SAFETY DATA SHEET

SECTION 1	IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

As of the revision date above, this SDS meets the regulations in the United Kingdom & Ireland.

1.1. PRODUCT IDENTIFIER

Product Name: HEXANE

Product Description: Aliphatic Hydrocarbon

Registration Name:

Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich

Identification Number: (EC #)925-292-5

Registration Number:

01-2119474209-33 01-2119474209-33

1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

Intended Use: Reaction Diluent, Solvent

Identified Uses:

Manufacture of substance
Distribution of substance
Use as an intermediate
Formulation and (re)packing of substances and mixtures
Use in Coatings - Industrial
Use in Cleaning Agents - Industrial
Lubricants - Industrial
Blowing agents
Use as a fuel - Industrial
Functional Fluids - Industrial
Use in laboratories - Industrial
Rubber production and processing
Polymer processing - Industrial
Mining chemicals
Use in Coatings - Professional
Use in Cleaning Agents - Professional
Agrochemical uses - Professional
Use as a fuel - Professional
Functional Fluids - Professional
Use in laboratories - Professional
Polymer processing - Professional

See Section 16 for list of REACH Use Descriptors for Identified Uses shown above.

Uses advised against: The above Identified Uses are specific to the customer for whom this Safety Data Sheet is intended and are uses for which the information in this Safety Data Sheet is applicable. Other uses for this product may be supported/registered. This product is not recommended for any industrial, professional or consumer use other than those which are supported/registered.

1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Supplier: **Same Chemicals B.V.**
Achterom78
2991 CV Barendrecht
Niederlande

Local Contact: **Same Chemicals B.V.**
Achterom78
2991 CV Barendrecht
Niederlande

Supplier General Contact: (+31 (0)10/891.73.55
E-Mail: Chemicals@samechemicals.com

1.4. EMERGENCY TELEPHONE NUMBER

24 Hour Emergency Telephone: +(44)-8708200418 (CHEMTREC)

SECTION 2 HAZARDS IDENTIFICATION

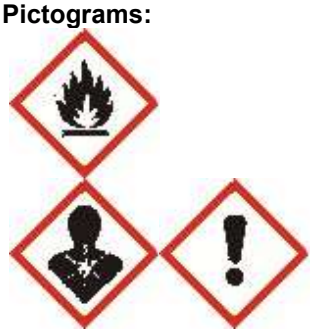
2.1. CLASSIFICATION OF SUBSTANCE OR MIXTURE

Classification according to Regulation (EC) No 1272/2008
Flammable liquid: Category 2.
Skin irritation: Category 2. Reproductive toxicant (fertility): Category 2. Specific target organ toxicant (central nervous system): Category 3. Specific target organ toxicant (repeated exposure): Category 2. Aspiration toxicant: Category 1. Chronic aquatic toxicant: Category 2.
H225: Highly flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H336: May cause drowsiness or dizziness. H361: Suspected of damaging fertility. H373: May cause damage to organs through prolonged or repeated exposure. Central Nervous system, Peripheral Nervous system
H411: Toxic to aquatic life with long lasting effects.

2.2. LABEL ELEMENTS

Label elements according to Regulation (EC) No 1272/2008

Pictograms:



Signal Word: Danger

Hazard Statements:

H225: Highly flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H336: May cause drowsiness or dizziness. H361: Suspected of damaging fertility. H373: May cause damage to organs through prolonged or repeated exposure. Central Nervous system, Peripheral Nervous system
H411: Toxic to aquatic life with long lasting effects.

Precautionary Statements:

P101: If medical advice is needed, have product container or label at hand. P103: Read label before use.
P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P260: Do not breathe dust/fume/gas/mist/vapours/spray. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P314: Get medical advice/attention if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage.
P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.
P501: Dispose of contents and container in accordance with local regulations.

Contains: Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich

2.3. OTHER HAZARDS

Physical / Chemical Hazards:

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

Health Hazards:

Overexposure to n-hexane may cause effects on the peripheral nerves, resulting in weakness or numbness of lower limbs. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression.

Environmental Hazards:

No additional hazards. Material does not meet the criteria for PBT or vPvB in accordance with REACH Annex XIII.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

3.1. SUBSTANCES

This material is defined as a substance.

Reportable hazardous substance(s) complying with the classification criteria and/or with an exposure limit (OEL)

Name	CAS#	EC#	Registration#	Concentration*	GHS/CLP classification
Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich		925-292-5	01-2119474209-33	100 %	[Aquatic Acute 2 H401], Aquatic Chronic 2 H411, Asp. Tox. 1 H304, Flam. Liq. 2 H225, Repr. 2 H361f, STOT SE 3 H336, Skin Irrit. 2 H315, STOT RE 2 H373

Note - any classification in brackets is a GHS building block that was not adopted by the EU in the CLP regulation (No 1272/2008) and therefore is not applicable in the EU or in non-EU countries which have implemented the CLP regulation and is shown for informational purposes only.

Reportable hazardous constituent(s) contained in UVCB- and/or multi-constituent substance(s) complying with the classification criteria and/or with an exposure limit (OEL)

Name	CAS#	EC#	Concentration*	GHS/CLP Classification
CYCLOHEXANE	110-82-7	203-806-2	< 5%	Aquatic Acute 1 H400 (M factor 1), Aquatic Chronic 1 H410 (M factor 1), Asp. Tox. 1 H304, Flam. Liq. 2 H225, STOT SE 3 H336, Skin Irrit. 2 H315
n-Hexane	110-54-3	203-777-6	50%	[Aquatic Acute 2 H401], Aquatic Chronic 2 H411, Asp. Tox. 1 H304, Flam. Liq. 2 H225, Repr. 2 H361f, STOT SE 3 H336, Skin Irrit. 2 H315, STOT RE 2 H373

Note - any classification in brackets is a GHS building block that was not adopted by the EU in the CLP regulation (No 1272/2008) and therefore is not applicable in the EU or in non-EU countries which have implemented the CLP regulation and is shown for informational purposes only.

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. Concentration values may vary.

Note: Any entry in the EC# column that begins with the number "9" is a Provisional List Number provided by ECHA pending publication of the official EC Inventory Number for the substance. See Section 15 for additional CAS number information for the substance.

Note: See SDS Section 16 for full text of hazard statements.

3.2. MIXTURES Not Applicable. This product is regulated as a substance.

SECTION 4 FIRST AID MEASURES

4.1. DESCRIPTION OF FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

4.2. MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Headache, dizziness, drowsiness, nausea and other CNS effects. Numbness, muscle cramps, weakness and paralysis that may be delayed. Itching, pain, redness, swelling of skin.

4.3. INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This material, or a component, may be associated with cardiac sensitization following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided. Contains hexane; individuals with pre-existing neurological disease should avoid exposure.

SECTION 5 FIRE FIGHTING MEASURES

5.1. EXTINGUISHING MEDIA

Suitable Extinguishing Media: Use foam, dry chemical, or carbon dioxide (CO2) to extinguish flames.

Unsuitable Extinguishing Media: Straight streams of water

5.2. SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Hazardous Combustion Products: Incomplete combustion products, Oxides of carbon, Smoke, Fume

5.3. ADVICE FOR FIRE FIGHTERS

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Highly flammable. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

FLAMMABILITY PROPERTIES

Flash Point [Method]: -28°C (-18°F) [ASTM D-56]
Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 8.0 LEL: 1.2 [Extrapolated]
Autoignition Temperature: 267°C (513°F) [ASTM E659]

SECTION 6 ACCIDENTAL RELEASE MEASURES

6.1. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

6.2. ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

6.3. METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

6.4. REFERENCES TO OTHER SECTIONS

See Sections 8 and 13.

SECTION 7 HANDLING AND STORAGE

7.1. PRECAUTIONS FOR SAFE HANDLING

Avoid breathing mists or vapour. Avoid all personal contact. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Loading/Unloading Temperature: [Ambient]

Transport Temperature: [Ambient]
Transport Pressure: [Ambient]

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

7.2. CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.
Storage Temperature: [Ambient]
Storage Pressure: [Ambient]

Suitable Containers/Packing: Tankers; Drums; Tank Cars; Tank Trucks; Barges; Railcars
Suitable Materials and Coatings (Chemical Compatibility): Carbon Steel; Stainless Steel; Polyester; Teflon; Polyethylene; Polypropylene
Unsuitable Materials and Coatings: Butyl Rubber; Polystyrene; Ethylene-proplyene-diene monomer (EPDM); Natural Rubber

7.3. SPECIFIC END USES

Section 1 informs about identified end-uses. No industrial or sector specific guidance available.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. CONTROL PARAMETERS

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Source
cyclohexane		STEL	1050 mg/m3	300 ppm		UK EH40
cyclohexane		TWA	350 mg/m3	100 ppm		UK EH40

cyclohexane		TWA	100 ppm			ACGIH
Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich		RCP - TWA	300 mg/m3	85 ppm		
n-Hexane		TWA	72 mg/m3	20 ppm		UK EH40
n-Hexane		TWA	50 ppm		Skin	ACGIH

UK EH40 Workplace Exposure Limits. Exposure limits for use with Control of Substances Hazardous to Health Regulations 2002 (as amended)

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

UK Health and Safety Executive (HSE)

DERIVED NO EFFECT LEVEL (DNEL)/DERIVED MINIMAL EFFECT LEVEL (DMEL)

Worker

Substance Name	Dermal	Inhalation
Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich	13 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	93 mg/m3 DNEL, Chronic Exposure, Systemic Effects

Consumer

Substance Name	Dermal	Inhalation	Oral
Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich	7 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	20 mg/m3 DNEL, Chronic Exposure, Systemic Effects	6 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects

Note: The Derived No Effect Level (DNEL) is an estimated safe level of exposure that is derived from toxicity data in accord with specific guidance within the European REACH regulation. The DNEL may differ from an Occupational Exposure Limit (OEL) for the same chemical. OELs may be recommended by an individual company, a governmental regulatory body or an expert organization, such as the Scientific Committee for Occupational Exposure Limits (SCOEL) or the American Conference of Governmental Industrial Hygienists (ACGIH). OELs are considered to be safe exposure levels for a typical worker in an occupational setting for an 8-hour work shift, 40 hour work week, as a time weighted average (TWA) or a 15 minute short-term exposure limit (STEL). While also considered to be protective of health, OELs are derived by a process different from that of REACH.

PREDICTED NO EFFECT CONCENTRATION (PNEC)

Substance Name	Aqua (fresh water)	Aqua (marine water)	Aqua (intermittent release)	Sewage treatment plant	Sediment	Soil	Oral (secondary poisoning)
Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich	NA	NA	NA	NA	NA	NA	NA

For hydrocarbon UVCBs, no single PNEC value is identified for the overall substance or used in risk assessment calculations. Therefore, no PNEC values are disclosed in the above table. For further information, please contact Same Chemicals.

8.2. EXPOSURE CONTROLS

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Half-face filter respirator Type A filter material, European Committee for Standardization (CEN) standards EN 136, 140 and 405 provide respirator masks and EN 149 and 143 provide filter recommendations.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves. Nitrile, minimum 0.38 mm thickness or comparable protective barrier material with a high performance level for continuous contact use conditions, permeation breakthrough minimum 480 minutes in accordance with CEN standards EN 420 and EN 374.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

For Summary of Risk Management Measures across all identified uses, see Annex.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Form: Clear
Colour: Colourless
Odour: Slight
Odour Threshold: No data available
pH: Not technically feasible
Melting Point: Not technically feasible
Freezing Point: No data available
Initial Boiling Point / and Boiling Range: 65°C (149°F) - 70°C (158°F) [ASTM D1078]
Flash Point [Method]: -28°C (-18°F) [ASTM D-56]
Evaporation Rate (n-butyl acetate = 1): 15 [In-house method]
Flammability (Solid, Gas): Not technically feasible
Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 8.0 LEL: 1.2 [Extrapolated]
Vapour Pressure: 18 kPa (135 mm Hg) at 20 °C [Calculated]
Vapour Density (Air = 1): 3 at 101 kPa [In-house method]
Relative Density: 0.67 [With respect to water] [Calculated]
Solubility(ies): water Negligible
Partition coefficient (n-Octanol/Water Partition Coefficient): > 4 [Estimated]
Autoignition Temperature: 267°C (513°F) [ASTM E659]
Decomposition Temperature: No data available
Viscosity: 0.4 cSt (0.4 mm2/sec) at 40ºC | 0.5 cSt (0.5 mm2/sec) at 20°C [Calculated]
Explosive Properties: None
Oxidizing Properties: None

9.2. OTHER INFORMATION

Density (at 15 ºC): 670 kg/m3 (5.59 lbs/gal, 0.67 kg/dm3) [ISO 12185]
Pour Point: < -20°C (-4°F) [Calculated]
Molecular Weight: 86 G/MOLE [Calculated]
Hygroscopic: No
Coefficient of Thermal Expansion: 0.00142 per Deg C [Calculated]

SECTION 10 STABILITY AND REACTIVITY

10.1. REACTIVITY: See sub-sections below.

10.2. CHEMICAL STABILITY: Material is stable under normal conditions.

10.3. POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

10.4. CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

10.5. INCOMPATIBLE MATERIALS: Strong oxidisers

10.6. HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

SECTION 11 TOXICOLOGICAL INFORMATION

11.1. INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 20 mg/l (Vapour) Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 3350 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation: Data available. Test scores or other study results meet criteria for classification.	Irritating to the skin. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation: Data available. Test scores or other study results do not meet criteria for classification.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 429
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 473 475 476
Carcinogenicity: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to cause cancer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Caused damage to fertility in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 414 416
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	May cause drowsiness or dizziness.
Repeated Exposure: Data available.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 408 413

OTHER INFORMATION

For the product itself:
Target Organs Repeated Exposure: Central Nervous system, Peripheral Nervous system

Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug.
COMMERCIAL HEXANE: In a two-generation reproduction study conducted on commercial hexane in animals, reduced body weights were seen in offspring of both generations at the highest concentration (9000 ppm). No effects on reproductive performance were noted. Effects were seen only at many times the concentration level of the TLV. Normal hexane (n-hexane) causes peripheral nerve damage in laboratory animals and humans.
Contains:
N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown.

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

12.1. TOXICITY
Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

12.2. PERSISTENCE AND DEGRADABILITY
Biodegradation:
Material -- Expected to be readily biodegradable.
Hydrolysis:
Material -- Transformation due to hydrolysis not expected to be significant.
Photolysis:
Material -- Transformation due to photolysis not expected to be significant.
Atmospheric Oxidation:
Material -- Expected to degrade rapidly in air

12.3. BIOACCUMULATIVE POTENTIAL
Not determined.

12.4. MOBILITY IN SOIL
Material -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

12.5. PERSISTENCE, BIOACCUMULATION AND TOXICITY FOR SUBSTANCE(S)
This product is not, or does not contain, a substance that is a PBT or a vPvB.

12.6. OTHER ADVERSE EFFECTS
No adverse effects are expected.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	LC50 3.9 mg/l: data for similar materials
Aquatic - Acute Toxicity	48 hour(s)	Oryzia latipes	LC50 >1000 ug/l: data for similar materials
Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	NOELR 30 mg/l: data for similar materials
Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	EbL50 55 mg/l: data for similar materials

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results: Basis
Water	Ready Biodegradability	28 day(s)	Percent Degraded 98 : similar material

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

13.1. WASTE TREATMENT METHODS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

European Waste Code: 08 XX XX

NOTE: These codes are assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste producers need to assess the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code(s).

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (ADR/RID)

14.1. UN Number: 1208
14.2. UN Proper Shipping Name (Technical Name): HEXANES
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: II

14.5. Environmental Hazards: Yes
14.6. Special Precautions for users:
Classification Code: F1
Label(s) / Mark(s): 3, EHS
Hazard ID Number: 33
Hazchem EAC: 3YE

INLAND WATERWAYS (ADNR/ADN)

14.1. UN (or ID) Number: 1208
14.2. UN Proper Shipping Name (Technical Name): HEXANES
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: II
14.5. Environmental Hazards: Yes
14.6. Special Precautions for users:
Hazard ID Number: 33
Label(s) / Mark(s): 3 (N2), EHS

SEA (IMDG)

14.1. UN Number: 1208
14.2. UN Proper Shipping Name (Technical Name): HEXANES
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: II
14.5. Environmental Hazards: Marine Pollutant
14.6. Special Precautions for users:
Label(s): 3
EMS Number: F-E, S-D
Transport Document Name: UN1208, HEXANES, 3, PG II, (-28°C c.c.), MARINE POLLUTANT

SEA (MARPOL 73/78 Convention - Annex II):

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Substance Name: HEXANE (ALL ISOMERS)
Ship type required: 2
Pollution category: Y

AIR (IATA)

14.1. UN Number: 1208
14.2. UN Proper Shipping Name (Technical Name): HEXANES
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: II
14.5. Environmental Hazards: Yes
14.6. Special Precautions for users:
Label(s) / Mark(s): 3
Transport Document Name: UN1208, HEXANES, 3, PG II

SECTION 15 REGULATORY INFORMATION

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, IECSC, KECI, PICCS, TCSI, TSCA

The following substance(s) in this product is (are) identified by the CAS number(s) shown in countries not

subject to the REACH regulation.

Name	CAS
Hydrocarbons, C6, n-alkanes, isoalkanes, cyclics, n-hexane rich	64742-49-0

15.1. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

Applicable EU Directives and Regulations:

1907/2006 [... on the Registration, Evaluation, Authorisation and Restriction of Chemicals ... and amendments thereto]

2004/42/CE [on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC.]

94/33/EC [...on the protection of young people at work]

96/82/EC as extended by 2003/105/EC [... on the control of major-accident hazards involving dangerous substances]. Product contains a substance that falls within the criteria defined in Annex I. Refer to Directive for details of requirements taking into account the volume of product stored on site.

98/24/EC [... on the protection of workers from the risk related to chemical agents at work ...]. Refer to Directive for details of requirements.

1272/2008 [on classification, labelling and packaging of substances and mixtures.. and amendments thereto]

15.2. CHEMICAL SAFETY ASSESSMENT

REACH Information: A Chemical Safety Assessment has been carried out for one or more substances present in the material.

SECTION 16 OTHER INFORMATION

IDENTIFIED USES:
Manufacture of substance (PROC1, PROC15, PROC2, PROC3, PROC4, PROC8a, PROC8b, SU10, SU3, SU8, SU9)
Distribution of substance (PROC1, PROC15, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, SU3, SU8, SU9)
Use as an intermediate (PROC1, PROC15, PROC2, PROC3, PROC4, PROC8a, PROC8b, SU3, SU8, SU9)
Formulation and (re)packing of substances and mixtures (PROC1, PROC14, PROC15, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, SU10, SU3)
Use in Coatings - Industrial (PROC1, PROC10, PROC13, PROC14, PROC15, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, SU3)
Use in Cleaning Agents - Industrial (PROC1, PROC10, PROC13, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8bSU3,)
Lubricants - Industrial (PROC1, PROC10, PROC13, PROC17, PROC18, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, SU3)
Blowing agents (PROC1, PROC12, PROC2, PROC3, PROC8b, PROC9, SU3)
Use as a fuel - Industrial (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU3)
Functional Fluids - Industrial (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, SU3)
Use in laboratories - Industrial (PROC10, PROC15, SU3)
Rubber production and processing (PROC1, PROC13, PROC14, PROC15, PROC2, PROC21, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, SU10)
Polymer processing - Industrial (PROC1, PROC13, PROC14, PROC2, PROC21, PROC3, PROC4, PROC5, PROC6,

PROC8a, PROC8b, PROC9, SU10, SU3)
Mining chemicals (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, SU3)
Use in Coatings - Professional (PROC1, PROC10, PROC11, PROC13, PROC15, PROC19, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, SU22)
Use in Cleaning Agents - Professional (PROC1, PROC10, PROC11, PROC13, PROC19, PROC2, PROC3, PROC4, PROC8a, PROC8b, SU22)
Agrochemical uses - Professional (PROC1, PROC11, PROC13, PROC2, PROC4, PROC8a, PROC8b, SU22)
Use as a fuel - Professional (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU22)
Functional Fluids - Professional (PROC1, PROC2, PROC20, PROC3, PROC8a, PROC9, SU22)
Use in laboratories - Professional (PROC10, PROC15, SU22)
Polymer processing - Professional (PROC1, PROC14, PROC2, PROC21, PROC6, PROC8a, PROC8b, SU22)

REFERENCES: Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, CONCAWE Product Dossiers, publications from other trade associations, such as the EU Hydrocarbon Solvents REACH Consortium, U.S. HPV Program Robust Summaries, the EU IUCLID Data Base, U.S. NTP publications, and other sources, as appropriate.

List of abbreviations and acronyms that could be (but not necessarily are) used in this safety data sheet:

Acronym	Full text
N/A	Not applicable
N/D	Not determined
NE	Not established
VOC	Volatile Organic Compound
AICS	Australian Inventory of Chemical Substances
AIHA WEEL	American Industrial Hygiene Association Workplace Environmental Exposure Limits
ASTM	ASTM International, originally known as the American Society for Testing and Materials (ASTM)
DSL	Domestic Substance List (Canada)
EINECS	European Inventory of Existing Commercial Substances
ELINCS	European List of Notified Chemical Substances
ENCS	Existing and new Chemical Substances (Japanese inventory)
IECSC	Inventory of Existing Chemical Substances in China
KECI	Korean Existing Chemicals Inventory
NDSL	Non-Domestic Substances List (Canada)
NZIoC	New Zealand Inventory of Chemicals
PICCS	Philippine Inventory of Chemicals and Chemical Substances
TLV	Threshold Limit Value (American Conference of Governmental Industrial Hygienists)
TSCA	Toxic Substances Control Act (U.S. inventory)
UVCB	Substances of Unknown or Variable composition, Complex reaction products or Biological materials
LC	Lethal Concentration
LD	Lethal Dose
LL	Lethal Loading
EC	Effective Concentration
EL	Effective Loading
NOEC	No Observable Effect Concentration
NOELR	No Observable Effect Loading Rate

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
Flam. Liq. 2 H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
Asp. Tox. 1 H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
Skin Irrit. 2 H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
STOT SE 3 H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
Repr. 2 H361f: Suspected of damaging fertility; Repro Tox, Cat 2 (Fertility)
STOT RE 2 H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
Aquatic Acute 1 H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
[Aquatic Acute 2 H401]: Toxic to aquatic life; Acute Env Tox, Cat 2

Aquatic Chronic 1 H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
Aquatic Chronic 2 H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
GHS Physical Hazards information was modified.
GHS Precautionary Statements - Prevention information was modified.
GHS Precautionary Statements - Response information was modified.
Section 12: VOC - Header information was deleted.
Section 12: VOC information was deleted.

Internal Use Only
MHC: 1A, 0, 0, 0, 4, 0

DGN: ALL2594HGB (1006434)

ANNEX

Section 1 Exposure Scenario Title	
Title:	
Manufacture of substance	
Use Descriptor	
Sector(s) of Use	SU10, SU3, SU8, SU9
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC4, PROC8a, PROC8b
Environmental Release Categories	ERC1, ERC4
Specific Environmental Release Category	ESVOC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	

Duration, frequency and amount
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General exposures (closed systems) PROC1** No other specific measures identified. **General exposures (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **General exposures (closed systems) PROC3** Ensure material transfers are under containment or extract ventilation. Handle substance within a closed system. **General exposures (open systems) PROC4** Ensure material transfers are under containment or extract ventilation. **Process sampling PROC8b** Ensure material transfers are under containment or extract ventilation. **Laboratory activities PROC15** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Bulk transfers (open systems) PROC8b** Provide extract ventilation to points where emissions occur. **Bulk transfers (closed systems) PROC8b** Ensure material transfers are under containment or extract ventilation. Handle substance within a closed system. **Equipment cleaning and maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Store substance within a closed system.

Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 15000 tons/yr Continuous release. Emission Days (days/year): 300 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 51000 kg / day Regional use tonnage (tonnes/year): 15000 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.05 Release fraction to soil from process (initial release prior to RMM): 0.0001 Release fraction to wastewater from process (initial release prior to RMM): 0.0003
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 45.8 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 10000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 720000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
During manufacturing no waste of the substance is generated [ETW4]
Conditions and measures related to external recovery of waste
During manufacturing no waste of the substance is generated [ERW2]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational

Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00078 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.07 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.

Section 1 Exposure Scenario Title	
Title:	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	SU3, SU8, SU9
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC1, ERC2, ERC3, ERC4, ERC5, ERC6A, ERC6B, ERC6C, ERC6D, ERC7
Specific Environmental Release Category	ESVOC 1.1b.v1
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.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC1** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General exposures (closed systems) PROC1** Handle substance within a closed system. **General exposures (closed systems) PROC2** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours. Handle substance within a closed system.	

General exposures (closed systems) PROC3 Handle substance within a closed system. Avoid carrying out activities involving exposure for more than 1 hour. **General exposures (open systems) PROC4** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. or Wear a respirator conforming to EN140 with Type A filter or better. **Process sampling PROC3** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. **Laboratory activities PROC15** Handle in a fume cupboard or under extract ventilation. or Wear a respirator conforming to EN140 with Type A filter or better. **Bulk transfers (closed systems) PROC8b** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. **Bulk transfers (open systems) PROC8b** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. Clear transfer lines prior to de-coupling. OR Wear a respirator conforming to EN140 with Type A filter or better. **Drum and small package filling PROC9** Fill containers/cans at dedicated fill points supplied with local extract ventilation. **Equipment cleaning and maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** Store substance within a closed system. Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 1.2 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 0.002 Maximum daily site tonnage (kg/d): 60 kg / day Regional use tonnage (tonnes/year): 600 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.001 Release fraction to soil from process (initial release prior to RMM): 0.00001 Release fraction to wastewater from process (initial release prior to RMM): 0.00001
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 210000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00000028 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00013 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.

Section 1 Exposure Scenario Title	
Title:	
Use as an intermediate	
Use Descriptor	
Sector(s) of Use	SU3, SU8, SU9
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC4, PROC8a, PROC8b
Environmental Release Categories	ERC6A
Specific Environmental Release Category	ESVOC 6.1a.v1
Processes, tasks, activities covered	
Use as an intermediate (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General exposures (closed systems) PROC1** No other specific measures identified. **General exposures (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **General exposures (closed systems) PROC3** Ensure material transfers are under containment or extract ventilation.	

Handle substance within a closed system. **General exposures (open systems) PROC4** Ensure material transfers are under containment or extract ventilation. **Process sampling PROC8b** Ensure material transfers are under containment or extract ventilation. **Laboratory activities PROC15** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Bulk transfers (open systems) PROC8b** Provide extract ventilation to points where emissions occur. **Bulk transfers (closed systems) PROC8b** Ensure material transfers are under containment or extract ventilation. Handle substance within a closed system. **Equipment cleaning and maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** Store substance within a closed system. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **General exposures (closed systems) PROC1** No other specific measures identified.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 250 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 13000 kg / day Regional use tonnage (tonnes/year): 250 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
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
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 80 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 56.7 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant

Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 140000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
This substance is consumed during use and no waste of the substance is generated [ETW5]
Conditions and measures related to external recovery of waste
This substance is consumed during use and no waste of the substance is generated [ERW3]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.0000057 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.088 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.

Section 1 Exposure Scenario Title	
Title:	
Formulation and (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	SU10, SU3
Process Categories	PROC1, PROC14, PROC15, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC2
Specific Environmental Release Category	ESVOC 2.2.v1
Processes, tasks, activities covered	
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenanance and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC1** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General exposures (closed systems) PROC1** Handle substance within a closed system. **General exposures (closed systems) PROC2** Ensure material transfers are under containment or extract ventilation. Handle substance within a closed system. **General exposures (closed systems) PROC3**	

Ensure material transfers are under containment or extract ventilation. Handle substance within a closed system. **General exposures (open systems) PROC4** Provide extract ventilation to points where emissions occur. **Batch processes at elevated temperatures Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC3** Ensure material transfers are under containment or extract ventilation. **Process sampling PROC3** Ensure material transfers are under containment or extract ventilation. or Avoid carrying out activities involving exposure for more than 1 hour. **Laboratory activities PROC15** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Bulk transfers PROC8b** Ensure material transfers are under containment or extract ventilation. **Mixing operations (open systems) PROC5** Provide extract ventilation to points where emissions occur. **Manual Transfer from/pouring from containers PROC8a** Provide extract ventilation to points where emissions occur. **Drum/batch transfers PROC8b** Provide extract ventilation to points where emissions occur. **Production of preparations or articles by tabletting, compression, extrusion, pelettisation PROC14** Handle substance within a predominantly closed system provided with extract ventilation. **Drum and small package filling PROC9** Fill containers/cans at dedicated fill points supplied with local extract ventilation. **Equipment cleaning and maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 310 tons/yr Continuous release. Emission Days (days/year): 100 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 3100 kg / day Regional use tonnage (tonnes/year): 310 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements): [OOC11] 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): 0.0002
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 220000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.000079 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.014 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.

Section 1 Exposure Scenario Title	
Title:	
Use in Coatings - Industrial	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC10, PROC13, PROC14, PROC15, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC4
Specific Environmental Release Category	ESVOC 4.3a.v1
Processes, tasks, activities covered	
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General exposures (closed systems) PROC1** Handle substance within a closed system. **General exposures (closed systems) with sample collection Use in contained systems PROC2** Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation. **Film formation - force drying, stoving and other technologies Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC2** Ensure material transfers are under containment or extract ventilation. Handle substance within a closed system. **Mixing operations (closed systems) General exposures (closed systems) PROC3**	

Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation. **Film formation - air drying PROC4** Provide extract ventilation to points where emissions occur. **Preparation of material for application Mixing operations (open systems) PROC5** Provide extract ventilation to points where emissions occur. **Spraying (automatic/robotic) PROC7** Carry out in a vented booth provided with laminar airflow. **Manual Spraying PROC7** Wear a respirator conforming to EN140 with Type A filter or better. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Material transfers PROC8a** Provide extract ventilation to points where emissions occur. Clear transfer lines prior to de-coupling. OR provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. Clear transfer lines prior to de-coupling. **Material transfers PROC8b** Provide extract ventilation to points where emissions occur. Clear transfer lines prior to de-coupling. **Roller, spreader, flow application PROC10** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Dipping, immersion and pouring PROC13** Provide extract ventilation to points where emissions occur. **Laboratory activities PROC15** Fill containers/cans at dedicated fill points supplied with local extract ventilation. **Material transfers Drum/batch transfers Transfer from/pouring from containers PROC9** Provide extract ventilation to material transfer points and other openings. OR Wear a respirator conforming to EN140 with Type A filter or better. **Production of preparations or articles by tabletting, compression, extrusion, pelettisation PROC14** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. OR Wear a respirator conforming to EN140 with Type A filter or better. **Equipment cleaning and maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** No other specific measures identified.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 830 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 42000 kg / day Regional use tonnage (tonnes/year): 830 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.98 Release fraction to soil from process (initial release prior to RMM): 0 Release fraction to wastewater from process (initial release prior to RMM): 0.0007 %
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 94.3 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 62000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00083 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.67 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.

Section 1 Exposure Scenario Title	
Title:	
Use in Cleaning Agents - Industrial	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC10, PROC13, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b
Environmental Release Categories	ERC4
Specific Environmental Release Category	ESVOC 4.4a.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. **Bulk transfers PROC8a** Ensure material transfers are under containment or extract ventilation. **Automated process with (semi) closed systems Use in contained systems PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour).	

Automated process with (semi) closed systems Drum/batch transfers PROC3 provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. OR Wear a respirator conforming to EN140 with Type A filter or better. **Application of cleaning products in closed systems PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Filling / preparation of equipment from drums or containers PROC8b** Ensure material transfers are under containment or extract ventilation. OR Wear a respirator conforming to EN140 with Type A filter or better. **Use in contained batch processes PROC4** Provide extract ventilation to points where emissions occur. OR Wear a respirator conforming to EN140 with Type A filter or better. **Degreasing small objects in cleaning station PROC13** Provide extract ventilation to points where emissions occur. OR Wear a respirator conforming to EN140 with Type A filter or better. **Cleaning with low-pressure washers PROC10** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. OR Wear a respirator conforming to EN140 with Type A filter or better. **Cleaning with high pressure washers PROC7** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Limit the substance content in the mixture to 25 %. Avoid carrying out activities involving exposure for more than 1 hour. OR Wear a respirator conforming to EN140 with Type A filter or better. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Manual Surfaces Cleaning PROC10** provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Limit the substance content in the mixture to 25 %. Avoid carrying out activities involving exposure for more than 1 hour. OR Wear a respirator conforming to EN140 with Type A filter or better. **Storage PROC1** No other specific measures identified.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 100 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 5000 kg / day Regional use tonnage (tonnes/year): 340 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM): 1 Release fraction to soil from process (initial release prior to RMM): 0 Release fraction to wastewater from process (initial release prior to RMM): 0.000003
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 70 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 14000000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.0003 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00035 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.

Section 1 Exposure Scenario Title	
Title:	
Lubricants - Industrial	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC10, PROC13, PROC17, PROC18, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC4, ERC7
Specific Environmental Release Category	ESVOC 4.6a.v1
Processes, tasks, activities covered	
Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC1** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. **General exposures (closed systems) PROC1** Handle substance within a closed system. **General exposures (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Handle substance within a closed system.	

General exposures (closed systems) PROC3 Ensure material transfers are under containment or extract ventilation. Handle substance within a closed system. **General exposures (open systems) PROC4** Ensure material transfers are under containment or extract ventilation. **Bulk transfers PROC8b** Ensure material transfers are under containment or extract ventilation. **Filling / preparation of equipment from drums or containers PROC8a** Use drum pumps or carefully pour from container. **Filling / preparation of equipment from drums or containers PROC8b** Use drum pumps or carefully pour from container. **Initial factory fill of equipment PROC9** Ensure material transfers are under containment or extract ventilation. **Operation and lubrication of high energy open equipment PROC17** Provide extract ventilation to points where emissions occur. **Operation and lubrication of high energy open equipment PROC18** Provide extract ventilation to points where emissions occur. **Roller application or brushing PROC10** Ensure material transfers are under containment or extract ventilation. **Treatment by dipping and pouring PROC13** Provide extract ventilation to points where emissions occur. **Spraying PROC7** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Maintenance (of larger plant items) and machine set up PROC8b** Drain down and flush system prior to equipment break-in or maintenance. **Maintenance (of larger plant items) and machine set up Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC8b** Drain down and flush system prior to equipment break-in or maintenance. **Maintenance of small items PROC8a** Provide extract ventilation to points where emissions occur. **Remanufacture of reject articles PROC9** Wear a respirator conforming to EN140 with Type A filter or better. **Storage PROC1** Store substance within a closed system. **Storage PROC2** Store substance within a closed system. Wear a respirator conforming to EN140 with Type A filter or better.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 12 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 600 kg / day Regional use tonnage (tonnes/year): 12 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
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): 0.00003
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 70 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 1400000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00000065 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00041 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.

Section 1 Exposure Scenario Title	
Title:	
Blowing agents	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC12, PROC2, PROC3, PROC8b, PROC9
Environmental Release Categories	ERC4
Specific Environmental Release Category	ESVOC 4.9.v1
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.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Bulk transfers PROC8b** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. Use dry break couplings for material transfer. Clear transfer lines prior to de-coupling. **Mixing operations (closed systems) PROC1** No other specific measures identified. **Extrusion and expansion of polymer mass PROC12**	

Provide extract ventilation to points where emissions occur. **Cutting and shaving PROC12** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Collection and re-processing of shavings, cuttings, etc PROC12** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Product packaging PROC12** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Storage PROC12** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Mixing operations (closed systems) Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC3** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Intermediate polymer storage Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC3** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Centrifuging including discharging Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC3** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Drying and storage PROC12** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Semi-bulk packaging PROC8b** Provide extract ventilation to points where emissions occur. **Treatment by heating Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC12** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Drying and storage PROC12** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Article formation in mould Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC12** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Cutting by heated wire Manual PROC12** Provide extract ventilation to points where emissions occur. **Mixing operations (closed systems) PROC3** Provide extract ventilation to points where emissions occur. **Drum and small package filling Filling / preparation of equipment from drums or containers PROC9** Ensure material transfers are under containment or extract ventilation. **Foaming PROC12** Provide extract ventilation to points where emissions occur. **Compression PROC12** Provide extract ventilation to points where emissions occur. **Cutting by heated wire PROC12** Provide extract ventilation to points where emissions occur.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount

Annual site tonnage (tonnes/year): 47 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 2300 kg / day Regional use tonnage (tonnes/year): 47 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 1 Release fraction to soil from process (initial release prior to RMM): 0 Release fraction to wastewater from process (initial release prior to RMM): 0.00003
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 1400000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet

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 Characterisation Ratio for Air Emissions [RCRair] 0.00047
Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.0016
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.

Section 1 Exposure Scenario Title	
Title:	
Use as a fuel - Industrial	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC7
Specific Environmental Release Category	ESVOC 7.12a.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC8b** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Bulk transfers PROC8b** Provide extract ventilation to points where emissions occur. Handle substance within a closed system. **Drum/batch transfers PROC8b** Use drum pumps or carefully pour from container. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **General exposures (closed systems) Use in contained batch processes PROC1** Handle substance within a closed system.	

General exposures (closed systems) Use in contained batch processes PROC2 Handle substance within a closed system. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **General exposures (closed systems) Use in contained batch processes PROC3** Ensure material transfers are under containment or extract ventilation. **General exposures (closed systems) PROC1** Handle substance within a closed system. **General exposures (closed systems) PROC2** Handle substance within a closed system. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Use as a fuel PROC16** Handle substance within a closed system. **Use as a fuel (closed systems) PROC3** Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation. **Equipment cleaning and maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** Store substance within a closed system. Provide extract ventilation to material transfer points and other openings.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 14 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 690 kg / day Regional use tonnage (tonnes/year): 14 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.05 Release fraction to soil from process (initial release prior to RMM): 0 Release fraction to wastewater from process (initial release prior to RMM): 0.00001
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 95 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 1600000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
Combustion emissions considered in regional exposure assessment [ETW2] Combustion emissions limited by required exhaust emission controls [ETW1]
Conditions and measures related to external recovery of waste
This substance is consumed during use and no waste of the substance is generated [ERW3]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00000063 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00016 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.

Section 1 Exposure Scenario Title	
Title:	
Functional Fluids - Industrial	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC7
Specific Environmental Release Category	ESVOC 7.13a.v1
Processes, tasks, activities covered	
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Bulk transfers (closed systems) PROC1** Transfer via enclosed lines **Bulk transfers (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Transfer via enclosed lines **Drum/batch transfers PROC8b** provide a good standard of controlled ventilation (10 to 15 air changes per hour).	

Avoid carrying out activities involving exposure for more than 1 hour. **Filling of articles/equipment (closed systems) PROC9** Provide extract ventilation to points where emissions occur. **Filling / preparation of equipment from drums or containers PROC8a** Provide extract ventilation to material transfer points and other openings. **General exposures (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **General exposures (open systems) PROC4** Provide extract ventilation to points where emissions occur. **General exposures (open systems) Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC4** Provide extract ventilation to points where emissions occur. Restrict area of openings to equipment. **Remanufacture of reject articles PROC9** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Equipment maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Store substance within a closed system.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 10 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 500 kg / day Regional use tonnage (tonnes/year): 610 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
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): 0.00003
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 1400000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.0000013 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00035 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.

Section 1 Exposure Scenario Title	
Title:	
Use in laboratories - Industrial	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC10, PROC15
Environmental Release Categories	ERC2, ERC4
Specific Environmental Release Category	
Processes, tasks, activities covered	
Use of the substance within laboratory settings, including material transfers and equipment cleaning.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Laboratory activities PROC15** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Carefully pour from containers. Put lids on containers immediately after use. **Cleaning PROC10** Handle in a fume cupboard or under extract ventilation.	
Section 2.2 Control of environmental exposure	
Product characteristics	
Predominantly hydrophobic.	

Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.1 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 5 kg / day Regional use tonnage (tonnes/year): 0.1 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
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): 0.02
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 2200 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]

4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00000032 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.0023 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.

Section 1 Exposure Scenario Title	
Title:	
Rubber production and processing	
Use Descriptor	
Sector(s) of Use	SU10
Process Categories	PROC1, PROC13, PROC14, PROC15, PROC2, PROC21, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC1, ERC4, ERC6D
Specific Environmental Release Category	ESVOC 4.19.v1
Processes, tasks, activities covered	
Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. **Material transfers (closed systems) PROC1** No other specific measures identified. **Material transfers (closed systems) PROC2** Avoid carrying out activities involving exposure for more than 1 hour.	

Material transfers PROC8b provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. **Bulk weighing PROC1** Handle substance within a closed system. **Bulk weighing PROC2** Avoid carrying out activities involving exposure for more than 1 hour. Handle substance within a closed system. **Small scale weighing PROC9** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. **Additive premixing PROC3** Avoid carrying out activities involving exposure for more than 1 hour. **Additive premixing PROC4** Avoid carrying out activities involving exposure for more than 1 hour. **Additive premixing PROC5** Ensure material transfers are under containment or extract ventilation. **Material transfers PROC8b** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Handle substance within a closed system. Avoid carrying out activities involving exposure for more than 1 hour. **Material transfers PROC9** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Handle substance within a closed system. Avoid carrying out activities involving exposure for more than 1 hour. **Calendering (including Banburys) Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC6** Minimise exposure by extracted full enclosure for the operation or equipment. **Pressing uncured rubber blanks PROC14** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Tyre build up PROC7** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Vulcanisation Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC6** Minimise exposure by extracted full enclosure for the operation or equipment. **Vulcanisation Operation is carried out at elevated temperature (> 20°C above ambient temperature). Manual PROC6** Minimise exposure by extracted full enclosure for the operation or equipment. **Cooling cured articles Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC6** Minimise exposure by extracted full enclosure for the operation or equipment. **Production of articles by dipping and pouring PROC13** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Finishing operations PROC21** No other specific measures identified. **Laboratory activities PROC15** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Equipment maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Store substance within a closed system.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic.

Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 79 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 4000 kg / day Regional use tonnage (tonnes/year): 79 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.01 Release fraction to soil from process (initial release prior to RMM): 0.0001 Release fraction to wastewater from process (initial release prior to RMM): 0.0003
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 140000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]

4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.0000082 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.027 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.

Section 1 Exposure Scenario Title	
Title:	
Polymer processing - Industrial	
Use Descriptor	
Sector(s) of Use	SU10, SU3
Process Categories	PROC1, PROC13, PROC14, PROC2, PROC21, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC4
Specific Environmental Release Category	ESVOC 4.21a.v1
Processes, tasks, activities covered	
Processing of formulated polymers including material transfers, additives handling (e.g. pigments, stabilisers, fillers, plasticisers, etc.), moulding, curing and forming activities, material re-works, storage and associated maintenance.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Bulk transfers (closed systems) PROC1** No other specific measures identified. **Bulk transfers (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Bulk transfers PROC8b** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour.	

Bulk weighing PROC1 No other specific measures identified. **Bulk weighing PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Handle substance within a closed system. **Small scale weighing PROC9** Ensure material transfers are under containment or extract ventilation. **Additive premixing PROC3** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Additive premixing PROC4** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Additive premixing Avoid carrying out activities involving exposure for more than 4 hours. PROC5** Ensure material transfers are under containment or extract ventilation. Avoid carrying out activities involving exposure for more than 4 hours. **Bulk transfers PROC8b** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. Transfer via enclosed lines Use dry break couplings for material transfer. **Bulk transfers PROC9** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. Transfer via enclosed lines Use dry break couplings for material transfer. **Calendering (including Banburys) Operation is carried out at elevated temperature (> 20°C above ambient temperature). PROC6** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Production of articles by dipping and pouring PROC13** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Extrusion and masterbatching PROC14** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Injection moulding of articles PROC14** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. **Finishing operations PROC21** No other specific measures identified. **Equipment maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 94 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 4700 kg / day Regional use tonnage (tonnes/year): 94 tons/yr

Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.5 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
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 80 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 17000000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.000095 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00012 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.

Section 1 Exposure Scenario Title	
Title:	
Mining chemicals	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9
Environmental Release Categories	ERC4
Specific Environmental Release Category	ESVOC 4.23.v1
Processes, tasks, activities covered	
Covers the use of the substance in extraction processes at mining operations, including material transfers, winning and separation activities, and substance recovery and disposal.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Bulk transfers PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Transfer via enclosed lines **Drum/batch transfers PROC8b** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Use drum pumps. Avoid carrying out activities involving exposure for more than 4 hours.	

Pouring from small containers PROC9 provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. **General exposures (closed systems) PROC3** Ensure samples are obtained under containment or extract ventilation. **General exposures (open systems) PROC5** Provide extract ventilation to points where emissions occur. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **phase separation (closed systems) PROC4** Provide extract ventilation to points where emissions occur. **ion exchange processes (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Process sampling PROC3** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Mixing operations (closed systems) PROC1** No other specific measures identified. **Equipment cleaning and maintenance PROC8a** Drain down and flush system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 47 tons/yr Continuous release. Emission Days (days/year): 20 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 2300 kg / day Regional use tonnage (tonnes/year): 47 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.25 Release fraction to soil from process (initial release prior to RMM): 0.05 Release fraction to wastewater from process (initial release prior to RMM): 0.5
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 96.3 % Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 80 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 99.9 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant

Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 2300 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 99.9 %
Conditions and measures related to external treatment of waste for disposal
Not applicable
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1] This substance is consumed during use and no waste of the substance is generated [ERW3]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.000029 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.91 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.

Section 1 Exposure Scenario Title	
Title:	
Use in Coatings - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC1, PROC10, PROC11, PROC13, PROC15, PROC19, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b
Environmental Release Categories	ERC8A, ERC8D
Specific Environmental Release Category	ESVOC 4.3a.v1 ,ESVOC 8.3b.v1
Processes, tasks, activities covered	
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation) and equipment cleaning, maintenance and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)	
General measures (skin irritants) Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. **General measures (Aspiration Hazard)** The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **GES03.02.00 G19 [HEXANE] PROC1** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin	

contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
General exposures (closed systems) PROC1
Handle substance within a closed system.
Filling / preparation of equipment from drums or containers Use in contained systems PROC2
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Handle substance within a closed system.
General exposures (closed systems) Use in contained systems PROC2
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Handle substance within a closed system.
Preparation of material for application Use in contained batch processes PROC3
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
or
Wear a respirator conforming to EN140 with Type A filter or better.
Film formation - air drying Outdoor. PROC4
Ensure operation is undertaken outdoors.
Avoid carrying out activities involving exposure for more than 1 hour.
Limit the substance content in the mixture to 50 %.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Ensure operation is undertaken outdoors.
Film formation - air drying Indoor PROC4
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
Limit the substance content in the mixture to 50 %.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Preparation of material for application Indoor PROC5
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Avoid carrying out activities involving exposure for more than 1 hour.
Limit the substance content in the mixture to 50 %.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Limit the substance content in the mixture to 50 %.
Preparation of material for application Outdoor. PROC5
Ensure operation is undertaken outdoors.
Wear a respirator conforming to EN140 with Type A filter or better.
Limit the substance content in the mixture to 50 %.
Material transfers Drum/batch transfers PROC8a
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Limit the substance content in the mixture to 25 %.
Use drum pumps.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Use drum pumps.
Material transfers Drum/batch transfers Dedicated facility PROC8b
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Avoid carrying out activities involving exposure for more than 1 hour.
or
Wear a respirator conforming to EN140 with Type A filter or better.
Roller, spreader, flow application Indoor PROC10
Limit the substance content in the mixture to 25 %.
provide a good standard of controlled ventilation (10 to 15 air changes per hour).

Avoid carrying out activities involving exposure for more than 1 hour. OR Wear a full face respirator conforming to EN140 with Type A filter or better. **Roller, spreader, flow application Outdoor. PROC10** Ensure operation is undertaken outdoors. Wear a respirator conforming to EN140 with Type A filter or better. Limit the substance content in the mixture to 50 %. **Manual Spraying Indoor PROC11** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better. Limit the substance content in the mixture to 50 %. **Manual Spraying Outdoor. PROC11** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours. Wear a respirator conforming to EN140 with Type A filter or better. Limit the substance content in the mixture to 50 %. **Dipping, immersion and pouring Indoor PROC13** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better. Avoid manual contact with wet work pieces. **Dipping, immersion and pouring Outdoor. PROC13** Ensure operation is undertaken outdoors. Wear a respirator conforming to EN140 with Type A filter or better. Avoid manual contact with wet work pieces. **Laboratory activities PROC15** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Hand application - finger paints, pastels, adhesives Indoor PROC19** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Wear a respirator conforming to EN140 with Type A filter or better. Limit the substance content in the mixture to 25 %. **Hand application - finger paints, pastels, adhesives Outdoor. PROC19** Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 4 hours. Wear a respirator conforming to EN140 with Type A filter or better.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.2 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 0.55 kg / day Regional use tonnage (tonnes/year): 400 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.98 Release fraction to soil from process (initial release prior to RMM): 0.01 Release fraction to wastewater from process (initial release prior to RMM): 0.01
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 1400 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00012 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00023 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.

Section 1 Exposure Scenario Title	
Title:	
Use in Cleaning Agents - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC1, PROC10, PROC11, PROC13, PROC19, PROC2, PROC3, PROC4, PROC8a, PROC8b
Environmental Release Categories	ERC8A, ERC8D
Specific Environmental Release Category	ESVOC 8.4b.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC8b** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. **Filling / preparation of equipment from drums or containers PROC8b** Limit the substance content in the mixture to 25 %. provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour.	

OR
Wear a respirator conforming to EN140 with Type A filter or better.
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Automated process with (semi) closed systems Use in contained systems PROC2
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Automated process with (semi) closed systems Drum/batch transfers Use in contained systems PROC3
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Semi-automated process (e.g.: Semi-automatic application of floor care and maintenance products) PROC4
Limit the substance content in the mixture to 25 %.
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 1 hour.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Filling / preparation of equipment from drums or containers PROC8a
Limit the substance content in the mixture to 5 %.
Ensure operation is undertaken outdoors.
Avoid carrying out activities involving exposure for more than 1 hour.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
Ensure operation is undertaken outdoors.
Avoid carrying out activities involving exposure for more than 4 hours.
Manual Surfaces Cleaning Dipping, immersion and pouring PROC13
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Limit the substance content in the mixture to 5 %.
Manual Surfaces Cleaning PROC13
Wear a respirator conforming to EN140 with Type A filter or better.
Cleaning with low-pressure washers Rolling, Brushing No spraying PROC10
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Limit the substance content in the mixture to 5 %.
Avoid carrying out activities involving exposure for more than 1 hour.
OR
Wear a respirator conforming to EN140 with Type A filter or better.
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
Cleaning with high pressure washers Spraying Indoor PROC11
Limit the substance content in the mixture to 5 %.
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Avoid carrying out activities involving exposure for more than 1 hour.
OR
Limit the substance content in the mixture to 5 %.
Wear a respirator conforming to EN140 with Type A filter or better.
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Cleaning with high pressure washers Spraying Outdoor. PROC11
Ensure operation is undertaken outdoors.
Limit the substance content in the mixture to 1 %.
Avoid carrying out activities involving exposure for more than 1 hour.
OR
Limit the substance content in the mixture to 5 %.
Wear a full face respirator conforming to EN140 with Type A filter or better.
Manual Surfaces Cleaning Spraying PROC10

Limit the substance content in the mixture to 5 %. provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Manual Surfaces Cleaning PROC10** Wear a respirator conforming to EN140 with Type A filter or better. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Ad hoc manual application via trigger sprays, dipping, etc. Rolling, Brushing PROC10** Provide extract ventilation to points where emissions occur. Avoid carrying out activities involving exposure for more than 1 hour. OR Provide extract ventilation to points where emissions occur. Wear a respirator conforming to EN140 with Type A filter or better. OR Limit the substance content in the mixture to 5 %. provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. OR Wear a respirator conforming to EN140 with Type A filter or better. provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Application of cleaning products in closed systems Outdoor. PROC4** Ensure operation is undertaken outdoors. Limit the substance content in the mixture to 5 %. Avoid carrying out activities involving exposure for more than 1 hour. OR Ensure operation is undertaken outdoors. Wear a respirator conforming to EN140 with Type A filter or better. Avoid carrying out activities involving exposure for more than 1 hour. **Cleaning of medical devices PROC4** Provide extract ventilation to points where emissions occur. Wear a respirator conforming to EN140 with Type A filter or better. **Storage PROC1** No other specific measures identified.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.11 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 0.31 kg / day Regional use tonnage (tonnes/year): 220 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.02 Release fraction to soil from process (initial release prior to RMM): 0 Release fraction to wastewater from process (initial release prior to RMM): 0.000001
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 1100 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00000029 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00012 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.

Section 1 Exposure Scenario Title	
Title:	
Agrochemical uses - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC1, PROC11, PROC13, PROC2, PROC4, PROC8a, PROC8b
Environmental Release Categories	ERC8A, ERC8D
Specific Environmental Release Category	ESVOC 8.11a.v1
Processes, tasks, activities covered	
Use as an agrochemical excipient for application by manual or machine spraying, smokes and fogging; including equipment clean-downs and disposal.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants)** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. **Transfer from/pouring from containers PROC8b** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. **Mixing operations (open systems) PROC4** Limit the substance content in the mixture to 25 %.	

Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. **Spraying/fogging by manual application PROC11** Ensure operation is undertaken outdoors. Wear a full face respirator conforming to EN140 with Type A filter or better. Avoid carrying out activities involving exposure for more than 4 hours. Wear suitable coveralls to prevent exposure to the skin. **Spraying/fogging by machine application PROC11** Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20. Limit the substance content in the mixture to 5 %. Avoid carrying out activities involving exposure for more than 4 hours. **Ad hoc manual application via trigger sprays, dipping, etc. PROC13** Limit the substance content in the mixture to 25 %. Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. **Equipment cleaning and maintenance PROC8a** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. Drain down system prior to equipment break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** Ensure material transfers are under containment or extract ventilation. Store substance within a closed system.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.67 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 1.8 kg / day Regional use tonnage (tonnes/year): 330 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.9 Release fraction to soil from process (initial release prior to RMM): 0.09 Release fraction to wastewater from process (initial release prior to RMM): 0.01
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils.

Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 4300 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.0004 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00042 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.

Section 1 Exposure Scenario Title	
Title:	
Use as a fuel - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC9A, ERC9B
Specific Environmental Release Category	ESVOC 9.12b.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC8b** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Bulk transfers PROC8b** Ensure operation is undertaken outdoors. Limit the substance content in the mixture to 5 %. Avoid carrying out activities involving exposure for more than 4 hours. Handle substance within a closed system. **Drum/batch transfers PROC8b** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour.	

refuelling PROC8b Ensure operation is undertaken outdoors. Limit the substance content in the mixture to 5 %. Avoid carrying out activities involving exposure for more than 4 hours. or Wear a respirator conforming to EN140 with Type A filter or better. **General exposures (closed systems) PROC1** Handle substance within a closed system. **General exposures (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Handle substance within a closed system. **General exposures (closed systems) (closed systems) PROC3** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Handle substance within a closed system. Limit the substance content in the mixture to 25 %. **Use as a fuel PROC16** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Handle substance within a closed system. **Equipment cleaning and maintenance PROC8a** Drain down system prior to equipment break-in or maintenance. Wear a respirator conforming to EN140 with Type A filter or better. **Storage PROC1** Store substance within a closed system.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.0014 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 0.0037 kg / day Regional use tonnage (tonnes/year): 2.7 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.01 Release fraction to soil from process (initial release prior to RMM): 0.00001 Release fraction to wastewater from process (initial release prior to RMM): 0.00001
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater.

Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 13 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
Combustion emissions considered in regional exposure assessment [ETW2] Combustion emissions limited by required exhaust emission controls [ETW1]
Conditions and measures related to external recovery of waste
This substance is consumed during use and no waste of the substance is generated [ERW3]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.00000028 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00012 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.

Section 1 Exposure Scenario Title	
Title:	
Functional Fluids - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC1, PROC2, PROC20, PROC3, PROC8a, PROC9
Environmental Release Categories	ERC9A, ERC9B
Specific Environmental Release Category	ESVOC 9.13b.v1
Processes, tasks, activities covered	
Use as functional fluids e.g. cable oils, transfer oils, insulators, refrigerants, hydraulic fluids in closed professional equipment including incidental exposures during maintenance and related material transfers.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC8a** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Drum/batch transfers PROC8a** Use drum pumps or carefully pour from container. provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Transfer from/pouring from containers PROC9** Use drum pumps or carefully pour from container. provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Filling / preparation of equipment from drums or containers PROC9**	

Use drum pumps or carefully pour from container. Avoid carrying out activities involving exposure for more than 1 hour. **General exposures (closed systems) PROC1** Handle substance within a closed system. **General exposures (closed systems) PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **General exposures (closed systems) PROC3** Ensure material transfers are under containment or extract ventilation. **Operation of equipment containing engine oils and similar PROC20** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Operation is carried out at elevated temperature (> 20°C above ambient temperature). Operation of equipment containing engine oils and similar PROC20** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Remanufacture of reject articles PROC9** Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Limit the substance content in the mixture to 25 %. Avoid carrying out activities involving exposure for more than 4 hours. **Equipment maintenance PROC8a** Drain down system prior to equipment break-in or maintenance. provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. **Storage PROC1** Store substance within a closed system. **Storage PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Store substance within a closed system.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.052 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 0.14 kg / day Regional use tonnage (tonnes/year): 100 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.05 Release fraction to soil from process (initial release prior to RMM): 0.025 Release fraction to wastewater from process (initial release prior to RMM): 0.025
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %

Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 410 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.000078 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00019 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.

Section 1 Exposure Scenario Title	
Title:	
Use in laboratories - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC10, PROC15
Environmental Release Categories	ERC8A
Specific Environmental Release Category	ESVOC 8.17.v1
Processes, tasks, activities covered	
Use of small quantities within laboratory settings, including material transfers and equipment cleaning.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC15** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Laboratory activities PROC15** provide a good standard of controlled ventilation (10 to 15 air changes per hour). **Cleaning PROC10** Handle in a fume cupboard or under extract ventilation. Avoid carrying out activities involving exposure for more than 1 hour.	
Section 2.2 Control of environmental exposure	
Product characteristics	
Predominantly hydrophobic. Substance is complex UVCB.	

Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.00005 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 0.00014 kg / day Regional use tonnage (tonnes/year): 0.1 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.5 Release fraction to soil from process (initial release prior to RMM): 0 Release fraction to wastewater from process (initial release prior to RMM): 0.5
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 0.49 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment

Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.0000018 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00012 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.

Section 1 Exposure Scenario Title	
Title:	
Polymer processing - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC1, PROC14, PROC2, PROC21, PROC6, PROC8a, PROC8b
Environmental Release Categories	ERC8A, ERC8D
Specific Environmental Release Category	ESVOC 8.21b.v1
Processes, tasks, activities covered	
Processing of formulated polymers including material transfers, moulding and forming activities, material re-works and associated maintenance.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ **Specific Risk Management Measures and Operating Conditions** (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)** Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice. **General measures (skin irritants) PROC1** Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **Bulk transfers (closed systems) PROC1** Handle substance within a closed system. **Bulk transfers (closed systems) PROC2** Handle substance within a closed system. Avoid carrying out activities involving exposure for more than 1 hour. **Material transfers PROC8b** Provide extract ventilation to material transfer points and other openings.	

Injection moulding of articles PROC6 Minimise exposure by extracted full enclosure for the operation or equipment. Limit the substance content in the mixture to 5 %. **Injection moulding of articles PROC14** Minimise exposure by extracted full enclosure for the operation or equipment. Limit the substance content in the mixture to 5 %. **Rework of articles PROC21** No other specific measures identified. **Equipment maintenance PROC8a** Avoid carrying out activities involving exposure for more than 1 hour. Drain or remove substance from equipment prior to break-in or maintenance. **Storage PROC1** Store substance within a closed system. **Storage PROC2** provide a good standard of controlled ventilation (10 to 15 air changes per hour). Store substance within a closed system.
Section 2.2 Control of environmental exposure
Product characteristics
Predominantly hydrophobic. Substance is complex UVCB.
Duration, frequency and amount
Annual site tonnage (tonnes/year): 0.013 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 1 Maximum daily site tonnage (kg/d): 0.036 kg / day Regional use tonnage (tonnes/year): 27 tons/yr
Environmental factors not influenced by risk management
Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.98 Release fraction to soil from process (initial release prior to RMM): 0.01 Release fraction to wastewater from process (initial release prior to RMM): 0.01
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % No secondary wastewater treatment required. Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 0 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 96.2 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 130 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 96.2 %

Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]
Conditions and measures related to external recovery of waste
External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet 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 Characterisation Ratio for Air Emissions [RCRair] 0.000008 Maximum Risk Characterisation Ratio for Wastewater Emissions [RCRwater] 0.00013 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.