

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

1.1. Product identifier

Product form	: Substance
Name	: ISOPENTANE
EC-No.	: 201-142-8
CAS-No.	: 78-78-4
REACH registration No	: 01-2119475602-38
Product code	: 100037600
Synonyms	: NOVASPRAY isopentane S / NOVEXPANS isopentane S / NOVASPRAY isopentane T / NOVEXPANS isopentane T

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

1.2.1. Relevant identified uses

Use of the substance/mixture	: Blowing agent Aerosol jet Cleaning product
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1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Supplier

Dehon Service SAS
26 Avenue du Petit Parc
94683 VINCENNES Cedex - France
T 01 43 98 75 00 - F 01 43 98 21 51
ContactFDS@climalife.dehon.com

Other

Climalife Hongrie Kft
Villányi út 47
1118 Budaörs - Hungary
T (36) 23 431 660 - F (36) 23 431 661
ContactFDS@climalife.dehon.com

Other

Climalife Supplied by Inventec Performance Chemicals Italia SRL
Via del Lavoro, 10/G
20874 Busnago MB - Italia
T +39 39-5973480 - F +39 39-5973490
ContactFDS@climalife.dehon.com

Other

Dehon Kälte-Fachvertriebs GmbH
Robert-Bosch-Strasse 14
40668 MEERBUSCH - Germany
T 00 49 2150 7073 0 - F 00 49 2150 7073 17
ContactFDS@climalife.dehon.com

Other

Dehon Service Belgium s.a/n.v.
Avenue Carton de Wiart, 79
1090 Bruxelles - Belgium
T 00 32 2 421 01 70 - F 00 32 2 426 96 62
ContactFDS@climalife.dehon.com

Other

Friogas sa
Poligono Industrial SEPES
Parcela 10
46500 SAGUNTO (Valencia) - Spain
T 00 34 9 6 266 36 32 - F 00 34 9 6 266 50 25
ContactFDS@climalife.dehon.com

Other

Galco s.a/n.v.
Avenue Carton de Wiart, 79
1090 BRUSSELS - Belgium
T 00 32 2 421 01 84 - F 00 32 2 421 01 84 / 00 32 2 425 38 12
ContactFDS@climalife.dehon.com

Other

Climalife Kft Budepesta sucursal Bucuresti Romania
Bulevardul Hristo Botev, Nr. 28,
Biroul NR 4, Modulul I
Bucuresti Sectorul 3 - Romania
ContactFDS@climalife.dehon.com

Other

Dehon Kälte-Fachvertriebs GmbH
Robert-Bosch-Strasse 14
40668 MEERBUSCH - Germany
T 00 49 2150 7073 0 - F 00 49 2150 7073 17
ContactFDS@climalife.dehon.com

Other

Dehon nordic service
Östra Hamngatan 50B 3tr
41109 GÖTEBORG - Sweden
T 00 46 44 21 58 80 - F 00 46 44 21 58 80
ContactFDS@climalife.dehon.com

Other

Dehon Service Nerderland B.V.
Van Konijnenburgweg 84
NL-4612 PL Bergen Op Zoom - Netherlands
T 00 31 164 212 830 - F 00 31 164 212 831
ContactFDS@climalife.dehon.com

Other

IDS Refrigeration Limited
Green Court, Kings Weston Lane
Avonmouth
BS11 8AZ Bristol - United Kingdom
T 00 44 1179 802520 - F 00 44 1179 802521
ContactFDS@climalife.dehon.com

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Other

Prochimac SA
Rue du Château 10
CH-2000 NEUCHÂTEL - Switzerland
T 00 41 32 727 36 00 - F 00 41 32 727 36 19
ContactFDS@climalife.dehon.com

1.4. Emergency telephone number

Emergency number : +33 (0) 1 72 11 00 03

Country	Organisation/Company	Address	Emergency number	Comment
United Kingdom	National Poisons Information Service (Birmingham Centre) City Hospital	Dudley Road B18 7QH Birmingham	0344 892 0111	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flam. Liq. 1 H224
STOT SE 3 H336
Asp. Tox. 1 H304
Aquatic Chronic 2 H411

Full text of hazard classes and H-statements : see section 16

Adverse physicochemical, human health and environmental effects

Extremely flammable liquid and vapour. May cause drowsiness or dizziness. May be fatal if swallowed and enters airways. Toxic to aquatic life with long lasting effects.

2.2. Label elements

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

Hazard pictograms (CLP) :



Signal word (CLP) :

Danger

Hazard statements (CLP)

: H224 - Extremely flammable liquid and vapour.
H304 - May be fatal if swallowed and enters airways.
H336 - May cause drowsiness or dizziness.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements (CLP)

: P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 - Keep container tightly closed.
P273 - Avoid release to the environment.
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER, a doctor.
P331 - Do NOT induce vomiting.
P403+P235 - Store in a well-ventilated place. Keep cool.
P501 - Dispose of contents and container to hazardous or special waste collection point in accordance with national regulation..

EUH-statements

: EUH066 - Repeated exposure may cause skin dryness or cracking.

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name : ISOPENTANE
CAS-No. : 78-78-4
EC-No. : 201-142-8

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
isopentane	(CAS-No.) 78-78-4 (EC-No.) 201-142-8 (EC Index-No.) 601-085-00-2 (REACH-no) 01-2119475602-38	>= 94	Flam. Liq. 1, H224 Asp. Tox. 1, H304 STOT SE 3, H336 Aquatic Chronic 2, H411

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing. In the event of coughing and slight breathlessness: Call a doctor.
First-aid measures after skin contact	: Wash with plenty of water/.... Take off immediately all contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention.
First-aid measures after eye contact	: Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses, if present and easy to do. Continue rinsing. Consult an ophthalmologist if irritation persists.
First-aid measures after ingestion	: Do not give the affected person anything to drink, even if he is fully conscious. Do not induce vomiting. Transfer to hospital rapidly.

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

Symptoms/effects	: May cause drowsiness or dizziness.
Symptoms/effects after skin contact	: Repeated exposure may cause skin dryness or cracking.
Symptoms/effects after ingestion	: Dizziness, headaches, nausea. Risk of lung oedema. CNS depression. Suffocation.

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

Risk of aspiration pneumonia. Do not administer medicines from the adrenalin-ephedrine group.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Carbon dioxide. Dry powder. Water spray. Foam.
Unsuitable extinguishing media	: Strong water jet.

5.2. Special hazards arising from the substance or mixture

Fire hazard	: Extremely flammable liquid and vapour. The vapours are denser than air and may travel along the ground. Distance ignition possible.
Hazardous decomposition products in case of fire	: Toxic fumes may be released.

5.3. Advice for firefighters

Precautionary measures fire	: Cool down the containers exposed to heat with a water spray. Contain the extinguishing fluids by bunding.
Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	: Avoid contact with skin and eyes.
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6.1.1. For non-emergency personnel

Emergency procedures	: Evacuate area.
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6.1.2. For emergency responders

Protective equipment	: Do not attempt to take action without suitable protective equipment. Do not breathe vapours.
Emergency procedures	: Stop leak if safe to do so. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Remove all sources of ignition.

6.2. Environmental precautions

Contain the spilled material by bunding (product is hazardous for the environment). Do not allow product to spread into the environment.

6.3. Methods and material for containment and cleaning up

For containment	: Collect spillage. Take up liquid spill into inert absorbent material.
Methods for cleaning up	: Wash with a solution of 60-70 % ethanol. Then wash with water and detergent.
Other information	: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of solid materials or residues refer to section 13: "Disposal considerations".

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapours may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Use only outdoors or in a well-ventilated area. Avoid breathing vapours. Vapour extraction at source.

Hygiene measures : Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Ground/bond container and receiving equipment.

Storage conditions : Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store : away from any source of ignition.

Incompatible products : Oxidizing materials. Oxidizing materials.

Heat and ignition sources : Keep away from heat and direct sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Packaging materials : Recommended materials: Stainless steel, Polyethylene, Polypropylene, Polyester, Teflon. Unsuitable materials: Rubbers.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

isopentane (78-78-4)	
Austria - Occupational Exposure Limits	
MAK (mg/m³)	1800 mg/m³
MAK (ppm)	600 ppm
MAK Short time value (mg/m³)	3600 mg/m³
MAK Short time value (ppm)	1200 ppm
Belgium - Occupational Exposure Limits	
Limit value (mg/m³)	1800 mg/m³
Limit value (ppm)	600 ppm
Short time value (mg/m³)	2250 mg/m³
Short time value (ppm)	750 ppm
Czech Republic - Occupational Exposure Limits	
Expoziční limity (PEL) (mg/m³)	3000 mg/m³
Expoziční limity (PEL) (ppm)	1020 ppm
Expoziční limity (NPK-P) (mg/m³)	4500 mg/m³
Expoziční limity (NPK-P) (ppm)	1526 ppm
Finland - Occupational Exposure Limits	
HTP-arvo (8h) (mg/m³)	1500 mg/m³
HTP-arvo (8h) (ppm)	500 ppm
HTP-arvo (15 min)	1900 mg/m³
HTP-arvo (15 min) (ppm)	630 ppm
France - Occupational Exposure Limits	
VME (mg/m³)	3000 mg/m³
VME (ppm)	1000 ppm
Germany - Occupational Exposure Limits (TRGS 900)	
Occupational exposure limit value (mg/m³)	3000 mg/m³
Occupational exposure limit value (ppm)	1000 ppm
Greece - Occupational Exposure Limits	
OEL TWA (mg/m³)	2950 mg/m³

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OEL TWA (ppm)	1000 ppm
Italy - Occupational Exposure Limits	
OEL TWA (mg/m³)	2000 mg/m³
OEL TWA (ppm)	667 ppm
Netherlands - Occupational Exposure Limits	
Grenswaarde TGG 8H (mg/m³)	1800 mg/m³
Poland - Occupational Exposure Limits	
NDS (mg/m³)	3000 mg/m³
Portugal - Occupational Exposure Limits	
OEL TWA (ppm)	600 ppm
Romania - Occupational Exposure Limits	
OEL TWA (mg/m³)	3000 mg/m³
OEL TWA (ppm)	1000 ppm
Spain - Occupational Exposure Limits	
VLA-ED (mg/m³)	3000 mg/m³
VLA-ED (ppm)	1000 ppm
Sweden - Occupational Exposure Limits	
nivågränsvärde (NVG) (mg/m³)	1800 mg/m³
nivågränsvärde (NVG) (ppm)	600 ppm
United Kingdom - Occupational Exposure Limits	
WEL TWA (mg/m³)	1800 mg/m³
WEL TWA (ppm)	600 ppm
Norway - Occupational Exposure Limits	
Grenseverdier (AN) (mg/m³)	750 mg/m³
Grenseverdier (AN) (ppm)	250 ppm
Switzerland - Occupational Exposure Limits	
MAK (mg/m³)	1800 mg/m³
MAK (ppm)	600 ppm
KZGW (mg/m³)	3600 mg/m³
KZGW (ppm)	1200 ppm

8.2. Exposure controls

Appropriate engineering controls:

Local exhaust is needed at source of vapours. Ensure good ventilation of the work station.

Hand protection:					
Nitrile-rubber protective gloves					
Type	Material	Permeation	Thickness (mm)	Penetration	Standard
	Nitrile rubber (NBR)	6 (> 480 minutes)	0.35		
Eye protection:					
Safety glasses with side shields					
Skin and body protection:					
Wear suitable protective clothing					
Respiratory protection:					
In the event of insufficient ventilation: Gas mask with filter type AX					

Environmental exposure controls:

Avoid release to the environment.

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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Colour	: Colourless.
Odour	: weak. Hydrocarbon-like.
Odour threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: -159.9 °C
Freezing point	: No data available
Boiling point	: 27.8 °C
Flash point	: -51 °C
Auto-ignition temperature	: 420 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Extremely flammable liquid and vapour.
Vapour pressure	: 79.3 kPa (21.1°C)
Relative vapour density at 20 °C	: 2.48
Relative density	: No data available
Density	: 0.62 g/cm³
Solubility	: Water: < 1 g/l practically insoluble Organic solvent: Miscible
Log Pow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: Not explosive material according to EC criteria.
Oxidising properties	: Non oxidizing material according to EC criteria.
Lower explosive limit (LEL)	: 1.4 vol %
Upper explosive limit (UEL)	: 7.6 vol %

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

None under normal conditions.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Strong oxidizing agents. oxidizing materials.

10.6. Hazardous decomposition products

On thermal decomposition (pyrolysis), releases : Carbon oxides (CO, CO2).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

isopentane (78-78-4)

LD50 oral rat	> 5000 ml/kg
LC50 inhalation rat (Vapours - mg/l/4h)	> 25.3 mg/l/4h

Skin corrosion/irritation	: Not classified pH: Not applicable
Serious eye damage/irritation	: Not classified pH: Not applicable
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified

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Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: May cause drowsiness or dizziness.
STOT-repeated exposure	: Not classified
Aspiration hazard	: May be fatal if swallowed and enters airways.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	: Toxic to aquatic life with long lasting effects.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Toxic to aquatic life with long lasting effects.

isopentane (78-78-4)

LC50 fish 1	4.26 mg/l 96 Hours (Oncorhynchus mykiss)
EC50 Daphnia 1	2.3 mg/l 48 Hours (Daphnia magna)

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

Component

isopentane (78-78-4)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
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12.6. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods	: Dispose of contents/container in accordance with licensed collector's sorting instructions.
Product/Packaging disposal recommendations	: Dispose of this material and its container at hazardous or special waste collection point.
Additional information	: Flammable vapours may accumulate in the container.

SECTION 14: Transport information


In accordance with ADR / IMDG / IATA

ADR	IMDG	IATA
14.1. UN number		
UN 1265	UN 1265	UN 1265
14.2. UN proper shipping name		
PENTANES	PENTANES	Pentanes
Transport document description		
UN 1265 PENTANES, 3, I, (D/E), ENVIRONMENTALLY HAZARDOUS	UN 1265 PENTANES, 3, I, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS	UN 1265 Pentanes, 3, I, ENVIRONMENTALLY HAZARDOUS
14.3. Transport hazard class(es)		
3	3	3

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14.4. Packing group		
I	I	I
14.5. Environmental hazards		
Dangerous for the environment : Yes	Dangerous for the environment : Yes Marine pollutant : Yes	Dangerous for the environment : Yes
No supplementary information available		
14.6. Special precautions for user		
Overland transport		
Classification code (ADR)	: F1	
Limited quantities (ADR)	: 0	
Tank code (ADR)	: L4BN	
Transport category (ADR)	: 1	
Hazard identification number (Kemler No.)	: 33	
Orange plates	: 	
Tunnel restriction code (ADR)	: D/E	
EAC code	: 3YE	
Transport by sea		
Limited quantities (IMDG)	: 0	
EmS-No. (Fire)	: F-E	
EmS-No. (Spillage)	: S-D	
Flash point (IMDG)	: - 40°C	
Air transport		
PCA Limited quantities (IATA)	: Forbidden	
PCA limited quantity max net quantity (IATA)	: Forbidden	
PCA packing instructions (IATA)	: 351	
PCA max net quantity (IATA)	: 1L	
CAO packing instructions (IATA)	: 361	
CAO max net quantity (IATA)	: 30L	
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

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

ISOPENTANE is not on the REACH Candidate List

ISOPENTANE is not on the REACH Annex XIV List

ISOPENTANE is not subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.

ISOPENTANE is not subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

15.1.2. National regulations

France

Occupational diseases : RG 84 - Affections engendrées par les solvants organiques liquides à usage professionnel

Germany

Reference to AwSV : Water hazard class (WGK) 2, Significantly hazardous to water (Classification according to AwSV; ID No. 648)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

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SZW-lijst van mutagene stoffen	: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding	: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid	: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling	: The substance is not listed

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:

Section	Changed item	Change	Comments
1.1	Article number	Modified	
1.3	Supplier	Modified	

Full text of H- and EUH-statements:

Aquatic Chronic 2	Hazardous to the aquatic environment — Chronic Hazard, Category 2
Asp. Tox. 1	Aspiration hazard, Category 1
Flam. Liq. 1	Flammable liquids, Category 1
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
H224	Extremely flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H336	May cause drowsiness or dizziness.
H411	Toxic to aquatic life with long lasting effects.
EUH066	Repeated exposure may cause skin dryness or cracking.

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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Annex to the safety data sheet

Identified Uses	Es N°	Short title	Page
Distribution of substance	1		11
Formulation & (re)packing of substances and mixtures	2		14
Use in blowing agents <Traduction manquante> - Industrial	3		18
Uses in cosmetics/personal care products, perfumes and fragrances	4		23
Use in functional fluids - Industrial	5		24

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1. SE 1: Distribution of substance

1.1. Title section

Distribution of substance

ES Ref.: SE 1

ES Type: Worker

Version: 1.0

Association ref code: ES 1

Date of issue: 30/09/2019

Environment		
	Contributing scenario controlling environmental exposure	ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1
Worker		
	Generic exposure scenario	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities	
Assessment method	Used ECETOC TRA model Hydrocarbon Block Method (Petrisk)	

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1)

ERC1	Manufacture of the substance
ERC2	Formulation into mixture
ERC3	Formulation into solid matrix
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
ERC6a	Use of intermediate
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC6c	Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC6d	Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC7	Use of functional fluid at industrial site
ESVOC SPERC 1.1b.v1	Distribution: Industrial (SU3)
Assessment method	Hydrocarbon Block Method (Petrisk)

Product (article) characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
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Amount used, frequency and duration of use (or from service life)

Annual site tonnage	4.3
Daily amount per site	<= 220 kg/day
Regional use tonnage	4.3
Fraction of Regional tonnage used locally:	1
Fraction of EU tonnage used in region:	0.1
Continuous release	
Emission days	20

Technical and organisational conditions and measures

Do not apply industrial sludge to natural soils	
No discharge of substance into waste water	
Sewage sludge should be incinerated, contained or reclaimed.	
Common practices vary across sites thus conservative process release estimates used	
Risk from environmental exposure is driven by freshwater	
Treat air emission to provide a typical removal efficiency of	90
Provide onsite wastewater treatment.	0
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0

Conditions and measures related to sewage treatment plant

Not applicable as there is no release to wastewater	
Assumed domestic sewage treatment plant flow	2000
Estimated substance removal from wastewater via	96

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municipal sewage treatment	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	6000000
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	96

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

External treatment and disposal of waste should comply with applicable local and/or national regulations	
External recovery and recycling of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

1.2.2. Control of worker exposure: Generic exposure scenario (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Product (article) characteristics

Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 %.

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

Covers daily exposures up to 8 hours	
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Other conditions affecting workers exposure

Keep good industrial hygiene	
Assumes use at not more than 20°C above ambient temperature.	

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVO SPERC 1.1b.v1)

Information for contributing exposure scenario

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Maximum Risk Characterization Ratios for air emissions [RCRair] : 0, Maximum Risk Characterization Ratios for wastewater emissions [RCRwater] : 0,000032, Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination, Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination

Release route	Release rate	Release estimation method
Release fraction to air from process (initial release prior to RMM):	1	
Release fraction to soil from process (initial release prior to RMM):	0.00001	
Release fraction to wastewater from process (initial release prior to RMM):	0.00003	

1.3.2. Worker exposure Generic exposure scenario (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

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

1.4.1. Environment

Guidance - Environment	Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Where other Risk Management
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	Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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1.4.2. Health

Guidance - Health	A qualitative approach was used to conclude safe use. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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2. SE 2: Formulation & (re)packing of substances and mixtures

2.1. Title section

Formulation & (re)packing of substances and mixtures

ES Ref.: SE 2
ES Type: Worker
Version: 1.0

Association ref code: ES 1
Date of issue: 30/09/2019

Environment		
	Contributing scenario controlling environmental exposure	ERC2, ESVOC SPERC 2.2.v1
Worker		
	Generic exposure scenario	
	Storage	PROC1, PROC2
	General exposures (closed systems)	PROC1, PROC2, PROC3
	Batch processes at elevated temperatures - Operation is carried out at elevated temperature (> 20°C above ambient temperature)	PROC3
	Process sampling	PROC3
	General exposures (open systems)	PROC4
	Mixing operations (open systems)	PROC5
	Transfer from/pouring from containers	PROC8a
	Equipment cleaning and maintenance	PROC8a
	Bulk transfers	PROC8b
	Drum/batch transfers	PROC8b
	Drum and small package filling	PROC9
	Production of preparations or articles by tableting, compression, extrusion, pelettisation	PROC14
	Laboratory activities	PROC15
Processes, tasks, activities covered	Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities	
Assessment method	Used ECETOC TRA model Hydrocarbon Block Method (Petrisk)	

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (ERC2, ESVOC SPERC 2.2.v1)

ERC2	Formulation into mixture
ESVOC SPERC 2.2.v1	Formulation & packing of preparations and mixtures: Industrial (SU10)
Assessment method	Hydrocarbon Block Method (Petrisk)

Product (article) characteristics

Other product characteristics	Substance is complex UVCB
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Amount used, frequency and duration of use (or from service life)

Annual site tonnage	11000
Daily amount per site	<= 37000 kg/day
Regional use tonnage	11000
Fraction of Regional tonnage used locally:	1
Fraction of EU tonnage used in region:	0.1
Continuous release	
Emission days	300

Technical and organisational conditions and measures

Bund storage facilities to prevent soil and water pollution in the event of spillage	
Prevent environmental discharge consistent with regulatory requirements	
Do not apply industrial sludge to natural soils	
Sewage sludge should be incinerated, contained or reclaimed.	
Common practices vary across sites thus conservative process release estimates used	
Prevent discharge of undissolved substance to or recover from onsite wastewater	
Risk from environmental exposure is driven by freshwater	
Treat air emission to provide a typical removal efficiency of	92
Provide onsite wastewater treatment.	0
If discharging to municipal sewage treatment plant, provide the required onsite wastewater	0

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removal efficiency of	
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Conditions and measures related to sewage treatment plant	
Not applicable as there is no release to wastewater	
Assumed domestic sewage treatment plant flow	2000
Estimated substance removal from wastewater via municipal sewage treatment	96
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	96
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	75000

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

Other conditions affecting environmental exposure	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100

2.2.2. Control of worker exposure: Generic exposure scenario

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 %.

Amount used (or contained in articles), frequency and duration of use/exposure	
Not applicable.	
Covers daily exposures up to 8 hours	

Other conditions affecting workers exposure	
Keep good industrial hygiene	
Assumes use at not more than 20°C above ambient temperature.	

2.2.3. Control of worker exposure: Storage (PROC1, PROC2)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

2.2.4. Control of worker exposure: General exposures (closed systems) (PROC1, PROC2, PROC3)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

2.2.5. Control of worker exposure: Batch processes at elevated temperatures - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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Technical and organisational conditions and measures	
Provide a good standard of controlled ventilation (10 to 15 air changes per hour)	
Formulate in enclosed or ventilated mixing vessels	

2.2.6. Control of worker exposure: Process sampling (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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2.2.7. Control of worker exposure: General exposures (open systems) (PROC4)

PROC4	Chemical production where opportunity for exposure arises
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2.2.8. Control of worker exposure: Mixing operations (open systems) (PROC5)

PROC5	Mixing or blending in batch processes
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2.2.9. Control of worker exposure: Transfer from/pouring from containers (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
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2.2.10. Control of worker exposure: Equipment cleaning and maintenance (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
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2.2.11. Control of worker exposure: Bulk transfers (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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2.2.12. Control of worker exposure: Drum/batch transfers (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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2.2.13. Control of worker exposure: Drum and small package filling (PROC9)

PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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2.2.14. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelettisation (PROC14)

PROC14	Tableting, compression, extrusion, pelettisation, granulation
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2.2.15. Control of worker exposure: Laboratory activities (PROC15)

PROC15	Use as laboratory reagent
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2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (ERC2, ESVOG SPERC 2.2.v1)

Information for contributing exposure scenario

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). Maximum Risk Characterization Ratios for air emissions [RCR_{air}] : 0, Maximum Risk Characterization Ratios for wastewater emissions [RCR_{water}] : 0,000032, Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination, Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination

Release route	Release rate	Release estimation method
Release fraction to air from process (initial release prior to RMM):	0.025	
Release fraction to soil from process (initial release prior to RMM):	0.0001	
Release fraction to wastewater from process (initial release prior to RMM):	0.002	

2.3.2. Worker exposure Generic exposure scenario

No information available

2.3.3. Worker exposure Storage (PROC1, PROC2)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.4. Worker exposure General exposures (closed systems) (PROC1, PROC2, PROC3)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.5. Worker exposure Batch processes at elevated temperatures - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.6. Worker exposure Process sampling (PROC3)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.7. Worker exposure General exposures (open systems) (PROC4)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.8. Worker exposure Mixing operations (open systems) (PROC5)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.9. Worker exposure Transfer from/pouring from containers (PROC8a)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

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2.3.10. Worker exposure Equipment cleaning and maintenance (PROC8a)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.11. Worker exposure Bulk transfers (PROC8b)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.12. Worker exposure Drum/batch transfers (PROC8b)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.13. Worker exposure Drum and small package filling (PROC9)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.14. Worker exposure Production of preparations or articles by tableting, compression, extrusion, pelettisation (PROC14)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

2.3.15. Worker exposure Laboratory activities (PROC15)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

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

2.4.1. Environment

Guidance - Environment	Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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2.4.2. Health

Guidance - Health	A qualitative approach was used to conclude safe use. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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3. SE 3: Use in blowing agents <Traduction manquante> - Industrial

3.1. Title section

Use in blowing agents <Traduction manquante> - Industrial

ES Ref.: SE 3

ES Type: Worker

Version: 1.0

Association ref code: ES 1

Date of issue: 30/09/2019

Environment		
	Contributing scenario controlling environmental exposure	ERC4, ESVOC SPERC 4.9.v1
Worker		
	Generic exposure scenario	
	Mixing operations	PROC1
	Mixing operations - Operation is carried out at elevated temperature (> 20°C above ambient temperature)	PROC3
	Intermediate polymer storage - Operation is carried out at elevated temperature (> 20°C above ambient temperature)	PROC3
	Centrifuging including discharging - Operation is carried out at elevated temperature (> 20°C above ambient temperature)	PROC3
	Mixing operations	PROC3
	Bulk transfers	PROC8b
	Semi-bulk packaging	PROC8b
	Drum and small package filling - Filling of equipment from drums or containers	PROC9
	Extrusion and expansion of polymer mass	PROC12
	Cutting and shaving	PROC12
	Collection and re-processing of shavings, cuttings, etc	PROC12
	Product packaging	PROC12
	Storage	PROC12
	Treatment by heating - Operation is carried out at elevated temperature (> 20°C above ambient temperature)	PROC12
	Article formation in mould - Operation is carried out at elevated temperature (> 20°C above ambient temperature)	PROC12
	Drying and storage	PROC12
	Cutting by heated wire	PROC12
	Foaming	PROC12
	Compression	PROC12
	Cutting by heated wire	PROC12
Processes, tasks, activities covered	Use as a blowing agent for rigid and flexible foams, including material transfers, mixing and injection, curing, cutting, storage and packing	
Assessment method	Used ECETOC TRA model	
	Hydrocarbon Block Method (Petrisk)	

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (ERC4, ESVOC SPERC 4.9.v1)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ESVOC SPERC 4.9.v1	Blowing agents: Industrial (SU3)
Assessment method	Hydrocarbon Block Method (Petrisk)

Product (article) characteristics

Other product characteristics	Substance is complex UVCB
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Amount used, frequency and duration of use (or from service life)

Annual site tonnage	960
Daily amount per site	<= 48000 kg/day
Regional use tonnage	960
Fraction of Regional tonnage used locally:	1
Fraction of EU tonnage used in region:	0.1
Continuous release	
Emission days	20

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Technical and organisational conditions and measures

Prevent environmental discharge consistent with regulatory requirements	
Do not apply industrial sludge to natural soils	
Sewage sludge should be incinerated, contained or reclaimed.	
Common practices vary across sites thus conservative process release estimates used	
Prevent discharge of undissolved substance to or recover from onsite wastewater	
Risk from environmental exposure is driven by freshwater	
Treat air emission to provide a typical removal efficiency of	0
Provide onsite wastewater treatment.	0
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0

Conditions and measures related to sewage treatment plant

Not applicable as there is no release to wastewater	
Assumed domestic sewage treatment plant flow	2000
Estimated substance removal from wastewater via municipal sewage treatment	97.1
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	5000000

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

External treatment and disposal of waste should comply with applicable local and/or national regulations	
External recovery and recycling of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

3.2.2. Control of worker exposure: Generic exposure scenario

Product (article) characteristics

Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 %.

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

Covers daily exposures up to 8 hours	
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Other conditions affecting workers exposure

Keep good industrial hygiene	
Assumes use at not more than 20°C above ambient temperature.	

3.2.3. Control of worker exposure: Mixing operations (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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3.2.4. Control of worker exposure: Mixing operations - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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Technical and organisational conditions and measures

Provide a good standard of controlled ventilation (10 to 15 air changes per hour)	
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3.2.5. Control of worker exposure: Intermediate polymer storage - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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Technical and organisational conditions and measures

Provide a good standard of controlled ventilation (10 to 15 air changes per hour)	
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3.2.6. Control of worker exposure: Centrifuging including discharging - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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Technical and organisational conditions and measures

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

3.2.7. Control of worker exposure: Mixing operations (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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3.2.8. Control of worker exposure: Bulk transfers (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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3.2.9. Control of worker exposure: Semi-bulk packaging (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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3.2.10. Control of worker exposure: Drum and small package filling - Filling of equipment from drums or containers (PROC9)

PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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3.2.11. Control of worker exposure: Extrusion and expansion of polymer mass (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.12. Control of worker exposure: Cutting and shaving (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.13. Control of worker exposure: Collection and re-processing of shavings, cuttings, etc (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.14. Control of worker exposure: Product packaging (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.15. Control of worker exposure: Storage (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.16. Control of worker exposure: Treatment by heating - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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Technical and organisational conditions and measures

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

3.2.17. Control of worker exposure: Article formation in mould - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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Technical and organisational conditions and measures

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

3.2.18. Control of worker exposure: Drying and storage (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.19. Control of worker exposure: Cutting by heated wire (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.20. Control of worker exposure: Foaming (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.21. Control of worker exposure: Compression (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.2.22. Control of worker exposure: Cutting by heated wire (PROC12)

PROC12	Use of blowing agents in manufacture of foam
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3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (ERC4, ESVOC SPERC 4.9.v1)

Information for contributing exposure scenario

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>), Maximum Risk Characterization Ratios for air emissions [RCR_{air}] : 0,004, Maximum Risk Characterization Ratios for wastewater emissions [RCR_{water}] : 0,041, Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination, Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination

Release route	Release rate	Release estimation method
Release fraction to air from process (initial release prior to RMM):	1	
Release fraction to soil from process (initial release	0	

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prior to RMM):		
Release fraction to wastewater from process (initial release prior to RMM):	0.00003	

3.3.2. Worker exposure Generic exposure scenario

No information available

3.3.3. Worker exposure Mixing operations (PROC1)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.4. Worker exposure Mixing operations - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.5. Worker exposure Intermediate polymer storage - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.6. Worker exposure Centrifuging including discharging - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC3)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.7. Worker exposure Mixing operations (PROC3)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.8. Worker exposure Bulk transfers (PROC8b)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.9. Worker exposure Semi-bulk packaging (PROC8b)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.10. Worker exposure Drum and small package filling - Filling of equipment from drums or containers (PROC9)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.11. Worker exposure Extrusion and expansion of polymer mass (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.12. Worker exposure Cutting and shaving (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.13. Worker exposure Collection and re-processing of shavings, cuttings, etc (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.14. Worker exposure Product packaging (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.15. Worker exposure Storage (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

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3.3.16. Worker exposure Treatment by heating - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.17. Worker exposure Article formation in mould - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.18. Worker exposure Drying and storage (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.19. Worker exposure Cutting by heated wire (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.20. Worker exposure Foaming (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.21. Worker exposure Compression (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

3.3.22. Worker exposure Cutting by heated wire (PROC12)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

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

3.4.1. Environment

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

Guidance - Health	A qualitative approach was used to conclude safe use. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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4. SE 4: Uses in cosmetics/personal care products, perfumes and fragrances

4.1. Title section

Uses in cosmetics/personal care products, perfumes and fragrances

ES Ref.: SE 4
ES Type: Consumer
Version: 1.0

Association ref code: ES 1
Date of issue: 30/09/2019

Consumer		
	Contributing scenario consumer end-use	PC28, PC39
Processes, tasks, activities covered	Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation	
Assessment method	Hydrocarbon Block Method (Petrisk)	

4.2. Conditions of use affecting exposure

4.2.. (ERC8a, ERC8d, ESVO SPERC 8.16.v1)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ESVO SPERC 8.16.v1	Other Consumer Uses: Consumer (SU21)
Assessment method	Hydrocarbon Block Method (Petrisk)

Product (article) characteristics

Other product characteristics	Substance is complex UVCB
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Annual site tonnage	0.0025
Regional use tonnage	5
Fraction of Regional tonnage used locally:	0.0005
Fraction of EU tonnage used in region:	0.1
Emission days	365
Continuous release	

4.2.1. Control of consumer exposure: Contributing scenario consumer end-use (PC28, PC39)

PC28	Perfumes, fragrances
PC39	Cosmetics, personal care products

4.3. Exposure estimation and reference to its source

4.3.1. Consumer exposure Contributing scenario consumer end-use (PC28, PC39)

Information for contributing exposure scenario

No exposure assessment presented for human health

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

4.4.1. Environment

4.4.2. Health

Guidance - Health	A qualitative approach was used to conclude safe use
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5. SE 5: Use in functional fluids - Industrial

5.1. Title section

Use in functional fluids - Industrial

ES Ref.: SE 5
ES Type: Worker
Version: 1.0

Association ref code: ES 1
Date of issue: 30/09/2019

Environment		
	Contributing scenario controlling environmental exposure	ERC7, ESVOC SPERC 7.13a.v1
Worker		
	Generic exposure scenario	
	Bulk transfers Closed systems	PROC1
	Storage	PROC1
	Bulk transfers Closed systems	PROC2
	General exposures (closed systems)	PROC2
	Storage	PROC2
	General exposures (open systems) - Operation is carried out at elevated temperature (> 20°C above ambient temperature)	PROC4
	Filling of equipment from drums or containers	PROC8a
	Equipment maintenance	PROC8a
	Drum/batch transfers	PROC8b
	Filling of articles/equipment	PROC9
	Remanufacture of reject articles	PROC9
Processes, tasks, activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers	
Assessment method	Used ECETOC TRA model Hydrocarbon Block Method (Petrisk)	

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (ERC7, ESVOC SPERC 7.13a.v1)

ERC7	Use of functional fluid at industrial site
ESVOC SPERC 7.13a.v1	Functional Fluids: Industrial (SU3)
Assessment method	Hydrocarbon Block Method (Petrisk)

Product (article) characteristics

Other product characteristics	Substance is complex UVCB
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Amount used, frequency and duration of use (or from service life)

Annual site tonnage	10
Daily amount per site	<= 500 kg/day
Regional use tonnage	46
Fraction of Regional tonnage used locally:	1
Fraction of EU tonnage used in region:	0.1
Continuous release	
Emission days	20

Technical and organisational conditions and measures

Prevent environmental discharge consistent with regulatory requirements	
Do not apply industrial sludge to natural soils	
Sewage sludge should be incinerated, contained or reclaimed.	
Common practices vary across sites thus conservative process release estimates used	
Prevent discharge of undissolved substance to or recover from onsite wastewater	
Treat air emission to provide a typical removal efficiency of	0
Provide onsite wastewater treatment.	0
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0

Conditions and measures related to sewage treatment plant

Not applicable as there is no release to wastewater	
Assumed domestic sewage treatment plant flow	2000
Estimated substance removal from wastewater via	96

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municipal sewage treatment	
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	96
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	500000

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

External treatment and disposal of waste should comply with applicable local and/or national regulations	
External recovery and recycling of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

5.2.2. Control of worker exposure: Generic exposure scenario

Product (article) characteristics

Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 %.

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

Covers daily exposures up to 8 hours	
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Other conditions affecting workers exposure

Keep good industrial hygiene	
Assumes use at not more than 20°C above ambient temperature.	

5.2.3. Control of worker exposure: Bulk transfers Closed systems (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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5.2.4. Control of worker exposure: Storage (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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5.2.5. Control of worker exposure: Bulk transfers Closed systems (PROC2)

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

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

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
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5.2.8. Control of worker exposure: General exposures (open systems) - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC4)

PROC4	Chemical production where opportunity for exposure arises
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Technical and organisational conditions and measures

Provide a good standard of controlled ventilation (10 to 15 air changes per hour)	
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5.2.9. Control of worker exposure: Filling of equipment from drums or containers (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
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5.2.10. Control of worker exposure: Equipment maintenance (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
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5.2.11. Control of worker exposure: Drum/batch transfers (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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5.2.12. Control of worker exposure: Filling of articles/equipment (PROC9)

PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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5.2.13. Control of worker exposure: Remanufacture of reject articles (PROC9)

PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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5.3. Exposure estimation and reference to its source

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5.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (ERC7, ESVOC SPERC 7.13a.v1)

Information for contributing exposure scenario

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). Maximum Risk Characterization Ratios for air emissions [RCR_{air}] : 0, Maximum Risk Characterization Ratios for wastewater emissions [RCR_{water}] : 0,001, Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination, Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination

Release route	Release rate	Release estimation method
Release fraction to air from process (initial release prior to RMM):	0.01	
Release fraction to soil from process (initial release prior to RMM):	0.001	
Release fraction to wastewater from process (initial release prior to RMM):	0.0003	

5.3.2. Worker exposure Generic exposure scenario

No information available

5.3.3. Worker exposure Bulk transfers Closed systems (PROC1)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.4. Worker exposure Storage (PROC1)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.5. Worker exposure Bulk transfers Closed systems (PROC2)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.6. Worker exposure General exposures (closed systems) (PROC2)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.7. Worker exposure Storage (PROC2)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.8. Worker exposure General exposures (open systems) - Operation is carried out at elevated temperature (> 20°C above ambient temperature) (PROC4)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.9. Worker exposure Filling of equipment from drums or containers (PROC8a)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.10. Worker exposure Equipment maintenance (PROC8a)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.11. Worker exposure Drum/batch transfers (PROC8b)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.12. Worker exposure Filling of articles/equipment (PROC9)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

5.3.13. Worker exposure Remanufacture of reject articles (PROC9)

Information for contributing exposure scenario

Risk Management Measures are based on qualitative risk characterisation, Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels

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

5.4.1. Environment

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

Guidance - Health	A qualitative approach was used to conclude safe use. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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