efficiency of 0 %

Conditions and measures related to sewage treatment plant

STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)

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

Other conditions affecting environmental exposure

Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

10.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures

No other specific measures identified.

Other conditions affecting workers exposure

Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.2.6. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

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

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.2.8. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.2.9. Control of worker exposure: Non industrial spraying (PROC11)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors. Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.2.10. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No other specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Release route	Release rate	Release estimation method
water	0,02 kg/day	
air	0 kg/day	
Soil	0 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,074 µg/m3 (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0051 µg/l	0
Freshwater sediment	0,075 µg/l	0
Sea water	0,000017 µg/l	0
Sea sediment	0,00016 µg/kg wet weight	0
Soil	0,0012 µg/kg wet weight	0

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

10.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure	Exposure	RCR

		indicator	estimate	
inhalative	systemic	Long-term	0,05 mg/m³	0,00
dermal	systemic	Long-term	0,34 mg/kg/d	0,00
combined routes				0,00

10.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³	0,046
dermal	systemic	Long-term	1,37 mg/kg/d	0,002
combined routes				0,048

10.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	116,79 mg/m³	0,057
dermal	systemic	Long-term	0,034 mg/kg/d	0
combined routes				0,058

10.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	163,51 mg/m³	0,080
dermal	systemic	Long-term	1,37 mg/kg/d	0,002
combined routes				0,082
inhalative	systemic	Long-term	233,58 mg/m³	0,115
dermal	systemic	Long-term	6,86 mg/kg/d	0,009
combined routes				0,124

10.3.6. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	327,01 mg/m³	0,161
dermal	systemic	Long-term	2,74 mg/kg/d	0,004
combined routes				0,164

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³	0,115
dermal	systemic	Long-term	1,37 mg/kg/d	0,002
combined routes				0,117

10.3.8. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³	0,069
dermal	systemic	Long-term	5,486 mg/kg/d	0,007
combined routes	systemic	Long-term		0,076
dermal	systemic	Long-term	2,743 mg/kg/d	0,004
combined routes	systemic	Long-term		0,072
inhalative	systemic	Long-term	280,29 mg/m³	0,138
inhalative	systemic	Long-term	56,06 mg/m³	0,028
dermal	systemic	Long-term	3,292 mg/kg/d	0,004
dermal	systemic	Long-term	0,823 mg/kg/d	0,001
combined routes	systemic	Long-term		0,142

10.3.9. Worker exposure: Non industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³	0,069
dermal	systemic	Long-term	4,286 mg/kg/d	0,006
combined routes	systemic	Long-term		0,074
inhalative	systemic	Long-term	163,51 mg/m³	0,080
dermal	systemic	Long-term	2,143 mg/kg/d	0,003
combined routes	systemic	Long-term		0,083
inhalative	systemic	Long-term	327,01 mg/m³	0,161
combined routes	systemic	Long-term		0,166

10.3.10. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	140,15 mg/m³	0,069
dermal	systemic	Long-term	2,742 mg/kg/d	0,004

combined routes	systemic	Long-term		0,072

10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 11: Use as a cleaning agent – consumer; Consumer uses (SU21).

11.1. Title section

Exposure Scenario name	:	Use as a cleaning agent – consumer
Structured Short Title	:	Use as a cleaning agent – consumer; Consumer uses (SU21).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a cleaning agent – consumer**	ERC8a, ERC8d
Consumer		
CS 2	**Use as a cleaning agent – professional**	PC3
CS 3	**Use as a cleaning agent – professional**	PC4
CS 4	**Use as a cleaning agent – professional**	PC8
CS 5	**Use as a cleaning agent – professional**	PC9a
CS 6	**Use as a cleaning agent – professional**	PC9b_1, PC9b_2, PC9b_3, PC9c
CS 7	**Use as a cleaning agent – professional**	PC24
CS 8	**Use as a cleaning agent – professional**	PC35, PC38

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	150 kg/day
Critical compartment for Msafe	:	Sewage treatment plant
Release type	:	Continuous release
Emission days	:	365
Conditions and measures related to treatment of waste (including article waste)		

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

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

11.2.2. Control of consumer exposure: Air care products (PC3)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Exposure duration 0,25 h
Use frequency	:	4 times/day
Duration	:	Exposure duration 0,25 h
Use frequency	:	4 times/day

Conditions and measures related to personal protection, hygiene and health evaluation
No other specific measures identified.

Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

11.2.3. Control of consumer exposure: Anti-Freeze and de-icing products (PC4)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Exposure duration 0,02 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,17 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,25 h

Use frequency	:	1 times/day

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

No other specific measures identified.

Other conditions affecting consumers exposure

Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Garage
Room size	:	34 M3
Ventilation rate	:	1,5

11.2.4. Control of consumer exposure: Biocidal products (e.g. Disinfectants, pest control) (PC8)

Product (article) characteristics

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Exposure duration 0,5 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,17 min
Use frequency	:	1 times/day

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

No other specific measures identified.

Other conditions affecting consumers exposure

Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

11.2.5. Control of consumer exposure: Coatings and paints, thinners, paint removers (PC9a)

Product (article) characteristics

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature

		and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Exposure duration 2,2 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 2 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No other specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

11.2.6. Control of consumer exposure: Fillers and putty (PC9b_1) / Plasters and floor equalizers (PC9b_2) / Modeling Clay (PC9b_3) / Finger paints (PC9c)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Amount used per event	:	85 g
Amount used per event	:	13800 g
Amount used per event	:	1 g
Amount used per event	:	1,35 g
Duration	:	Exposure duration 4 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 2 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No other specific measures identified.		
Other conditions affecting consumers exposure		

Body parts exposed	:	Skin
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

11.2.7. Control of consumer exposure: Lubricants, greases, release products (PC24)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Amount used per event	:	2200 g
Amount used per event	:	34 g
Amount used per event	:	73 g
Duration	:	Exposure duration 0,17 h
Use frequency	:	1 times/day
Conditions and measures related to personal protection, hygiene and health evaluation		
No other specific measures identified.		
Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	34 M3
Ventilation rate	:	0,6

11.2.8. Control of consumer exposure: Washing and cleaning products (including solvent based products) (PC35) / Welding and soldering products (with flux coatings or flux cores.), flux products (PC38)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Amount used per event	:	15 g
Amount used per event	:	27 g

Amount used per event	:	35 g
Amount used per event	:	12 g
Duration	:	Exposure duration 0,50 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,33 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 0,17 h
Use frequency	:	1 times/day
Duration	:	Exposure duration 1 h
Use frequency	:	1 times/day

Conditions and measures related to personal protection, hygiene and health evaluation
No other specific measures identified.

Other conditions affecting consumers exposure		
Body parts exposed	:	Skin
Body parts exposed	:	Skin
Indoor or outdoor use	:	Indoor activities
Room size	:	20 M3
Ventilation rate	:	0,6

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a) / Wide dispersive outdoor use of processing aids in open systems (ERC8d)

Release route	Release rate	Release estimation method
air	0,95 kg/day	
water	0,025 kg/day	
Soil	0,025 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,000074 mg/m³ (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0000064 mg/l	0
Freshwater sediment	0,00013 mg/kg wet weight	0
Sea water	0,0000001 mg/l	0
Sea sediment	0,0000055 mg/kg wet weight	0
Soil	0,00004 mg/kg wet weight	0,052

11.3.2. Consumer exposure: Air care products (PC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	0 mg/kg bw/day	0
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	0,10 mg/m³	0
combined routes	systemic	Long-term		0
inhalative	systemic	Long-term	0,02 mg/m³	0

Additional information on exposure estimation

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk management measures are based on qualitative risk characterisation.

11.3.3. Consumer exposure: Anti-Freeze and de-icing products (PC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	7,13 mg/kg bw/day	0,01
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	0,18 mg/m³	0
combined routes	systemic	Long-term		0,01
dermal	systemic	Long-term	17,87 mg/m³	0,03
inhalative	systemic	Long-term	0,51 mg/m³	0
combined routes	systemic	Long-term		0,03

Additional information on exposure estimation

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk management measures are based on qualitative risk characterisation.

11.3.4. Consumer exposure: Biocidal products (e.g. Disinfectants, pest control) (PC8)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	0,07 mg/kg bw/day	0,01
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	0,07 mg/m³	0

combined routes	systemic	Long-term		0
dermal	systemic	Long-term	7,15 mg/m³	0,01
inhalative	systemic	Long-term	0,08 mg/m³	0
combined routes	systemic	Long-term		0,01

Additional information on exposure estimation

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk management measures are based on qualitative risk characterisation.

11.3.5. Consumer exposure: Coatings and paints, thinners, paint removers (PC9a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	1,07 mg/kg bw/day	0
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	10,53 mg/m³	0,02
combined routes	systemic	Long-term		0,02
dermal	systemic	Long-term	19,65 mg/m³	0,03
inhalative	systemic	Long-term	52,06 mg/m³	0,09
combined routes	systemic	Long-term		0,11
inhalative	systemic	Long-term	34,29 mg/m³	0,06
combined routes	systemic	Long-term		0,06
dermal	systemic	Long-term	71,46 mg/m³	0,10
inhalative	systemic	Long-term	59,57 mg/m³	0,10
combined routes	systemic	Long-term		0,20

Additional information on exposure estimation

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk management measures are based on qualitative risk characterisation.

11.3.6. Consumer exposure: Fillers and putty (PC9b_1) / Plasters and floor equalizers (PC9b_2) / Modeling Clay (PC9b_3) / Finger paints (PC9c)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	0,12 mg/kg bw/day	0
oral	systemic	Long-term	0 mg/kg bw/day	0

inhalative	systemic	Long-term	0,54 mg/m³	0
combined routes	systemic	Long-term		0
dermal	systemic	Long-term	2,86 mg/m³	0
inhalative	systemic	Long-term	66,97 mg/m³	0,11
combined routes	systemic	Long-term		0,11
dermal	systemic	Long-term	2,54 mg/kg bw/day	0
oral	systemic	Long-term	1 mg/kg bw/day	0
combined routes	systemic	Long-term		0,01
dermal	systemic	Long-term	127,20 mg/kg bw/day	0,18
oral	systemic	Long-term	67,50 mg/kg bw/day	0,10
combined routes	systemic	Long-term		0,28

Additional information on exposure estimation

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk management measures are based on qualitative risk characterisation.

11.3.7. Consumer exposure: Lubricants, greases, release products (PC24)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	78,00 mg/kg bw/day	0,11
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	0,40 mg/m³	0
combined routes	systemic	Long-term		0,11
dermal	systemic	Long-term	15,60 mg/m³	0,02
combined routes	systemic	Long-term		0,02
dermal	systemic	Long-term	35,73 mg/kg bw/day	0,05
inhalative	systemic	Long-term	12,29 mg/kg bw/day	0,02
combined routes	systemic	Long-term		0,07

Additional information on exposure estimation

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.

Risk management measures are based on qualitative risk characterisation.

11.3.8. Consumer exposure: Washing and cleaning products (including solvent based products) (PC35) / Welding and soldering products (with flux coatings or flux cores.), flux products (PC38)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
dermal	systemic	Long-term	0,07 mg/kg bw/day	0
oral	systemic	Long-term	0 mg/kg bw/day	0
inhalative	systemic	Long-term	0,07 mg/m³	0
combined routes	systemic	Long-term		0
dermal	systemic	Long-term	7,15 mg/kg bw/day	0,01
inhalative	systemic	Long-term	0,08 mg/m³	0
combined routes	systemic	Long-term		0,02
dermal	systemic	Long-term	10,70 mg/kg bw/day	0,02
inhalative	systemic	Long-term	1,77 mg/m³	0
combined routes	systemic	Long-term		0,02
inhalative	systemic	Long-term	0,38 mg/m³	0

Additional information on exposure estimation

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Risk management measures are based on qualitative risk characterisation.

11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

ES 12: Use as a laboratory agent – industrial; Industrial uses (SU3).

12.1. Title section

Exposure Scenario name	:	Use as a laboratory agent – industrial
Structured Short Title	:	Use as a laboratory agent – industrial; Industrial uses (SU3).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a laboratory agent – industrial**	ERC2, ERC4
Worker		
CS 2	**Cleaning**	PROC10
CS 3	**Laboratory activities**	PROC15

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: Formulation of preparations (ERC2) / Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	900 kg/day
Release type	:	Continuous release
Emission days	:	20
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Air - minimum efficiency of 0 % Water - minimum efficiency of 0 % Soil - minimum efficiency of 66,5 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils.

		Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

12.2.2. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

12.2.3. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure: Formulation of preparations (ERC2) / Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Release route	Release rate	Release estimation method
air	0,025 kg/day	
Soil	0 kg/day	
water	0,02 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,13 µg/m3 (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0037 mg/l	0,098
Freshwater sediment	0,16 µg/kg wet weight	0,11
Sea water	0,37 µg/l	0,001
Sea sediment	0,016 mg/kg wet weight	0,011
Soil	0,0019 µg/kg wet weight	0

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

12.3.2. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	233,58 mg/m³	0,115
dermal	systemic	Long-term	5,486 mg/kg/d	0,007
combined routes	systemic	Long-term		0,122

Additional information on exposure estimation
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk management measures are based on qualitative risk characterisation.

12.3.3. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³	0,023
dermal	systemic	Long-term	0,34 mg/kg/d	0
combined routes	systemic	Long-term		0,023

Additional information on exposure estimation
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk management measures are based on qualitative risk characterisation.

12.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

ES 13: Use as a laboratory agent – professional; Professional uses (SU22).

13.1. Title section

Exposure Scenario name	:	Use as a laboratory agent – professional
Structured Short Title	:	Use as a laboratory agent – professional; Professional uses (SU22).
Substance	:	2,2,4-trimethylpentane EC-No.: 208-759-1

Environment		
CS 1	**Use as a laboratory agent – professional**	ERC8a
Worker		
CS 2	**Cleaning**	PROC10
CS 3	**Laboratory activities**	PROC15

13.2. Conditions of use affecting exposure

13.2.1. Control of environmental exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Amount used (or contained in articles), frequency and duration of use/exposure		
Maximum allowable site tonnage (MSafe)	:	131 kg/day
Release type	:	Continuous release
Emission days	:	365
Technical and organisational conditions and measures		
Risk from environmental exposure is driven by freshwater. No wastewater treatment required. Air - minimum efficiency of 0 % Water - minimum efficiency of 0 % Soil - minimum efficiency of 0 %		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Prevent discharge of undissolved substance to or recover from wastewater.

		Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
STP effluent	:	2.000 m3/d

Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Local freshwater dilution factor	:	10
Local marine water dilution factor	:	100

13.2.2. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

13.2.3. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No other specific measures identified.

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

13.3. Exposure estimation and reference to its source

13.3.1. Environmental release and exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a)

Release route	Release rate	Release estimation method
air	0,5 kg/day	
Soil	0 kg/day	
water	0,5 kg/day	

Protection Target	Exposure estimate	RCR
Air	0,074 µg/m3 (Hydrocarbon Block Method (Petrorisk))	
Freshwater	0,0077 µg/l	0
Freshwater sediment	0,00011 mg/kg wet weight	0
Sea water	0,00025 µg/l	0
Sea sediment	0,000011 mg/kg wet weight	0
Soil	0,047 µg/kg wet weight	0

Additional information on exposure estimation
Common practices vary across sites thus conservative process release estimates used.

13.3.2. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	93,43 mg/m³	0,046
dermal	systemic	Long-term	1,372 mg/kg/d	0,002
combined routes	systemic	Long-term		0,048

Additional information on exposure estimation
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk management measures are based on qualitative risk characterisation.

13.3.3. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	Long-term	46,72 mg/m³	0,023
dermal	systemic	Long-term	0,034 mg/kg/d	0
combined routes	systemic	Long-term		0,023

Additional information on exposure estimation
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk management measures are based on qualitative risk characterisation.

13.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.