Vertrel™ XF specialty fluid

Version 7.0 (replaces: Version 6.1)
Revision Date 14.04.2016 Ref. 130000000559

This Safety Data Sheet adheres to the standards and regulatory requirements of Great Britain and may not meet the regulatory requirements in other countries.

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

1.1. Product identifier

Product name : Vertrel™ XF specialty fluid

Registration number : 01-2119446695-28-0000

Synonyms : 1,1,1,2,2,3,4,5,5,5-decafluoropentane
HFC-43-10mee
HFC-4310

Identification number : CAS-No. 138495-42-8 EC-No. 420-640-8

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

Use of the Substance/Mixture : Packaging, Formulation [mixing] of preparations and/or re-packaging (excluding alloys), Solvent, Solvents for aerosol, Cleaning agent, Heat transfer fluids, Solvent recovery

1.3. Details of the supplier of the safety data sheet

Company : Chemours Netherlands B.V.
Baanhoekweg 22
NL-3313 LA Dordrecht
Netherlands

Telephone : +31-(0)-78-630-1011

Telefax : +31-78-6163737

E-mail address : sds-support@chemours.com

1.4. Emergency telephone number

Emergency telephone number : +(44)-870-8200418 (CHEMTREC - Recommended)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Chronic aquatic toxicity, Category 3 H412: Harmful to aquatic life with long lasting effects.

2.2. Label elements

H412	Harmful to aquatic life with long lasting effects.
Special labelling of certain substances and mixtures	Contains: Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane / Kyoto: Contains fluorinated greenhouse gas covered by the Kyoto Protocol.,HFC-43-10mee,
P273	Avoid release to the environment.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3. Other hazards

This substance is not considered to be persistent, bioaccumulating and toxic (PBT).
This substance is not considered to be very persistent and very bioaccumulating (vPvB).
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Prolonged skin contact may defat the skin and produce dermatitis.
Effects of breathing high concentrations of vapour may include:
May cause cardiac arrhythmia.
Central nervous system effects
Convulsions

SECTION 3: Composition/information on ingredients

Chemical name of the substance : Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane - Synonym: 1,1,1,2,2,3,4,5,5,5-decafluoropentane

3.1. Substances

Registration number	Classification according to Regulation (EU) 1272/2008 (CLP)	Concentration (% w/w)
Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane (CAS-No.138495-42-8) (EC-No.420-640-8)		
01-2119446695-28-0000	Aquatic Chronic 3; H412	>= 99 %

3.2. Mixtures

Not applicable

The above products are compliant to REACH registration obligations; Registration number(s) may not be provided because substance(s) are exempted, not yet registered under REACH or are registered under another regulatory process (biocide uses, plant protection products), etc.

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	:	Never give anything by mouth to an unconscious person. Victim to lie down in the recovery position, cover and keep him warm. Give oxygen or artificial respiration if needed. When symptoms persist or in all cases of doubt seek medical advice.
Inhalation	:	Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
Skin contact	:	Take off all contaminated clothing immediately. Wash off with warm water. Get medical attention.
Eye contact	:	In case of eye contact
	:	Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Ingestion	:	Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Drink 1 or 2 glasses of water. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Consult a physician.

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

Symptoms	:	For further information see Section 11.

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

Treatment	:	Do not give adrenaline or similar drugs. Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	:	Water spray, Water mist, Dry chemical, Carbon dioxide (CO2)

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting	:	Fire or intense heat may cause violent rupture of packages.
	:	The product is not flammable.
	:	Hazardous combustion products:

: Hydrogen fluoride
: Fluorinated hydrocarbons
: Carbonyl fluoride
: Carbon oxides

5.3. Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire. Exposure to decomposition products may be a hazard to health.

Further information : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Evacuate personnel to safe areas. Cool containers/tanks with water spray. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. Refer to protective measures listed in sections 7 and 8.

6.2. Environmental precautions

Environmental precautions : Prevent further leakage or spillage. Prevent spreading over a wide area (e.g. by containment or oil barriers). Should not be released into the environment.

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

For disposal instructions see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling : Avoid contact with skin, eyes and clothing. Avoid breathing vapours or mist. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.

For further information see Annex - Exposure scenario.

Advice on protection against fire and explosion : Avoid any dust buildup with fluorocarbons and metal mixtures.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Protect from contamination. Keep container tightly closed in a dry and well-ventilated place. Store in original container. Avoid freezing temperatures. If stored below -10°C (14°F), mix prior to use.

Advice on common storage : No materials to be especially mentioned. For further information see Section 10 of the safety data sheet.

7.3. Specific end use(s)

For further information see Annex - Exposure scenario.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

If sub-section is empty then no values are applicable.

Derived No Effect Level (DNEL)

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane

: Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Acute effects, Systemic effects
Value: 2072 mg/m3

: Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic effects
Value: 2072 mg/m3

: Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Acute effects, Systemic effects
Value: 1546 mg/m3

: Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic effects
Value: 1546 mg/m3

: Type of Application (Use): Consumers
Exposure routes: Ingestion
Health Effect: Chronic effects
Value: 37 mg/kg body weight (bw) /day

Predicted No Effect Concentration (PNEC)

• Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane	:	Value: 0.0344 mg/l Compartment: Fresh water
	:	Value: 0.0034 mg/l Compartment: Marine water
	:	Value: 0.106 mg/l Compartment: Water Remarks: Intermittent use/release
	:	Value: 1.75 mg/kg dry weight (d.w.) Compartment: Fresh water sediment
	:	Value: 0.175 mg/kg dry weight (d.w.) Compartment: Marine sediment
	:	Value: 0.215 mg/kg dry weight (d.w.) Compartment: Soil

8.2. Exposure controls

Engineering measures	:	Ensure adequate ventilation, especially in confined areas. For further information see Annex - Exposure scenario.
Eye protection	:	Safety glasses with side-shields Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.
Hand protection	:	Material: Hydrofluoric acid-resistant and solvent-resistant gloves (gloves made of VITON ®). Glove thickness: 0.7 mm Wearing time: 120 min 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.
Skin and body protection	:	Protective suit
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. When using do not eat, drink or smoke. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Wash hands before breaks and at the end of workday.
Respiratory protection	:	For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing

oxygen available for breathing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	: liquid
Colour	: colourless
Odour	: slight, ether-like
Freezing point	: -83.7 °C at 1,013 hPa
Boiling range	: 53.2 - 54.2 °C at 1,013 hPa
Flash point	: Method: Tested according to Directive 92/69/EEC. does not flash
Oxidizing properties	: The product is not oxidizing.
Explosive properties	: Not explosive
Lower explosion limit/ lower flammability limit	: Type: lower flammability limit, Method: ASTM E681, None.
Upper explosion limit/ upper flammability limit	: Type: upper flammability limit, Method: ASTM E681, None.
Vapour pressure	: 248 hPa at 20 °C
	: 313 hPa at 25 °C
Density	: 1.60 g/cm3 at 20 °C
Water solubility	: 0.126 g/l at 20 °C
Partition coefficient: n-octanol/water	: Pow: 2.7 at 24 °C
Viscosity, dynamic	: 6.7 mPa.s at 25 °C

9.2. Other information

no data available

SECTION 10: Stability and reactivity

10.1. Reactivity : Stable at normal ambient temperature and pressure.

10.2. Chemical stability : The product is chemically stable.

10.3. Possibility of hazardous reactions : No decomposition if stored and applied as directed.

10.4. Conditions to avoid : The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions. Avoid open flames and high temperatures.

10.5. Incompatible materials : Alkali metals
Alkaline earth metals
Powdered metals
Powdered metal salts
Strong bases

10.6. Hazardous decomposition products : Hazardous thermal decomposition products may include:
Carbon oxides
Hydrogen fluoride
Carbonyl fluoride
Fluorocarbons

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute oral toxicity

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  LD50 / Rat : > 5,000 mg/kg

Acute inhalation toxicity

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  LC50 / 4 h Rat : 114 mg/l
  Central nervous system effects Convulsions

Acute dermal toxicity

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  LD50 / Rabbit : > 5,000 mg/kg

Skin irritation

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Rabbit
  Classification: Not classified as irritant
  Result: No skin irritation

Eye irritation

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Rabbit
  Classification: Not classified as irritant
  Result: No eye irritation

Sensitisation

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Guinea pig
  Classification: Not a skin sensitizer.
  Result: Did not cause sensitisation on laboratory animals.

Repeated dose toxicity

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Inhalation Rat
  No toxicologically significant effects were found.

Mutagenicity assessment

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.

Toxicity to reproduction assessment

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  No toxicity to reproduction Animal testing showed no reproductive toxicity.

Assessment teratogenicity

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Animal testing showed no developmental toxicity.

Human experience

Excessive exposures may affect human health, as follows:

Inhalation
Effects of breathing high concentrations of vapour may include:, Tiredness or drowsiness, Central nervous system depression, Convulsions, Cardiac arrhythmias Adverse effects from repeated inhalation may include:, Central nervous system depression

Skin contact
Prolonged skin contact may defat the skin and produce dermatitis.

Ingestion
Aspiration may cause pulmonary oedema and pneumonitis.

SECTION 12: Ecological information

12.1. Toxicity

Toxicity to fish

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  LC50 / 96 h / Oncorhynchus mykiss (rainbow trout): 13.9 mg/l

  LC50 / 96 h / Pimephales promelas (fathead minnow): 27.2 mg/l

  LC50 / 96 h / Danio rerio (zebra fish): 13 mg/l

Toxicity to aquatic plants

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  EC50 / 72 h / Pseudokirchneriella subcapitata (green algae): > 120 mg/l

Toxicity to aquatic invertebrates

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  LC50 / 48 h / Daphnia magna (Water flea): 11.7 mg/l

Chronic toxicity to aquatic Invertebrates

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  NOEC / 21 d / Daphnia magna (Water flea): 1.72 mg/l

12.2. Persistence and degradability

Biodegradability

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Not readily biodegradable.

12.3. Bioaccumulative potential

Bioaccumulation

- Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
  Bioaccumulation is unlikely.

12.4. Mobility in soil

Mobility in soil

Koc: 217.78

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating and toxic (PBT). / This substance is not considered to be very persistent and very bioaccumulating (vPvB).

12.6. Other adverse effects

Ozone depletion potential

0

Global warming potential (GWP)

1640

Additional ecological information

IPCC - AR4 (Fourth Assessment Report of the Intergovernmental Panel on Climate Change) - 2007

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	:	Can be used after re-conditioning. If recycling is not practicable, dispose of in compliance with local regulations. The product should not be allowed to enter drains, water courses or the soil. For further information see Annex - Exposure scenario.
Contaminated packaging	:	If recycling is not practicable, dispose of in compliance with local regulations.

SECTION 14: Transport information

ADR

14.1.	UN number:	Not applicable
14.2.	UN proper shipping name:	Not applicable
14.3.	Transport hazard class(es):	Not applicable
14.4.	Packing group:	Not applicable
14.5.	Environmental hazards:	none
14.6.	Special precautions for user:	

Not classified as dangerous in the meaning of transport regulations.

IATA_C

14.1.	UN number:	Not applicable
14.2.	UN proper shipping name:	Not applicable
14.3.	Transport hazard class(es):	Not applicable
14.4.	Packing group:	Not applicable
14.5.	Environmental hazards:	none
14.6.	Special precautions for user:	

Not classified as dangerous in the meaning of transport regulations.

IMDG

14.1.	UN number:	Not applicable
14.2.	UN proper shipping name:	Not applicable
14.3.	Transport hazard class(es):	Not applicable
14.4.	Packing group:	Not applicable
14.5.	Environmental hazards:	none
14.6.	Special precautions for user:	

Not classified as dangerous in the meaning of transport regulations.

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable

SECTION 15: Regulatory information

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

Other regulations : Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

15.2. Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under section 3.

H412 Harmful to aquatic life with long lasting effects.

Abbreviations and acronyms

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute toxicity estimate
CAS-No.	Chemical Abstracts Service number
CLP	Classification, Labelling and Packaging
EbC50	Concentration at which 50% reduction of biomass is observed
EC50	Median effective concentration
EN	European Norm
EPA	Environmental Protection Agency
ErC50	Concentration at which a 50% inhibition of growth rate is observed
EyC50	Concentration at which 50 % inhibition of yield is observed
IATA_C	International Air Transport Association (Cargo)
IBC	International Bulk Chemical Code
ICAO	International Civil Aviation Organization
ISO	International Standard Organization
IMDG	International Maritime Dangerous Goods
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
LOEC	Lowest Observed Effect Concentration
LOEL	Lowest observed effect level
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
n.o.s.	Not Otherwise Specified
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No observed adverse effect level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
OECD	Organisation for Economic Co-operation and Development
OPPTS	Office of Prevention, Pesticides and Toxic Substances
PBT	Persistent, Bioaccumulative and Toxic
STEL	Short term exposure limit
TWA	Time Weighted Average (TWA):
vPvB	very Persistent and very Bioaccumulative

Further information

For certain lead and priority substances within the mixture where no Exposure Scenario information is currently available please see Sections 1 to 16 of the Safety Data Sheet.
Before use read Chemours safety information., For further information contact the local Chemours office or nominated distributors.

Significant change from previous version is denoted with a double bar.

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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The above information relates only to the specific material(s) designated herein and may not be valid for such material(s) used in combination with any other materials or in any process or if the material is altered or processed, unless specified in the text.

Annex - Exposure scenario

The exposure scenario provides specific information on how hazardous substances (as such or in a mixture) are to be managed and controlled. It considers specific conditions of use, in order to ensure that a use should be safe to humans and the environment. Identified risk management measures are to be implemented unless the downstream user is able to ensure safe use in a diverging way.

ES1 - Packaging, Formulation [mixing] of preparations and/or re-packaging (excluding alloys), Industrial use

ES2 - Solvent, Industrial use

ES3 - Solvents for aerosol, Industrial use

ES4 - Cleaning agent, Professional use

ES5 - Heat transfer fluids, Professional use

ES6 - Solvent recovery, Industrial use

Exposure scenario 1:

1. Short title of Exposure Scenario: Packaging, Formulation [mixing] of preparations and/or re-packaging (excluding alloys), Industrial use

Main User Group	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of End Use	:	**SU 10:** Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
Product Category	:	**PC21:** Laboratory chemicals
CS1	:	Formulation of preparations (ERC2)
CS2	:	Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage
CS3	:	Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance
CS4	:	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)
CS5	:	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5)

CS6	:	Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9) Packaging
CS7	:	Use as laboratory reagent (PROC15) Use in laboratories

2. Conditions of use affecting exposure

2.1 Control of environmental exposure for: CS1 - Formulation of preparations (ERC2)

ECETOC TRA v2.0 Environment

Product characteristics

Not readily biodegradable.

Amount used

Annual amount per site	:	160 ton(s)/year
Daily amount per site	:	3200 kg/day

Frequency and duration of use

Continuous use/release	:	50 days/year

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM)	:	0.1
Remarks	:	Process designed to minimize releases to air. Negligible air emissions as process operates in a contained system.
Limit release rate to waste water to (kg/day):	:	0.5 kg/day
Remarks	:	Process designed to minimize releases to wastewater.
Remarks	:	Process designed to minimize releases to soil.

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Domestic sewage treatment is not assumed.

Conditions and measures related to external treatment of waste

Remarks	:	No waste from process

2.2 Control of worker exposure for: CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

ECETOC TRA v2.0 Worker
ECETOC TRA modified version: Reduction factor for local exhaust ventilation (LEV) has not been used for the calculation of dermal exposure estimates.

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Not required for TRA worker assessments.

Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Outdoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Handle substance within a closed system. Ensure operation is undertaken outdoors. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.3 Control of worker exposure for: CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Outdoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Ensure operation is undertaken outdoors. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.4 Control of worker exposure for: CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 15 minutes.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Outdoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Transfer via enclosed lines. Ensure operation is undertaken outdoors. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.5 Control of worker exposure for: CS5 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 15 minutes.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.

Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.6 Control of worker exposure for: CS6 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9) Packaging

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 4 hours.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Inhalation exposure:

Handle substance within a predominantly closed system provided with extract ventilation. (Effectiveness: 90 %)

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.7 Control of worker exposure for: CS7 - Use as laboratory reagent (PROC15) Use in laboratories

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Volatile., liquid
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Inhalation exposure:

Handle in a fume cupboard or under extract ventilation. (Effectiveness: 80 %)

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

3. Exposure estimation and reference to its source

Environment

CS1 - Formulation of preparations (ERC2)

Compartment	:	Fresh water
Risk characterization ratio	:	0.7
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine water
Risk characterization ratio	:	0.7
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Fresh water sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Agricultural soil (30 days)
Risk characterization ratio	:	0.1
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Grassland
Risk characterization ratio	:	0.1
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).
Risk characterization ratio	:	0.000008
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).
Risk characterization ratio	:	0.00002
Method	:	ECETOC TRA v2.0 Environment

Workers

CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.000010
Method	:	ECETOC TRA v2.0 Worker

CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.036
Method	:	ECETOC TRA v2.0 Worker

CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.053
Method	:	ECETOC TRA v2.0 Worker

CS5 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5)

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.13
Method	:	ECETOC TRA v2.0 Worker

CS6 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9) Packaging

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.063
Method	:	ECETOC TRA v2.0 Worker

CS7 - Use as laboratory reagent (PROC15) Use in laboratories

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.011
Method	:	ECETOC TRA v2.0 Worker

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

CS1 - Formulation of preparations (ERC2)

For further information, please contact sds-support@chemours.com., The information within this CS is relevant for all CS within this chapter of the Exposure Scenario.

Exposure scenario 2:

1. Short title of Exposure Scenario: Solvent, Industrial use

Main User Group	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of End Use	:	**SU12:** Manufacture of plastics products, including compounding and conversion
Product Category	:	**PC32:** Polymer preparations and compounds
CS1	:	Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)
CS2	:	Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage
CS3	:	Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance
CS4	:	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure for: CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

ECETOC TRA v2.0 Environment

Product characteristics

Not biodegradable

Amount used

Annual amount per site	:	30 ton(s)/year
Daily amount per site	:	1500 kg/day

Frequency and duration of use

Continuous use/release	:	20 days/year

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM)	:	0.5

Remarks	:	Process designed to minimize releases to air. Negligible air emissions as process operates in a contained system.
Limit release rate to waste water to (kg/day):	:	0.5 kg/day
Remarks	:	Process designed to minimize releases to wastewater.
Remarks	:	Process designed to minimize releases to soil.

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Domestic sewage treatment is not assumed.

Conditions and measures related to external treatment of waste

Remarks	:	No waste from process

2.2 Control of worker exposure for: CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Handle substance within a closed system. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.3 Control of worker exposure for: CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Transfer via enclosed lines. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.4 Control of worker exposure for: CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 15 minutes.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

3. Exposure estimation and reference to its source

Environment

CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Compartment	:	Fresh water
Risk characterization ratio	:	0.7
Method	:	ECETOC TRA v2.0 Environment

Compartment	:	Marine water
Risk characterization ratio	:	0.7
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Fresh water sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Agricultural soil (30 days)
Risk characterization ratio	:	0.1
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Grassland
Risk characterization ratio	:	0.1
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).
Risk characterization ratio	:	0.000008
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).
Risk characterization ratio	:	0.00001
Method	:	ECETOC TRA v2.0 Environment

Workers

CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.000010
Method	:	ECETOC TRA v2.0 Worker

CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.053
Method	:	ECETOC TRA v2.0 Worker

CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

Value type	:	Worker - inhalation - long-term, systemic

Risk characterization ratio	:	0.077
Method	:	ECETOC TRA v2.0 Worker

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

CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

For further information, please contact sds-support@chemours.com., The information within this CS is relevant for all CS within this chapter of the Exposure Scenario.

Exposure scenario 3:

1. Short title of Exposure Scenario: Solvents for aerosol, Industrial use

Main User Group	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of End Use	:	**SU16:** Manufacture of computer, electronic and optical products, electrical equipment
	:	**SU20:** Health services
Product Category	:	**PC1:** Adhesives, sealants
	:	**PC24:** Lubricants, greases, release products
	:	**PC29:** Pharmaceuticals
	:	**PC33:** Semiconductors
CS1	:	Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)
CS2	:	Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage
CS3	:	Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance
CS4	:	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)
CS5	:	Treatment of articles by dipping and pouring (PROC13)
CS6	:	Industrial spraying (PROC7)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure for: CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

ECETOC TRA v2.0 Environment

Product characteristics

Not biodegradable

Amount used

Annual amount per site	:	15 ton(s)/year
Daily amount per site	:	750 kg/day

Frequency and duration of use

Continuous use/release : 20 days/year

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM) : 0.5

Remarks : Process designed to minimize releases to air. Negligible air emissions as process operates in a contained system.

Limit release rate to waste water to (kg/day): : 0.5 kg/day

Remarks : Process designed to minimize releases to wastewater.

Remarks : Process designed to minimize releases to soil.

Technical and organisational conditions and measures

Air : Treat air emission to provide a typical removal efficiency of (%) (Effectiveness: > 50 %)

Conditions and measures related to municipal sewage treatment plant

Remarks : Domestic sewage treatment is not assumed.

Conditions and measures related to external treatment of waste

Remarks : No waste from process

2.2 Control of worker exposure for: CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : liquid, Volatile.

Vapour pressure : 248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Handle substance within a closed system. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.3 Control of worker exposure for: CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.

Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.4 Control of worker exposure for: CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 15 minutes.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Transfer via enclosed lines. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.5 Control of worker exposure for: CS5 - Treatment of articles by dipping and pouring (PROC13)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 4 hours.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Inhalation exposure:

Handle substance within a predominantly closed system provided with extract ventilation. Carry out in a vented booth or extracted enclosure. (Effectiveness: 95 %)

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.6 Control of worker exposure for: CS6 - Industrial spraying (PROC7)

For control of exposure please see:
Contributing Scenario 5

3. Exposure estimation and reference to its source

Environment

CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Compartment	:	Fresh water
Risk characterization ratio	:	0.7
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine water
Risk characterization ratio	:	0.7
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Fresh water sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Agricultural soil (30 days)
Risk characterization ratio	:	0.06
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Grassland
Risk characterization ratio	:	0.06
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).
Risk characterization ratio	:	0.000004
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).
Risk characterization ratio	:	0.000006
Method	:	ECETOC TRA v2.0 Environment

Workers

CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.000010

Method : ECETOC TRA v2.0 Worker

CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

Value type : Worker - inhalation - long-term, systemic
Risk characterization ratio : 0.053
Method : ECETOC TRA v2.0 Worker

CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

Value type : Worker - inhalation - long-term, systemic
Risk characterization ratio : 0.077
Method : ECETOC TRA v2.0 Worker

CS5 - Treatment of articles by dipping and pouring (PROC13)

Value type : Worker - inhalation - long-term, systemic
Risk characterization ratio : 0.039
Method : ECETOC TRA v2.0 Worker

CS6 - Industrial spraying (PROC7)

Value type : Worker - inhalation - long-term, systemic
Risk characterization ratio : 0.077
Method : ECETOC TRA v2.0 Worker

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

CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

For further information, please contact sds-support@chemours.com., The information within this CS is relevant for all CS within this chapter of the Exposure Scenario.

Exposure scenario 4:

1. Short title of Exposure Scenario: Cleaning agent, Professional use

Main User Group	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Product Category	:	**PC35:** Washing and cleaning products (including solvent based products)
CS1	:	Wide dispersive indoor use of processing aids in open systems (ERC8a) Cleaning agent
CS2	:	Treatment of articles by dipping and pouring (PROC13)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure for: CS1 - Wide dispersive indoor use of processing aids in open systems (ERC8a) Cleaning agent

ECETOC TRA v2.0 Environment

Product characteristics

Not biodegradable

Amount used

Amount used not relevant (volume independent assessment).

Frequency and duration of use

Continuous use/release	:	365 days/year

Other given operational conditions affecting environmental exposure

Remarks	:	Process designed to minimize releases to air. Negligible air emissions as process operates in a contained system.
Limit release rate to waste water to (kg/day):	:	0.5 kg/day
Remarks	:	Process designed to minimize releases to wastewater.
Remarks	:	Process designed to minimize releases to soil.

Technical and organisational conditions and measures

Air	:	Treat air emission to provide a typical removal efficiency of (%) (Effectiveness: > 90 %)

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Domestic sewage treatment is not assumed.

Conditions and measures related to external treatment of waste

Remarks	:	No waste from process

2.2 Control of worker exposure for: CS2 - Treatment of articles by dipping and pouring (PROC13)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 4 hours.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use

Technical and organisational conditions and measures

Inhalation exposure:

Handle substance within a predominantly closed system provided with extract ventilation. (Effectiveness: 90 %)

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

3. Exposure estimation and reference to its source

Environment

CS1 - Wide dispersive indoor use of processing aids in open systems (ERC8a) Cleaning agent

Compartment	:	Fresh water
Risk characterization ratio	:	0.08
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine water
Risk characterization ratio	:	0.08
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Fresh water sediment
Risk characterization ratio	:	0.04
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine sediment
Risk characterization ratio	:	0.04
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Agricultural soil (30 days)
Risk characterization ratio	:	< 0.000001
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Grassland
Risk characterization ratio	:	< 0.000001
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).
Risk characterization ratio	:	< 0.000001
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).
Risk characterization ratio	:	0.000006
Method	:	ECETOC TRA v2.0 Environment

Workers

CS2 - Treatment of articles by dipping and pouring (PROC13)

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.1
Method	:	ECETOC TRA v2.0 Worker

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

CS1 - Wide dispersive indoor use of processing aids in open systems (ERC8a) Cleaning agent

For further information, please contact sds-support@chemours.com., The information within this CS is relevant for all CS within this chapter of the Exposure Scenario.

Exposure scenario 5:

1. Short title of Exposure Scenario: Heat transfer fluids, Professional use

Main User Group	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sector of End Use	:	**SU17:** General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Product Category	:	**PC16:** Heat transfer fluids
	:	**PC0:** Other (use UCN codes)
	:	**E07400:** UCN E07400: Dielectric
Further information	:	**AC2:** Machinery, mechanical appliances, electrical/electronic articles
CS1	:	Wide dispersive indoor use of substances in closed systems (ERC9a)
CS2	:	Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure for: CS1 - Wide dispersive indoor use of substances in closed systems (ERC9a)

Releases based on SpERC (Specific Environmental Release Categories):
ESVOC SpERC 9.13b.v1

Product characteristics

Not biodegradable

Amount used

Amount used not relevant (volume independent assessment).

Frequency and duration of use

Continuous use/release	:	365 days/year

Other given operational conditions affecting environmental exposure

Remarks	:	Process designed to minimize releases to air. Negligible air emissions as process operates in a contained system.
Limit release rate to waste water to (kg/day):	:	0.5 kg/day

Remarks	:	Process designed to minimize releases to wastewater.
Remarks	:	Process designed to minimize releases to soil.

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Domestic sewage treatment is not assumed.

Conditions and measures related to external treatment of waste

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

2.2 Control of worker exposure for: CS2 - Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 4 hours.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Store substance within a closed system. For further information see Section 7 of the safety data sheet.

Carefully handle the substance to minimise releases.

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

For further information see Section 8 of the safety data sheet.

3. Exposure estimation and reference to its source

Environment

CS1 - Wide dispersive indoor use of substances in closed systems (ERC9a)

Compartment	:	Fresh water
Risk characterization ratio	:	0.0004
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1
Compartment	:	Marine water
Risk characterization ratio	:	0.0005
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1
Compartment	:	Fresh water sediment
Risk characterization ratio	:	0.0002
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1
Compartment	:	Marine sediment
Risk characterization ratio	:	0.002
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1
Compartment	:	Agricultural soil (30 days)
Risk characterization ratio	:	< 0.000001
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1
Compartment	:	Grassland
Risk characterization ratio	:	0.002
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).
Risk characterization ratio	:	< 0.000001
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).

Risk characterization ratio	:	< 0.000001
Method	:	Releases based on SpERC (Specific Environmental Release Categories): ESVOC SpERC 9.13b.v1

Workers

CS2 - Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.2
Method	:	ECETOC TRA v2.0 Worker

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

CS1 - Wide dispersive indoor use of substances in closed systems (ERC9a)

For further information, please contact sds-support@chemours.com., The information within this CS is relevant for all CS within this chapter of the Exposure Scenario.

Exposure scenario 6:

1. Short title of Exposure Scenario: Solvent recovery, Industrial use

Main User Group	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of End Use	:	**SU17:** General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
CS1	:	Industrial use of processing aids in processes and products, not becoming part of articles (ERC4) Solvent recovery
CS2	:	Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage
CS3	:	Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance
CS4	:	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure for: CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4) Solvent recovery

ECETOC TRA v2.0 Environment

Product characteristics

Not biodegradable

Amount used

Annual amount per site	:	15 ton(s)/year
Daily amount per site	:	750 kg/day

Frequency and duration of use

Continuous use/release	:	20 days/year, Continuous release.

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM)	:	0.5

Remarks	:	Process designed to minimize releases to air. Negligible air emissions as process operates in a contained system.
Limit release rate to waste water to (kg/day):	:	0.5 kg/day
Remarks	:	Process designed to minimize releases to wastewater.
Remarks	:	Process designed to minimize releases to soil.

Conditions and measures related to municipal sewage treatment plant

Remarks	:	Domestic sewage treatment is not assumed.

Conditions and measures related to external treatment of waste

Remarks	:	No waste from process

2.2 Control of worker exposure for: CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

Handle substance within a closed system. For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.3 Control of worker exposure for: CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 1 hour.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

2.4 Control of worker exposure for: CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

ECETOC TRA v2.0 Worker

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	liquid, Volatile.
Vapour pressure	:	248 hPa

Amount used - Frequency and duration of use

Amount per Use	:	Not required for TRA worker assessments.
Frequency of use	:	Covers frequency up to 5 days per week. Avoid carrying out operation for more than 15 minutes.

Other operational conditions affecting workers exposure

Remarks	:	High volatile liquid. Dermal exposure is considered to be not relevant.
Outdoor / Indoor	:	Indoor use
Remarks	:	Assumes activities are at ambient temperature (unless stated differently).

Technical and organisational conditions and measures

For further information see Section 7 of the safety data sheet.

Ensure operatives are trained to minimise exposures. Supervision in place to check that the Risk Management Measures in place are being used correctly and operational conditions followed.

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

For further information see Section 8 of the safety data sheet.

3. Exposure estimation and reference to its source

Environment

CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4) Solvent recovery

Compartment	:	Fresh water
Risk characterization ratio	:	0.7

Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine water
Risk characterization ratio	:	0.7
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Fresh water sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Marine sediment
Risk characterization ratio	:	0.3
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Agricultural soil (30 days)
Risk characterization ratio	:	0.06
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Grassland
Risk characterization ratio	:	0.06
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).
Risk characterization ratio	:	0.000004
Method	:	ECETOC TRA v2.0 Environment
Compartment	:	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).
Risk characterization ratio	:	0.000006
Method	:	ECETOC TRA v2.0 Environment

Workers

CS2 - Use in closed process, no likelihood of exposure (PROC1) Material transfers, Storage

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.000010
Method	:	ECETOC TRA v2.0 Worker

CS3 - Use in closed, continuous process with occasional controlled exposure (PROC2) Material transfers, Equipment maintenance

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.053
Method	:	ECETOC TRA v2.0 Worker

CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

Value type	:	Worker - inhalation - long-term, systemic
Risk characterization ratio	:	0.077
Method	:	ECETOC TRA v2.0 Worker

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

CS1 - Industrial use of processing aids in processes and products, not becoming part of articles (ERC4) Solvent recovery

For further information, please contact sds-support@chemours.com., The information within this CS is relevant for all CS within this chapter of the Exposure Scenario.