Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the REACH Regulation (EC) 1907/2006 and its modifications.

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

1.1. Product identifier
Acota HFE 72DE Engineered Fluid

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

Identified uses
For Industrial Use Only. See Limitations on Use for supplemental information on intended applications including Medical Device applications.

Restrictions on Use
Acota Engineered Fluids are used in a wide variety of applications including but not limited to precision cleaning of medical devices and as lubricant deposition solvents for medical devices. When the product is used for applications where the finished device is implanted into the human body, no residual Acota solvent may remain on the parts. It is highly recommended that the supporting test results and protocol be cited during FDA registration.

1.3. Details of the supplier of the safety data sheet
Address: Maesbury Industrial Estate, Maes Y Clawdd, Oswestry SY10 8NN

Email: sales@acota.co.uk
Website: www.acota.co.uk

1.4. Emergency telephone number
+44 (0)1743 466200

SECTION 2: Hazard identification

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

The health and environmental classifications of this material have been derived using the calculation method, except in cases where test data are available or the physical form impacts classification. Classification(s) based on test data or physical form are noted below, if applicable.
This material has been tested for acute inhalation toxicity and the test results do not meet the criteria for classification.

CLASSIFICATION:
Serious Eye Damage/Eye Irritation, Category 2 - Eye Irrit. 2; H319
Specific Target Organ Toxicity-Single Exposure, Category 3 - STOT SE 3; H336
Hazardous to the Aquatic Environment (Chronic), Category 3 - Aquatic Chronic 3; H412

For full text of H phrases, see Section 16.

2.2. Label elements CLP REGULATION (EC) No 1272/2008

SIGNAL WORD
WARNING.

Symbols
GHS07 (Exclamation mark) |

Pictograms

Ingredients:

Ingredient	CAS Nbr	EC No.	% by Wt
trans-dichloroethylene	156-60-5	205-860-2	68 - 72

HAZARD STATEMENTS:

H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H412	Harmful to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS

Prevention:

P261A	Avoid breathing vapours.

Response:

P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

SUPPLEMENTAL INFORMATION:

Supplemental Hazard Statements:

EUH018	In use, may form flammable/explosive vapour-air mixture.

Supplemental Precautionary Statements:
Provide ventilation adequate to maintain vapor concentration below lower explosive concentration.

Notes on labelling
Updated per Regulation (EC) No. 648/2004 on detergents.

2.3. Other hazards

None known.

SECTION 3: Composition/information on ingredients

3.1. Substances
Not applicable

3.2. Mixtures

Ingredient	Identifier(s)	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
trans-dichloroethylene	(CAS-No.) 156-60-5 (EC-No.) 205-860-2 (REACH-No.) 01-2120093504-55	68 - 72	Flam. Liq. 2, H225 Acute Tox. 4, H332 Aquatic Chronic 3, H412 Nota C Eye Irrit. 2, H319 STOT SE 3, H336
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1-ethoxy1,1,2,2,3,3,4,4,4-nonafluoro-butane	(EC-No.) 425-340-0	12 - 30	Aquatic Chronic 4, H413 EUH018
Reaction Mass of 1,1,2,3,3,3-hexafluoro1-methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1methoxybutane	(EC-No.) 422-270-2 (REACH-No.) 01-0000016878-53	5 - 15	Substance not classified as hazardous

Please see section 16 for the full text of any H statements referred to in this section

For information on ingredient occupational exposure limits or PBT or vPvB status, see sections 8 and 12 of this SDS

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation
Remove person to fresh air. If you feel unwell, get medical attention.

Skin contact
Wash with soap and water. If you feel unwell, get medical attention.

Eye contact
Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If swallowed
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
The most important symptoms and effects based on the CLP classification include:
Serious irritation to the eyes (significant redness, swelling, pain, tearing, and impaired vision). Central nervous system depression (headache, dizziness, drowsiness, incoordination, nausea, slurred speech, giddiness, and unconsciousness).

4.3. Indication of any immediate medical attention and special treatment required
Not applicable

SECTION 5: Fire-fighting measures

5.1. Extinguishing media
Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture
Exposure to extreme heat can give rise to thermal decomposition. No closed-cup flash point but flam/expl. vapour air mixture Material displays no closed-cup flash point but may form flammable/explosive vapor air mixture.
Hazardous Decomposition or By-Products

Substance	Condition
Carbon monoxide	During combustion.
Carbon dioxide.	During combustion.
Hydrogen Chloride	During combustion.
Hydrogen Fluoride	During combustion.

5.3. Advice for fire-fighters
When fire fighting conditions are severe and total thermal decomposition of the product is possible, wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, tunic and trousers (leggings),bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Keep away from sparks/flames/extreme heat Keep away from sparks, flames, and extreme heat. Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapours, in accordance with good industrial hygiene practice. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions
Avoid release to the environment. For larger spills, cover drains and build dykes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up
Eliminate ignition sources when cleaning spill Eliminate all potential ignition sources when cleaning up spill. Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorised person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and Safety Data Sheet. Seal the container. Dispose of collected material as soon as possible.

6.4. Reference to other sections
Refer to Section 8 and Section 13 for more information

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Contents may be under pressure, open carefully. Avoid inhalation of thermal decomposition products. For industrial/occupational use only. Not for consumer sale or use. Store work clothes separately from other clothing, food and tobacco products. Avoid breathing dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment. Avoid contact with oxidising agents (eg. chlorine, chromic acid etc.) No smoking: Smoking while using this product can result in

contamination of the tobacco and/or smoke and lead to the formation of hazardous decomposition products. Keep away from sparks/flames/extreme heat Keep away from sparks, flames, and extreme heat.

7.2. Conditions for safe storage including any incompatibilities

Store in a well-ventilated place. Keep container tightly closed. Store away from heat. Store at temperatures not exceeding 38C/100F Store away from strong bases. Store away from oxidising agents.

7.3. Specific end use(s)

See information in Section 7.1 and 7.2 for handling and storage recommendations. See Section 8 for exposure controls and personal protection recommendations.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	CAS Nbr	Agency	Limit type	Additional comments
trans-dichloroethylene	156-60-5	UK HSC	TWA:806 mg/m3(200 ppm);STEL:1010 mg/m3(250 ppm)	

UK HSC : UK Health and Safety Commission
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

Biological limit values

No biological limit values exist for any of the components listed in Section 3 of this safety data sheet.

Derived no effect level (DNEL)

Ingredient	Degradation Product	Population	Human exposure pattern	DNEL
trans-dichloroethylene		Consumer	Inhalation, Long-term exposure (24 hours), Systemic effects	198 mg/m³
trans-dichloroethylene		Consumer	Oral, Long-term exposure (24 hours), Systemic effects	57 mg/kg bw/d
trans-dichloroethylene		Worker	Inhalation, Long-term exposure (8 hours), Systemic effects	797 mg/m³
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane		Worker	Inhalation, Long-term exposure (8 hours), Systemic effects	1,764 mg/m³

Predicted no effect concentrations (PNEC)

Ingredient	Degradation Product	Compartment	PNEC
trans-dichloroethylene		Agricultural soil	0.0563 mg/kg d.w.

trans-dichloroethylene		Freshwater	0.0364 mg/l
trans-dichloroethylene		Freshwater sediments	0.5483 mg/kg d.w.
trans-dichloroethylene		Grassland average	0.0563 mg/kg d.w.
trans-dichloroethylene		Intermittent releases to water	0.3636 mg/l
trans-dichloroethylene		Marine water	0.0036 mg/l
trans-dichloroethylene		Marine water sediments	0.0548 mg/kg d.w.
trans-dichloroethylene		Sewage Treatment Plant	17 mg/l
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane		Agricultural soil	0.0041 mg/kg d.w.
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane		Freshwater	0.00237 mg/l
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane		Freshwater sediments	0.0393 mg/kg d.w.
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane		Grassland average	0.0041 mg/kg d.w.
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane		Marine water	0.000237 mg/l
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane		Marine water sediments	0.00393 mg/kg d.w.

Recommended monitoring procedures: Information on recommended monitoring procedures can be obtained from UK HSC

8.2. Exposure controls
In addition, refer to the annex for more information.

8.2.1. Engineering controls
Provide appropriate local exhaust when product is heated. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapours/spray. If ventilation is not adequate, use respiratory protection equipment. Provide ventilation adequate to maintain vapor concentration below lower explosive concentration.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended: Indirect vented goggles.

Applicable Norms/Standards
Use eye protection conforming to EN 166

Skin/hand protection
Chemical protective gloves are not required under normal use conditions. However, when the product is subjected to extreme heat, HF may be formed. For those cases, neoprene gloves and apron are recommended.

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
During heating: Use a positive pressure supplied-air respirator if there is a potential for over exposure from an uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.
Half facepiece or full facepiece air-purifying respirator suitable for organic vapours Organic vapour respirators may have short service life.

For questions about suitability for a specific application, consult with your respirator manufacturer.

Applicable Norms/Standards
Use a respirator conforming to EN 140 or EN 136: filter type A

8.2.3. Environmental exposure controls
Refer to Annex

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid.
Specific Physical Form:	Liquid.
Colour	Colourless
Odour	Slight Odour
Odour threshold	*No data available.*
Melting point/freezing point	*Not applicable.*
Boiling point/boiling range	43 ºC
Flammability (solid, gas)	Not applicable.

Flammable Limits(LEL)	7.3 % volume [*Details:*@ 25 C, Tested according to ASTM method E-681-98 (per Annex A1)]
Flammable Limits(UEL)	15 % volume [*Details:*@ 25 C, Tested according to ASTM method E-681-98 (per Annex A1)]
Flash point	No flash point [*Details:*Tested according to ASTM method D 3278-96]
Autoignition temperature	396 ºC
Decomposition temperature	*Not applicable.*
pH	*substance/mixture is non-soluble (in water)*
Kinematic Viscosity	0.3515625 mm²/sec
Water solubility	Negligible
Solubility- non-water	*No data available.*
Partition coefficient: n-octanol/water	*No data available.*
Vapour pressure	46,662.7 Pa [@ 25 ºC]
Density	1.28 g/ml
Relative density	1.28 [*Ref Std:*WATER=1]
Relative Vapor Density	*No data available.*

9.2. Other information

9.2.2 Other safety characteristics

EU Volatile Organic Compounds	1,280 g/l
Evaporation rate	*No data available.*
Molecular weight	*No data available.*
Percent volatile	100 %

SECTION 10: Stability and reactivity

10.1 Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section

10.2 Chemical stability
Stable.

10.3 Possibility of hazardous reactions
Hazardous polymerisation will not occur.

10.4 Conditions to avoid
Heat.
Sparks and/or flames.

10.5 Incompatible materials
Strong bases.
Strong oxidising agents.

10.6 Hazardous decomposition products

Substance	Condition
Carbon monoxide	At elevated temperatures. - extreme conditions of heat
Carbon dioxide.	At elevated temperatures. - extreme conditions of heat

Hydrogen Chloride	At elevated temperatures. - extreme conditions of heat
Hydrogen Fluoride	At elevated temperatures. - extreme conditions of heat
Perfluoroisobutylene (PFIB).	At elevated temperatures. - extreme conditions of heat

Refer to section 5.2 for hazardous decomposition products during combustion.

If the product is exposed to extreme conditions of heat from misuse or equipment failure, toxic decomposition products that include hydrogen fluoride and perfluoroisobutylene can occur.

SECTION 11: Toxicological information

The information below may not agree with the EU material classification in Section 2 and/or the ingredient classifications in Section 3 if specific ingredient classifications are mandated by a competent authority. In addition, statements and data presented in Section 11 are based on UN GHS calculation rules and classifications derived from internal hazard assessments.

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

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation
Respiratory tract irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause additional health effects (see below).

Skin contact
Contact with the skin during product use is not expected to result in significant irritation.

Eye contact
Moderate eye irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Ingestion
Gastrointestinal irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhoea. May cause additional health effects (see below).

Additional Health Effects: Single exposure may

cause target organ effects:

Central nervous system (CNS) depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE >5,000 mg/kg
Overall product	Ingestion		No data available; calculated ATE >5,000 mg/kg
Overall product	InhalationVapour (4 hours)	Rat	LC50 > 19.7 mg/l
trans-dichloroethylene	Dermal	Rabbit	LD50 > 5,000 mg/kg
trans-dichloroethylene	InhalationVapour (4 hours)	Rat	LC50 95.6 mg/l
trans-dichloroethylene	Ingestion	Rat	LD50 7,902 mg/kg

Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane	Dermal		LD50 estimated to be 2,000 - 5,000 mg/kg
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane	InhalationVapour (4 hours)	Rat	LC50 > 989 mg/l
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane	Ingestion	Rat	> 2,000 mg/kg
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1methoxybutane	Dermal		LD50 estimated to be > 5,000 mg/kg
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1methoxybutane	InhalationVapour (4 hours)	Rat	LC50 > 1,000 mg/l
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1methoxybutane	Ingestion	Rat	LD50 > 5,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
trans-dichloroethylene	Rabbit	Minimal irritation
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane	Rabbit	No significant irritation
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1-methoxybutane	Rabbit	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
trans-dichloroethylene	Rabbit	Moderate irritant
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane	Rabbit	No significant irritation
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1-methoxybutane	Rabbit	No significant irritation

Skin Sensitisation

Name	Species	Value
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane	Guinea pig	Not classified
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1-methoxybutane	Guinea pig	Not classified

Respiratory Sensitisation

For the component/components, either no data is currently available or the data is not sufficient for classification.

Germ Cell Mutagenicity

Name	Route	Value
trans-dichloroethylene	In Vitro	Not mutagenic
trans-dichloroethylene	In vivo	Not mutagenic
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane	In Vitro	Not mutagenic
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane	In vivo	Not mutagenic
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1-methoxybutane	In Vitro	Not mutagenic

Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1-methoxybutane	In vivo	Not mutagenic

Carcinogenicity

For the component/components, either no data is currently available or the data is not sufficient for classification.

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test result	Exposure Duration
trans-dichloroethylene	Inhalation	Not classified for development	Rat	NOAEL 24 mg/l	during organogenesis
Reaction Mass of 2-(ethoxydifluoromethyl)1,1,1,2,3,3,3-heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane	Inhalation	Not classified for development	Rat	NOAEL 260 mg/l	during gestation
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1methoxybutane	Inhalation	Not classified for female reproduction	Rat	NOAEL 129 mg/l	1 generation
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1methoxybutane	Inhalation	Not classified for male reproduction	Rat	NOAEL 129 mg/l	1 generation
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4-nonafluoro-1methoxybutane	Inhalation	Not classified for development	Rat	NOAEL 307 mg/l	during gestation

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
trans-dichloroethylene	Inhalation	central nervous system depression	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
trans-dichloroethylene	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	
trans-dichloroethylene	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Rat	LOAEL 4,500 mg/kg	not applicable
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	Inhalation	cardiac sensitisation	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 204 mg/l	17 minutes
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	Inhalation	respiratory irritation	Not classified	Rat	NOAEL 989 mg/l	4 hours
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	Inhalation	nervous system	Not classified	Dog	LOAEL 913 mg/l	10 minutes

Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	Inhalation	cardiac sensitisation	Not classified	Dog	NOAEL 913 mg/l	10 minutes

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
trans-dichloroethylene	Inhalation	endocrine system | liver | kidney and/or bladder | respiratory system	Not classified	Rat	NOAEL 16 mg/l	90 days
trans-dichloroethylene	Ingestion	kidney and/or bladder	Not classified	Rat	NOAEL 2,000 mg/kg/day	14 weeks
trans-dichloroethylene	Ingestion	blood | liver	Not classified	Rat	NOAEL 125 mg/kg/day	14 weeks
trans-dichloroethylene	Ingestion	heart | immune system | respiratory system	Not classified	Rat	NOAEL 2,000 mg/kg/day	14 weeks
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	Inhalation	liver | kidney and/or bladder | respiratory system | heart | endocrine system | gastrointestinal tract | bone marrow | hematopoietic system | immune system | nervous system	Not classified	Rat	NOAEL 263.4 mg/l	4 weeks
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	Ingestion	blood | liver | kidney and/or bladder | heart | endocrine system | bone marrow | hematopoietic system | immune system | nervous system | respiratory system	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	Inhalation	liver	Not classified	Rat	NOAEL 155 mg/l	13 weeks
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	Inhalation	bone, teeth, nails, and/or hair	Not classified	Rat	NOAEL 129 mg/l	11 weeks

Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	Inhalation	heart | skin | endocrine system | gastrointestinal tract | hematopoietic system | immune system | muscles | nervous system | eyes | kidney and/or bladder | respiratory system	Not classified	Rat	NOAEL 155 mg/l	13 weeks
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	Ingestion	endocrine system | liver | heart | hematopoietic system | immune system | nervous system | eyes | kidney and/or bladder | respiratory	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days
		system				

Aspiration Hazard

For the component/components, either no data is currently available or the data is not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

11.2. Information on other hazards

This material does not contain any substances that are assessed to be an endocrine disruptor for human health.

SECTION 12: Ecological information

The information below may not agree with the EU material classification in Section 2 and/or the ingredient classifications in Section 3 if specific ingredient classifications are mandated by a competent authority. In addition, statements and data presented in Section 12 are based on UN GHS calculation rules and classifications derived from Acota assessments.

12.1. Toxicity

No product test data available.

Material	CAS #	Organism	Type	Exposure	Test endpoint	Test result
trans-dichloroethylene	156-60-5	Bluegill	Estimated	96 hours	LC50	135 mg/l
trans-dichloroethylene	156-60-5	Green Algae	Experimental	48 hours	EC50	36.36 mg/l
trans-dichloroethylene	156-60-5	Water flea	Experimental	48 hours	LC50	220 mg/l
trans-dichloroethylene	156-60-5	Anaerobic sludge	Experimental	96 hours	IC50	48 mg/l
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Fathead minnow	Analogous Compound	96 hours	No tox obs at lmt of water sol	>100 mg/l

Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Green algae	Analogous Compound	72 hours	No tox obs at lmt of water sol	>100 mg/l
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Water flea	Analogous Compound	48 hours	No tox obs at lmt of water sol	>100 mg/l
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Green algae	Endpoint not reached	72 hours	EC50	>100 mg/l
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Fathead minnow	Experimental	96 hours	No tox obs at lmt of water sol	>100 mg/l
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane						
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Water flea	Experimental	48 hours	No tox obs at lmt of water sol	>100 mg/l
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Green algae	Analogous Compound	72 hours	EC10	2.37 mg/l
Reaction Mass of 2(ethoxydifluoromethyl) -1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Green algae	Experimental	72 hours	EC10	2.37 mg/l
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Green Algae	Analogous Compound	72 hours	No tox obs at lmt of water sol	>100 mg/l
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Water flea	Analogous Compound	48 hours	No tox obs at lmt of water sol	>100 mg/l

Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Fathead minnow	Endpoint not reached	96 hours	LC50	>100 mg/l
Reaction Mass of 1,1,2,3,3,3-hexafluoro1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Fathead minnow	Endpoint not reached	96 hours	No tox obs at lmt of water sol	>100 mg/l
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Green algae	Experimental	72 hours	EC50	>100 mg/l
Reaction Mass of 1,1,2,3,3,3-hexafluoro1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Water flea	Experimental	48 hours	EC50	>100 mg/l
Reaction Mass of 1,1,2,3,3,3-hexafluoro-	422-270-2	Green Algae	Analogous Compound	72 hours	No tox obs at lmt of water sol	>100 mg/l
1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane						
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1-methoxy-2-(trifluoromethyl)propan e and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Green algae	Experimental	72 hours	NOEC	100 mg/l

12.2. Persistence and degradability

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
trans-dichloroethylene	156-60-5	Experimental Photolysis		Photolytic half-life (in air)	13 days (t 1/2)	
trans-dichloroethylene	156-60-5	Experimental Biodegradation	28 days	Percent degraded	8 % BOD/ThBOD	OECD 301D - Closed bottle test
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Estimated Photolysis		Photolytic half-life (in air)	0.55 years (t 1/2)	Non-standard method
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Estimated Biodegradation	28 days	BOD	0 % BOD/ThBOD	OECD 301D - Closed bottle test

Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Analogous Compound Biodegradation	28 days	BOD	0 % BOD/ThBOD	OECD 301D - Closed bottle test
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Experimental Photolysis		Photolytic half-life (in air)	2.9 years (t 1/2)	Non-standard method
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Experimental Biodegradation	28 days	BOD	22 % BOD/ThBOD	OECD 301D - Closed bottle test
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Analogous Compound Biodegradation	28 days	BOD	22 % BOD/ThBOD	OECD 301D - Closed bottle test

12.3 : Bioaccumulative potential

Material	Cas No.	Test type	Duration	Study Type	Test result	Protocol
trans-dichloroethylene	156-60-5	Experimental Bioconcentration		Log Kow	2.06	
Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
Reaction Mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3heptafluoropropane and 1ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Experimental Bioconcentration		Log Kow	4.0	Non-standard method
Reaction Mass of 1,1,2,3,3,3-hexafluoro-1methoxy-2-(trifluoromethyl)propane and 1,1,2,2,3,3,4,4,4nonafluoro-1methoxybutane	422-270-2	Analogous Compound Bioconcentration		Log Kow	4.0	

12.4. Mobility in soil

Material	Cas No.	Test type	Study Type	Test result	Protocol
trans-dichloroethylene	156-60-5	Estimated Mobility in Soil	Koc	61 l/kg	Episuite™

12.5. Results of the PBT and vPvB assessment

This material does not contain any substances that are assessed to be a PBT or vPvB

12.6. Endocrine disrupting properties

This material does not contain any substances that are assessed to be an endocrine disruptor for environmental effects **12.7. Other adverse effects**

Material	CAS Nbr	Ozone Depletion Potential	Global Warming Potential
reaction mass of 2(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4nonafluoro-butane	425-340-0	0	

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include halogen acid (HCl/HF/HBr). Facility must be capable of handling halogenated materials. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.
The coding of a waste stream is based on the application of the product by the consumer. Since this is out of the control of Acota, no waste code(s) for products after use will be provided. Please refer to the European Waste Code (EWC - 2000/532/EC and amendments) to assign the correct waste code to your waste stream. Ensure national and/or regional regulations are complied with and always use a licensed waste contractor.

EU waste code (product as sold)

070103*	Organic halogenated solvents, washing liquids and mother liquors
14 06 02*	Other halogenated solvents and solvent mixtures

SECTION 14: Transportation information

Not hazardous for transportation.

	Ground Transport (ADR)	Air Transport (IATA)	Marine Transport (IMDG)
14.1 UN number	No data available.	No Data Available	No Data Available
14.2 UN proper shipping name	No data available.	No Data Available	No Data Available
14.3 Transport hazard class(es)	No data available.	No Data Available	No Data Available
14.4 Packing group	No data available.	No Data Available	No Data Available

14.5 Environmental hazards	No data available.	No Data Available	No Data Available
14.6 Special precautions for user	Please refer to the other sections of the SDS for further information.	Please refer to the other sections of the SDS for further information.	Please refer to the other sections of the SDS for further information.
14.7 Transport in bulk according to Annex II of Marpol 73/78 and IBC Code	No data available.	No Data Available	No Data Available
Control Temperature	No data available.	No Data Available	No Data Available
Emergency Temperature	No data available.	No Data Available	No Data Available
ADR Tunnel Code	No data available.	Not Applicable	No Data Available
ADR Classification Code	No data available.	No Data Available	No Data Available
ADR Transport Category	No data available.	No Data Available	No Data Available
ADR Multiplier	No data available.	No Data Available	No Data Available
IMDG Segregation Code	No data available.	No Data Available	No Data Available
Transport not Permitted	No data available.	No Data Available	No Data Available

Please contact the address or phone number listed on the first page of the SDS for additional information on the transport/shipment of the material by rail (RID) or inland waterways (ADN).

SECTION 15: Regulatory information

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

Global inventory status

Contact Acota for more information. The components of this material are in compliance with the provisions of the Korea Chemical Control Act. Certain restrictions may apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of Japan Chemical Substance Control Law. Certain restrictions may apply. Contact the selling division for additional information. The components of this product are in compliance with the new substance notification requirements of CEPA. This product complies with Measures on Environmental Management of New Chemical Substances. All ingredients are listed on or exempt from on China IECSC

inventory. The components of this product are in compliance with the chemical notification requirements of TSCA. All required components of this product are listed on the active portion of the TSCA Inventory.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this mixture. Chemical safety assessments for the contained substances may have been carried out by the registrants of the substances in accordance with Regulation (EC) No 1907/2006, as amended.

SECTION 16: Other information

List of relevant H statements

EUH018	In use, may form flammable/explosive vapour-air mixture.
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H336	May cause drowsiness or dizziness.
H412	Harmful to aquatic life with long lasting effects.
H413	May cause long lasting harmful effects to aquatic life.

Revision information:

EU Section 09: pH information information was added.
Formulation: Section 16: Annex information was modified.
Industrial Handling of Heat Transfer, Cooling, and Dielectric Fluid: Section 16: Annex information was modified.
Industrial Laboratory Use: Section 16: Annex information was modified.
Industrial Use as a Solvent: Section 16: Annex information was modified.
Industrial Use in Vapour Degreasing Systems: Section 16: Annex information was modified.
Industrial Use of Cleaners: Section 16: Annex information was modified.
Laboratory Use: Section 16: Annex information was modified.
Professional Handling of Heat Transfer Fluid: Section 16: Annex information was modified.
Professional Laboratory Use: Section 16: Annex information was modified.
Professional Use as a Solvent: Section 16: Annex information was modified.
Label: CLP Precautionary - Disposal information was deleted.
Section 03: Composition table % Column heading information was added.
Section 3: Composition/ Information of ingredients table information was modified.
Section 03: Substance not applicable information was added.
Section 04: First Aid - Symptoms and Effects (CLP) information was added.
Section 04: Information on toxicological effects information was modified.
Section 7: Precautions safe handling information information was modified.
Section 8: Personal Protection - Respiratory Information information was modified.
Section 8: Personal Protection - Thermal hazards information information was deleted.
Section 9: Evaporation Rate information information was deleted.
Section 9: Explosive properties information information was deleted.
Section 09: Kinematic Viscosity information information was added.
Section 9: Melting point information information was modified.
Section 9: Oxidising properties information information was deleted.
Section 9: pH information information was deleted.
Section 9: Property description for optional properties information was modified.
Section 9: Vapour density value information was added.
Section 9: Vapour density value information was deleted.
Section 9: Viscosity information information was deleted.
Section 11: No endocrine disruptor information available warning information was added.
Section 12: 12.6. Endocrine Disrupting Properties information was added.
Section 12: 12.7. Other adverse effects information was modified.

Section 12: Component ecotoxicity information information was modified.
Section 12: Contact manufacturer for more detail. information was deleted.
Section 12: Mobility in soil information information was added.
Section 12: No endocrine disruptor information available warning information was added.
Section 12: Persistence and Degradability information information was modified.
Section 12:Bioccumulative potential information information was modified.
Section 14 Classification Code – Main Heading information was added.
Section 14 Classification Code – Regulation Data information was added.
Section 14 Control Temperature – Main Heading information was added.
Section 14 Control Temperature – Regulation Data information was added.
Section 14 Disclaimer Information information was added.
Section 14 Emergency Temperature – Main Heading information was added.
Section 14 Emergency Temperature – Regulation Data information was added.
Section 14 Hazard Class + Sub Risk – Main Heading information was added.
Section 14 Hazard Class + Sub Risk – Regulation Data information was added.
Section 14 Hazardous/Not Hazardous for Transportation information was added.
Section 14 Multiplier – Main Heading information was added.
Section 14 Multiplier – Regulation Data information was added.
Section 14 Other Dangerous Goods – Main Heading information was added.
Section 14 Other Dangerous Goods – Regulation Data information was added.
Section 14 Packing Group – Main Heading information was added.
Section 14 Packing Group – Regulation Data information was added.
Section 14 Proper Shipping Name information was added.
Section 14 Regulations – Main Headings information was added.
Section 14 Segregation – Regulation Data information was added.
Section 14 Segregation Code – Main Heading information was added.
Section 14 Special Precautions – Main Heading information was added.
Section 14 Special Precautions – Regulation Data information was added. Section
14 Transport Category – Main Heading information was added.
Section 14 Transport Category – Regulation Data information was added.
Section 14 Transport in bulk – Regulation Data information was added.
Section 14 Transport in bulk according to Annex II of Marpol and the IBC Code – Main Heading information was added.
Section 14 Transport Not Permitted – Main Heading information was added.
Section 14 Transport Not Permitted – Regulation Data information was added.
Section 14 Tunnel Code – Main Heading information was added.
Section 14 Tunnel Code – Regulation Data information was added.
Section 14 UN Number Column data information was added.
Section 14 UN Number information was added.
Section 15: Regulations - Inventories information was added.
Widespread Use in Cooling Applications: Section 16: Annex information was modified.

Annex

1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;
Exposure Scenario Name	Formulation
Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 05 -Mixing or blending in batch processes ERC 02 -Formulation into mixture
Processes, tasks and activities covered	Mixing or blending of solid or liquid materials.

2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: 2,000,000 liters per day; Emission days per year: 30 ; Flow rate of receiving surface water:: 18,000 cubic meters per day; Fraction of applied product leaving the site with products: 0.98 ; Fraction of applied product lost from process/use to solid waste in percent: 0 ; Fraction of applied product lost from process/use to waste: 0.02 ; Fraction of applied product lost from process/use to waste gas: 0.02 ; Fraction of applied product lost from process/use to waste water: 0 ; Fraction of product consumed in process/use: 0 ; Frequent release; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	No use-specific waste management measures are required for this product. Refer to Section 13 of main SDS for disposal instructions:
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and

	1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;
Exposure Scenario Name	Industrial Handling of Heat Transfer, Cooling, and Dielectric Fluid
Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 01 -Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions. PROC 08a -Transfer of substance or mixture (charging and discharging) at nondedicated facilities PROC 08b -Transfer of substance or mixture (charging and discharging) at dedicated facilities ERC 07 -Use of functional fluid at industrial site
Processes, tasks and activities covered	Draining process equipment. Transfers with dedicated controls, including loading, filling, dumping, bagging. Transfers without dedicated controls, including loading, filling, dumping, bagging. Use as heat transfer fluids.
2. Operational conditions and risk management measures	

Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Continuous process; Discharge volume of sewage treatment plant: <= 2,000,000 liters per day; Emission days per year: 365 days/year; Flow rate of receiving surface water:: <= 18,000 cubic meters per day; Fraction of applied product lost from process/use to solid waste in percent: 99.95 %; Fraction of applied product lost from process/use to waste: 0.0001 ; Fraction of applied product lost from process/use to waste gas: 0.0001 ; Fraction of applied product lost from process/use to waste water: 0 ; Fraction of product consumed in process/use: 0 ; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	trans-dichloroethylene; EC No. 205-860-2; CAS Nbr 156-60-5;
Exposure Scenario Name	Industrial Laboratory Use
Lifecycle Stage	Widespread use by professional workers
Contributing activities	PROC 15 -Use a laboratory reagent ERC 08a -Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
Processes, tasks and activities covered	Use as a laboratory reagent.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid.

	General operating conditions: Duration of use; Indoors with LEV and good general ventilation;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;

Waste management measures	No use-specific waste management measures are required for this product. Refer to Section 13 of main SDS for disposal instructions:
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;
Exposure Scenario Name	Industrial Laboratory Use
Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 15 -Use a laboratory reagent ERC 04 -Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Processes, tasks and activities covered	Use as a laboratory reagent.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: <= 2,000,000 liters per day; Emission days per year: 300 days/year; Flow rate of receiving surface water:: <= 18,000 cubic meters per day; Fraction of applied product lost from process/use to solid waste in percent: 50 %; Fraction of applied product lost from process/use to waste: 1 ; Fraction of applied product lost from process/use to waste gas: 0.5 ; Fraction of applied product lost from process/use to waste water: 0 ; Fraction of product consumed in process/use: 0 ; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.

1. Title	
Substance identification	trans-dichloroethylene; EC No. 205-860-2; CAS Nbr 156-60-5;
Exposure Scenario Name	Industrial Use as a Solvent
Lifecycle Stage	Use at industrial sites

Contributing activities	PROC 07 -Industrial spraying PROC 08a -Transfer of substance or mixture (charging and discharging) at nondedicated facilities PROC 08b -Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC 10 -Roller application or brushing PROC 13 -Treatment of articles by dipping and pouring ERC 04 -Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC 07 -Use of functional fluid at industrial site
Processes, tasks and activities covered	Cleaning process equipment and parts. Cleaning surfaces by wiping, brushing. Spraying of substances/mixtures. Transfer of substance/mixture with dedicated engineering controls. Transfer of substances/mixtures into small containers e.g. tubes , bottles or small reservoirs.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: 2,000,000 liters per day; Emission days per year: 365 days per year; Flow rate of receiving surface water:: 18,000 cubic meters per day; Indoors with enhanced general ventilation; Indoors with good general ventilation; Large factory building (> 500 m³); Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ; **Task: Spraying**; Duration of use: 4 hours/day; **Task: Transferring Material**; Duration of use: 4 hours/day; **Task: Wiping Surfaces**; Duration of use: 4 hours/day;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	No use-specific waste management measures are required for this product. Refer to Section 13 of main SDS for disposal instructions:
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and

	1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;
Exposure Scenario Name	Industrial Use as a Solvent

Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 07 -Industrial spraying PROC 08a -Transfer of substance or mixture (charging and discharging) at nondedicated facilities PROC 08b -Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC 10 -Roller application or brushing PROC 13 -Treatment of articles by dipping and pouring ERC 04 -Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Processes, tasks and activities covered	Mixing operations (open systems). Transfer of substance/mixture with dedicated engineering controls. Transfer of substances/mixtures into small containers e.g. tubes , bottles or small reservoirs.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: <= 2,000,000 liters per day; Emission days per year: 20 days per year; Flow rate of receiving surface water:: <= 18,000 cubic meters per day; Fraction of applied product leaving the site with products: 0 ; Fraction of applied product lost from process/use to solid waste in percent: 0 %; Fraction of applied product lost from process/use to waste: 1 ; Fraction of applied product lost from process/use to waste gas: 1 ; Fraction of applied product lost from process/use to waste water: 0 ; Fraction of product consumed in process/use: 0 ; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	trans-dichloroethylene; EC No. 205-860-2; CAS Nbr 156-60-5;
Exposure Scenario Name	Industrial Use in Vapour Degreasing Systems
Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 04 -Chemical production where opportunity for exposure arises PROC 08b -Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC 13 -Treatment of articles by dipping and pouring ERC 04 -Use of non-reactive processing aid at industrial site (no inclusion into or

	onto article) ERC 07 -Use of functional fluid at industrial site
Processes, tasks and activities covered	Draining process equipment. Transfer of substance/mixture with dedicated engineering controls. Vapour Degreasing
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: 2,000,000 litres per day; Duration of use: 8 hours/day; Emission days per year: 300 days per year; Flow rate of receiving surface water:: 18,000 cubic meters per day; Indoor use without Local Exhaust Ventilation; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ; Medium sized room or workshop (100 m^3 - 500 m^3); Partially open and partially closed process;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	
Exposure Scenario Name	Industrial Use of Cleaners
Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 04 -Chemical production where opportunity for exposure arises PROC 07 -Industrial spraying PROC 08b -Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC 10 -Roller application or brushing ERC 04 -Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC 08a -Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
Processes, tasks and activities covered	Application of product with a roller or brush. Spraying of substances/mixtures. Transfers with dedicated controls, including loading, filling, dumping, bagging.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Assumes use at not more than 20°C above ambient temperature; Duration of use: 8 hours/day;

Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:**

	None needed;
Waste management measures	No use-specific waste management measures are required for this product. Refer to Section 13 of main SDS for disposal instructions:
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	
Exposure Scenario Name	Laboratory Use
Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 15 -Use a laboratory reagent ERC 04 -Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Processes, tasks and activities covered	Use as a laboratory reagent.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Duration of use: 4 hours/day;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	No use-specific waste management measures are required for this product. Refer to Section 13 of main SDS for disposal instructions:
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted. Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;
Exposure Scenario Name	Professional Handling of Heat Transfer Fluid
Lifecycle Stage	Widespread use by professional workers
Contributing activities	PROC 08a -Transfer of substance or mixture (charging and discharging) at nondedicated facilities ERC 09a -Widespread use of functional fluid (indoor)

Processes, tasks and activities covered	Transfers without dedicated controls, including loading, filling, dumping, bagging.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Continuous release; Discharge volume of sewage treatment plant: <= 2,000,000 liters per day; Emission days per year: 365 days/year; Flow rate of receiving surface water:: <= 18,000 cubic meters per day; Fraction of applied product lost from process/use to solid waste in percent: 99.95 %;

	Fraction of applied product lost from process/use to waste: 0.0001 ; Fraction of applied product lost from process/use to waste gas: 0.0001 ; Fraction of applied product lost from process/use to waste water: 0 ; Fraction of product consumed in process/use: 0 ; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	trans-dichloroethylene; EC No. 205-860-2; CAS Nbr 156-60-5;
Exposure Scenario Name	Professional Laboratory Use
Lifecycle Stage	Use at industrial sites
Contributing activities	PROC 15 -Use a laboratory reagent ERC 04 -Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Processes, tasks and activities covered	Use as a laboratory reagent.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: 2,000,000 litres per day; Duration of use: 8 hours/day; Flow rate of receiving surface water:: 18,000 cubic meters per day; Indoors with LEV and good general ventilation; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;

Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.

1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;
Exposure Scenario Name	Professional Laboratory Use
Lifecycle Stage	Widespread use by professional workers
Contributing activities	PROC 15 -Use a laboratory reagent ERC 08a -Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
Processes, tasks and activities covered	Use as a laboratory reagent.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: <= 2,000,000 litres per day; Emission days per year: 300 days/year; Flow rate of receiving surface water:: <= 18,000 cubic meters per day; Fraction of applied product lost from process/use to solid waste in percent: 50 %; Fraction of applied product lost from process/use to waste: 1 ; Fraction of applied product lost from process/use to waste gas: 0.5 ; Fraction of applied product lost from process/use to waste water: 0 ; Fraction of product consumed in process/use: 0 ; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.

1. Title	
Substance identification	trans-dichloroethylene; EC No. 205-860-2; CAS Nbr 156-60-5;
Exposure Scenario Name	Professional Use as a Solvent
Lifecycle Stage	Widespread use by professional workers
Contributing activities	PROC 08a -Transfer of substance or mixture (charging and discharging) at nondedicated facilities PROC 08b -Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC 10 -Roller application or brushing PROC 11 -Non industrial spraying PROC 13 -Treatment of articles by dipping and pouring ERC 08a -Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC 09a -Widespread use of functional fluid (indoor)
Processes, tasks and activities covered	Cleaning process equipment and parts. Cleaning surfaces by wiping, brushing. Spraying of substances/mixtures. Transfer of substance/mixture with dedicated engineering controls. Transfer of substances/mixtures into small containers e.g. tubes , bottles or small reservoirs.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Indoors with good general ventilation; Medium sized room or workshop (100 m³ - 500 m³); **Task: Pouring Material - Liquids**; Duration of use: 15 min - 1 hour task; **Task: Spraying**; Duration of use: 15 min - 1 hour task; **Task: Wiping Surfaces**; Duration of use: 15 min - 1 hour task;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	No use-specific waste management measures are required for this product. Refer to Section 13 of main SDS for disposal instructions:
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;

Exposure Scenario Name	Professional Use as a Solvent
Lifecycle Stage	Widespread use by professional workers
Contributing activities	PROC 08a -Transfer of substance or mixture (charging and discharging) at nondedicated facilities PROC 08b -Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC 10 -Roller application or brushing PROC 11 -Non industrial spraying PROC 13 -Treatment of articles by dipping and pouring ERC 08a -Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
Processes, tasks and activities covered	Cleaning surfaces by wiping, brushing. Immersion operations. Spraying of substances/mixtures. Transfer of substance/mixture with dedicated engineering controls. Transfer of substances/mixtures into small containers e.g. tubes , bottles or small reservoirs.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: <= 2,000,000 litres per day; Emission days per year: 20 days per year; Flow rate of receiving surface water:: <= 18,000 cubic meters per day; Fraction of applied product leaving the site with products: 0 ; Fraction of applied product lost from process/use to solid waste in percent: 0 %; Fraction of applied product lost from process/use to waste: 1 ;
	Fraction of applied product lost from process/use to waste gas: 1 ; Fraction of applied product lost from process/use to waste water: 0 ; Fraction of product consumed in process/use: 0 ; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	Incinerate in a facility capable of handling halogenated waste;
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.
1. Title	
Substance identification	Reaction Mass of 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane and 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro-butane; EC No. 425-340-0;
Exposure Scenario Name	Widespread Use in Cooling Applications
Lifecycle Stage	Service Life
Contributing activities	PROC 0 -Other Process or activity ERC 10a -Widespread use of articles with low release (outdoor) ERC 11a -Widespread use of articles with low release (indoor)

Processes, tasks and activities covered	Passive system losses to environment. Use as heat transfer fluids.
2. Operational conditions and risk management measures	
Operating Conditions	**Physical state:**Liquid. **General operating conditions:** Discharge volume of sewage treatment plant: 2,000,000 litres per day; Emission days per year: 365 days/year; Flow rate of receiving surface water:: 18,000 cubic meters per day; Fraction of applied product leaving the site with products: 0.95 ; Fraction of applied product lost from process/use to solid waste in percent: 0 ; Fraction of applied product lost from process/use to waste: 0 ; Fraction of applied product lost from process/use to waste gas: 0.05 ; Fraction of applied product lost from process/use to waste water: 0.05 ; Fraction of product consumed in process/use: 0 ; Local freshwater dilution factor: 10 ; Local marine water dilution factor: 100 ;
Risk management measures	Under the operational conditions described above the following risk management measures apply: **General risk management measures:** **Human health:** None needed; **Environmental:** None needed;
Waste management measures	No use-specific waste management measures are required for this product. Refer to Section 13 of main SDS for disposal instructions:
3. Prediction of exposure	
Prediction of exposure	Human and environmental exposures are not expected to exceed the DNELs and
	PNECs when the identified risk management measures are adopted.Contact Acota at the address or phone number listed on the first page of the SDS for information on exposure estimation.

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