
Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

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

1.1. Product identifier

- Trade name: **ATMOSPHERIC RESIDUE**
- Chemical name: Residues (petroleum), atmospheric
- Index no.: 649-019-00-1
- EC no.: 269-777-3
- CAS no.: 68333-22-2
- Registration No.: 01-2119485969-10-0035
- Product code: 1000697

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

- Relevant identified uses: **Industrial:** Manufacture of Substances, Distribution of Substances, Use as intermediate, Use as a fuel
Professional: Use as a fuel
- Uses advised against: The uses that are in the list above are relevant.
Other uses are not recommended unless an assessment that proves that the related risks are controlled has been conducted before starting that use.

1.3. Details of the supplier of the safety data sheet

- Manufacturer/supplier: **INA-Industrija nafte, d.d.**

Address: Av. Većeslava Holjevcica 10
pp 555, 10002 Zagreb, HRVATSKA

Phone: 00-385-1-6450-842 / 00-385-1-6451-075 (24 h)

Fax: 00-385-1-6452-050

e-mail:

sds@ina.hr

- Responsible person:

Mirela Mavrinac, B.Sc.
Hrvoje Raukar, B.Sc.

SD & HSE

Tel. 00-385-1-6450-803

1.4. Emergency Telephone Number

- Emergency Service Telephone Number: **112**
National Protection and Rescue Directorate 00-385-1-3650-011
Nehajska 5, 10000 Zagreb 00-385-1-3650-084
e-mail: info@duzs.hr 00-385-1-3650-082
00-385-1-3650-083
- Medical Information Telephone Number: **00-385-1-23-48-342**

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EC) No 1272/2008 (CLP/GHS):

Ac. Tox. 4; H332

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Repr. 2; H361d
 Carc. 1B; H350
 STOT RE2; H373 (blood, thymus, liver)
 Aquatic. Acute 1; H400
 Aquatic. Chronic 1; H410
 Full text of H-phrases: see section 16.

2.2. Label elements

2.2.1. Labelling according to Regulation (EC) No 1272/2008 (CLP/GHS)

Hazard pictograms:



GHS07



GHS08



GHS09

Signal word: Danger

Hazard statements (H):	H332	Harmful if inhaled.
	H350	May cause cancer (skin, inhalation).
Precautionary statements (P):	H361d	Suspected of damaging fertility or the unborn child.
	H373	May cause damage to organs through prolonged or repeated exposure (blood, thymus, liver).
	H410	Very toxic to aquatic life with long lasting effects.
	EUH 066	Repeated exposure may cause skin dryness or cracking.
	P201	Obtain special instructions before use.
	P260	Do not breathe dust/fume/ gas/mist/vapours/spray.
	P273	Avoid release to the environment.
	P280	Wear protective gloves/ protective clothing/eye protection/face protection.
	P308+	IF exposed or concerned: Get medical advice/attention.
	P313	

2.3. Other hazards

The product does not meet the criteria for PBT or vPvB classification in Annex XIII of REACH.

3. COMPOSITION / INFORMATION ON INGREDIENTS			
-Substance:	X	Mixture:	
- Components contributing to product hazardoussness:			
Substance name	Substance identification	[%]	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

	CAS no.	EC no.	Registration no. (REACH)		Classification according to Regulation (EC) No 1272/2008 (CLP/GHS)
Residues (petroleum), atmospheric	68333-22-2	269-777-3	01-2119485969-10-0035	100	Ac. Tox. 4; H332 Repr 2; H361 Carc. 1B H350 STOT RE2; H373 (blood, liver, thymus) Aquatic. Acute.1; H400 Aquatic. Chronic.1; H410

4. FIRST AID MEASURES

4.1 Description of first aid measures

- general information: In case of ingestion, always assume aspiration into the lungs has occurred, accompanied by the pulmonary oedema hazard. Show the label on the packaging or the SDS.
- after inhalation: Remove the person from dangerous area to fresh air.
In case of headache, dizziness, nausea and permanent complaints immediately seek medical attention.
In case of fainting transport in lateral position to hospital, paying attention to the free passing of the air thorough the respiratory tract.
In case of difficulty in breathing or respiratory arrest, open airways, initiate resuscitation (heart massage and artificial respiration) and immediately seek medical attention.
- after skin contact: Take the soaked clothing and footwear off in a safe manner. Rinse thoroughly the places of contact with water and soap for 10-15 minutes.
In case of irritation, swelling or redness immediately seek medical assistance.
- after eye contact: Remove contact lenses and flush the eyes with running water for at least 15 minutes. In case of irritation, blurred vision and swelling immediately seek medical attention.
- after ingestion: Do NOT induce vomiting! Do not give anything by mouth. Always assume aspiration into the lungs has occurred. If vomiting occurs, keep the head below the level of hips in order to prevent penetration into the lungs. Immediately seek medical attention.

4.2 Most important symptoms and effects, both acute and delayed

- after inhalation: Long-term inhalation of vapours causes a sense of intoxication, headache, urge to vomiting, fainting.
- after skin contact: Repeated exposure may cause skin dryness or cracking.
- after eye contact: No data available.
- after ingestion: It can cause nausea or headache. May cause lung damage if swallowed.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically. Only qualified medical personnel should administer oxygen.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

- SUITABLE: Heavy air foam, dry powder, CO₂, water mist.
- UNSUITABLE: Water jet.

- Firefighting measures for special hazards: Remove all ignition sources, if required call firemen. Particularly take into account that there is a risk of creating an explosive mixture with air at temperatures exceeding the flash point temperature.

- Special firefighting measures: Use of water mist and spray for cooling the surfaces exposed to heat and for protection of persons. Only those trained in fire-fighting/fire protection may use water spray (dispersed water).

- Special fire fighter protective equipment: Wear protective clothing for firefighters (intervention suit) in accordance with HRN EN 469 and a self-contained open-circuit compressed air breathing apparatus in accordance with HRN EN 137.

5.2 Special hazards arising from the substance or mixture: Vapours, as heavier than air, remain close to the ground and in recesses; they may spread further from the place of accident, causing explosion and fire.

5.3 Advice for firefighters: No data.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures: Display a visible sign prohibiting entrance, use of open flame and sparking devices. Eliminate all sources of ignition. Measure the concentration of fumes in the air, in compliance with regulations. Do not inhale vapours, evaporation. Do not smoke. Stand upwind of the spill site. Use personal protection equipment listed in Section 8.

6.2 Environmental precautions: Define the risk area and prevent discharging and spilling into watercourses, canals, drainage systems and soil by digging out a protective ditch, fencing it with bags filled with dry sand, earth or clay. Provide good ventilation of the area. In case of major leaks notify the Emergency Service by dialling 112.

6.3 Methods for cleaning-up and recovery: Pump the product from the damaged tank into an empty tank - container with the pump designed for use in a potentially explosive atmosphere. Absorb the remainders with absorbents (sand or other inert material). Store the waste material and contaminated surface layer of soil that was removed in tightly closed containers in well-ventilated premises until disposal. Hand over for disposal to legal entities for hazardous waste disposal, authorised by the Ministry in charge of environmental protection.

- Additional warnings: Prevent release into the soil, waterways and air.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

6.4 Reference to other sections: See sections 8 and 13.

7. HANDLING AND STORAGE

- Handling

7.1 Precautions for safe handling

7.1.1 Safe handling advice: Re-loading i.e. unloading/loading shall be performed at the sites designed for the purpose, ensuring the air ventilation/outlet. Use the equipment and devices in good working order. Do not use sparking tools. Equipment shall be grounded and appropriate protective measures shall be taken against static electricity: grounding, air ionization, use of antistatic material, maintaining air humidity above 65%, bypassing the static electricity through electric influence.

7.1.2 Advice on general occupational hygiene: Do not smoke, eat or drink in a room where this product is handled. It is mandatory to wear prescribed work suit, rubber boots, protective gloves and goggles. Personal clothing should be kept separately from work clothing and work place. Heavily soiled, soaked or torn clothing should be immediately replaced.

7.2 Conditions for safe storage, including any incompatibilities

- SUITABLE: Store in tightly closed containers, properly built and equipped where adequate temperature is provided and ensure good ventilation of the area. Take preventive measures against electrostatic charge. Make sure that receiving tank farms are below self-supporting tanks.

- TO BE AVOIDED: Avoid storing with other chemicals, especially flammable ones. Do not use tools or devices that produce a spark or a flame. Do not use sparking tools or equipment in storage area.

- Packaging materials

- RECOMMENDED: Original as made by the tank/container manufacturer with valid certification.

- NOT SUITABLE: Any other.

7.3 Specific end use(s): None.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Hazardous substance (CAS No.)	Occupational exposure limit values/short term values (OEL/STEL)		Biological limit values
	ppm	mg/m ³	
Naphthas	100/-	400/-	-

- **Monitoring procedures:** No data available.

8.2. Exposure controls

- **Summary of risk management measures:** Make sure work areas are well-ventilated.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

8.2.1 Occupational exposure controls

- Description of operating procedure and technological control:

Make sure work areas are well-ventilated. Provide a decontamination sprayer for the eyes and face. Adopt personal hygiene measures: wash the hands after contact with the fuel, especially before eating, drinking and/or smoking. Regularly maintain and wash the clothing and equipment after use to remove dirt. Properly dispose of the contaminated clothing and equipment. Maintain cleanliness in accordance with good practice. Educate the employees on the hazards and control measures. Test and maintain the equipment used when handling the fuel: for example, personal protective equipment and ventilation system. Do not swallow. If swallowed, seek medical attention.

8.2.2 Personal protective equipment

- respiratory tract protection: In the presence of vapours use self-contained open circuit compressed air breathing apparatus (HRN EN 137).
- hand protection: Wear gloves resistant to organic solvents: PVA (polyvinyl alcohol) Teflon, Viton (HRN EN 374). DO NOT use rubber gloves!
- eye protection: Protective goggles or a visor at lower concentrations (HRN EN 166), protective mask at higher concentrations.
- skin and body protection: Use chemical resistant gloves, clothing and apron (where there is a risk of splashing).
- **Special hygienic and safety precautions:** Maintain the prescribed hygiene standards for working with hazardous substances. Remove contaminated clothing and footwear. Do not smoke, eat, and drink when handling the product. Wash hands before breaks and at the end of work.

8.2.3 Environmental exposure controls

- **Summary of risk management measures:** No data available.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

- state: Liquid
- colour: Brown-black
- odour: Characteristic for hydrocarbons
- odour threshold: No data available.
- pH value (indicate conc. and temp.): Not applicable.
- Melting point/freezing point: °C < 30
- boiling point/boiling range: °C 150 – 750 (from literature)
- flash point: °C ≥ 90
- Evaporation rate: No data available.
- flammability (solid, gas): No data available.
- explosive limits: vol. % No data available.
- vapour pressure at 120°C: kPa 0,02 – 0,79 (from literature)
- vapour density at 15°C: kg/m³ 900 - 1100.
- relative density: No data available.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

- density at 15°C:	kg/m ³	840 – 1100
- solubility (indicate solvent):	g/L	No data available.
- Solubility in water:	g/L	Insoluble.
- partition coefficient n-octanol / water	logPow	Not applicable.
- auto ignition temperature:	°C	220 - 550 (from literature)
- disintegration temperature:	°C	No data available.
- viscosity (kinematic) at 100 °C:	mm ² /s	18 – 40
- oxidizing properties:		Not applicable.
- conductivity:	pS/m	No data available.

9.2 Other information:

10. STABILITY AND REACTIVITY

10.1 Reactivity:	Stable under recommended conditions of storage and use.
10.2 Chemical stability:	Stable under recommended conditions of storage and use.
10.3 Possibility of hazardous reactions:	Potentially hazardous reactions are not known.
10.4 Conditions to avoid:	Sources of heat, flame, spark.
10.5 Incompatible materials:	Strong oxidants, strong alkalis and acids.
10.6 Hazardous decomposition products:	None in standard operating conditions and in proper storage; however thermal decomposition may generate harmful gases including carbon-monoxide (CO).

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

- Acute toxicity

- oral (LD ₅₀):	> 5000 mg/kg body mass (rat).
- inhalation (LC ₅₀):	4,1 mg/L (rat).
- dermal (LD ₅₀):	> 2000 mg/kg body mass (rabbit).

- Irritation/Corrosion

- skin:	Repeated exposure may cause skin dryness or cracking (EUH066).
- eyes:	It does not causes eye irritation (tested on rabbit).
- respiratory tract:	Harmful if inhaled (H332).

- Sensitisation

- skin:	It does not cause hypersensitivity.
- respiratory tract:	Long-term inhalation of vapours may cause dizziness.

- Aspiration hazard:

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

- Other classic effects: (e.g. unconsciousness, particularly toxic metabolites, etc.):	Long-term inhalation of vapours causes a sense of intoxication, headache, urge to vomiting, fainting.
- Permanent effects due to acute or chronic exposure:	No data available.
- Special effects	
- mutagenicity:	No data available.
- carcinogenicity:	May cause cancer (H350).
- fertility decrease:	No data available.
- harmful effect on unborn child:	No data available.
- toxicity to reproduction:	Suspected of damaging the unborn child (H361d).
- other (e.g. endocrine disruptors):	No data available.
- STOT (SE):	No data available.
- STOT (RE):	May cause damage to blood, thymus and liver through prolonged or repeated exposure. (H373)
- Prohibitions and restrictions:	No data available.
- Other:	No data available.

12. ECOLOGICAL INFORMATION

12.1. Toxicity

- to aquatic organisms:	EL ₅₀ =0,2 mg/l (invertebrates), ErL ₅₀ =0,32 mg/l (algae), LL ₅₀ =79 mg/l (fish)
- to ground organisms:	No data available.
- to plants and land animals:	No data available.

12.2. Persistence and degradability

- biodegradation:	No data available.
- other degradation processes:	No data available.
- degradation in wastewater:	Very toxic to aquatic life with long lasting effects.

12.3. Bioaccumulative potential

- bio-concentration factor (BCF):	No data available.
-----------------------------------	--------------------

12.4. Mobility in soil

Method: No data available.

- Known or predicted distribution in environmental compartments:	No data available.
- surface tension:	No data available.
- absorption/desorption:	No data available.
- other physical and chemical properties:	See Section 9.

12.5. Results of PBT and vPvB assessment

- data from chemical safety report:	Product does not fulfil PBT and vPvB criteria for classification defined by Annex XIII of REACH Regulation.
-------------------------------------	---

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

12.6. Other adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Waste shall be handed over to the person authorised for waste collection, disposal or recovery. If possible, the waste shall be recovered.

- Waste codes: 13 07 03*

- Waste from residues: There is no classic waste from this product, except in case of unintentional release. For such cases see Section 6.

- Contaminated packaging: Not applicable.

- Relevant provisions: Act on Sustainable Waste Management, Regulation on waste catalogue, Regulation on waste management.

14. TRANSPORT INFORMATION

14.1 UN number: **3082**

14.2 UN proper shipping name: SUBSTANCES HAZARDOUS FOR THE ENVIRONMENT, LIQUIDS, N.O.S. (ATMOSPHERIC DISTILLATION RESIDUE)

14.3 Transport hazard class(es)

ADR/RID/ADN/ICAO/IATA: 9

IMDG: 9

14.4 Packing group

ADR/RID/ADN/IMDG/ICAO/IATA: III

14.5 Environmental hazards

ADR, RID, ADN, ICAO/IATA: yes

IMDG: yes, marine pollutant

14.6 Special precautions for user

ADR	RID
Transport category: 3	Transport category: 3
Vehicle for tank carriage: AT	Tank code: LGBV
Tank code: LGBV	Label: 9
Tunnel restriction code: -	Classification code: M6
Label: 9	Hazard identification: 90
Classification code: M6	Special provisions: 274,335,601,W12,CW13, CW31
Hazard identification: 90	
Special provisions: 274,335,375,601,CW13	
ADN	IMDG

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Label: 9	Subsidiary risk: yes, marine pollutant
Additional requirements/Remarks: 40	Group of the cargo: A
Dangers: 9+ CMR (N1, N2, F or S)	Special provisions: 274, 335, 969, TP2,TP29
Equipment required: PP	EmS: F-A, S-F
Classification code: M6	Segregation group: A
Carriage permitted: T	
Type of tank vessel: N/3	
Anti-explosion protection required: no	
Maximum degree of filling in %: 97	

ICAO

Label: 9 + designation "Hazardous for the environment"

Cargo IMP code: RMD

Passenger and cargo aircraft: LQ- 30KG G (PI Y964); 450L (PI 964)

Cargo aircraft only: 450L (PI 964)

ERG code: 9L

14.7 Transport in bulk condition according to MARPOL Convention, Annex II and IBC Codex

Trade name:	Not applicable
Pollution category (according to MARPOL, Annex II):	Not applicable
Vessel type (according to IBC Code):	Not applicable
Special and operative requirements (according to IBC Code):	Not applicable

15. REGULATORY INFORMATION

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

- Applicable EU regulations:

EU Regulation No. 1906/2007 and No. 1272/2008 of the European Parliament and the Council; Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH); EU Regulation No. 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer; EU Regulation No 689/2008 of the European Parliament and of the Council of 17 June 2008 concerning the export and import of dangerous chemicals; EU Regulation No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants; Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

- Applicable national regulations: Chemicals Act; Regulation on workers protection to dangerous chemicals exposure during work, exposure limit values and biological limit values; Act on Sustainable Waste Management, Regulation on Waste Catalogue, Regulation on waste management

- Authorization information: -

- Restriction information: -

- Chemical Safety Assessment carried out (CSA): YES X NO

16. OTHER INFORMATION

Revision indicators

Section: **Subject of change:**

Completely revised version with changes in almost all sections.

Full text of H- phrases, EUH- and P-phrases

H332	Harmful if inhaled.
H350	May cause cancer (of the skin, when inhaled).
H361d	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure (blood, thymus, liver).
H410	Very toxic to aquatic life with long lasting effects.
EUH 066	Repeated exposure may cause skin dryness or cracking.
P201	Obtain special instructions before use.
P260	Do not breathe dust/fume/ gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection
P308+P313	IF exposed or concerned: Get medical advice/attention

Abbreviations and acronyms:

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS number	Chemical Abstract Service number
CLP	Classification, Labelling and Packaging of substances and mixtures
CSA	Chemical Safety Assessment
CSR	Chemical Safety Report
EC number	European Community number for identification of chemical substances commercially available in the EU
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

IMDG	International Maritime Dangerous Goods Code transport
LC50	Lethal concentration for 50% of tested organisms
LD50	Lethal concentration for 50% of tested organisms (medium lethal concentration)
OIN	Oil industry notes
PBT	Persistent, bioaccumulative and toxic
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
STOT (SE)	Specific Target Organ Toxicity (Single Exposure)
STOT (RE)	Specific Target Organ Toxicity (Repeated Exposure)
UVCB	Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials
vPvB	Very persistent and very bioaccumulative

Statement:

This SDS is in compliance with the EU Regulation No. 1907/2006 and No. 1272/2008 of the European Parliament and the Council. It contains important user health and safety and environmental protection information. The information provided herein is not a substitute for any specification of quality and should not be deemed as a guarantee of the adequacy and applicability of this product for any purpose whatsoever. All information provided herein is based on our current knowledge and compliant with applicable legal regulations. The user is responsible for adherence to relevant legal regulations.

Data source:

1. www.hzt.hr
2. <http://echa.europa.eu/hr>
3. Hazard classification and labelling of petroleum substances in the EEA, Concawe 2017.
4. Handbook – Identified Uses of Petroleum Substances, Concawe, July 2018

APPENDIX: EXPOSURE SCENARIOS ACCORDING TO CHEMICAL SAFETY REPORT

Product

ATMOSPHERIC RESIDUE

Date: 2018/11/30

Edition: 4

9.1 Identified Use Description and Exposure Scenario Number Key

IU	Category	Identified use name	Sector	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article category (AC)	Specific Environmental Release Category (SpERC)
1	Heavy fuel oils	01 – Manufacture of substances	Industrial	3, 8, 9	NA	1, 2, 3, 8a, 8b, 15	1	NA	ESVOC SpERC 1.1.v1
2	Heavy fuel oils	01b – Use of substance as intermediate	Industrial	8, 9	NA	1, 2, 3, 8a, 8b, 15	6a	NA	ESVOC SpERC 6.1a.v1
3	Heavy fuel oils	01a – Distribution of substances	Industrial	3	NA	1, 2, 3, 8a, 8b, 15	4, 5, 6a, 6b, 6c, 6d, 7	NA	ESVOC SpERC 1.1b.v1
15	Heavy fuel oils	12a – Use as a fuel: Industrial	Industrial	3	NA	1, 2, 3, 8a, 8b, 16	7	NA	ESVOC SpERC 7.12a.v1
16	Heavy fuel oils	12b – Use as a fuel: Professional	Professional		NA	1, 2, 3, 8a, 8b, 16	9a, 9b	NA	ESVOC SpERC 9.12b.v1

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

1. Manufacturing of atmospheric residue – Industrial

Section 1 Exposure scenario title: Atmospheric residue (viscosity > 20.5 mm²/s at 40°C)	
Title	
01 - Manufacture of substance	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	1
Specific Environmental Release Category	ESVOC SpERC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance. Includes material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). OC7. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
General measures (carcinogens) G18	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20
CS15 General exposures (closed systems).	Handle substance within a closed system E47. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

CS2 Process sampling. +OC9 Outdoor	Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 15 minutes OC26. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS85 Bulk product storage.	Store substance within a closed system E84. Avoid carrying out activities involving exposure for more than 4 hours OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure E12. Wear suitable gloves tested to EN374 PPE15.
CS510 Marine vessel/barge (un)loading	Avoid carrying out activities involving exposure for more than 4 hours OC28. Transfer via enclosed lines E52. Clear transfer lines prior to de-coupling E39. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENVT4. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS511 Road tanker/Railcar loading	Ensure material transfers are under containment or extract ventilation E66. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance E55. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENVT4.
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [PrC3] Predominantly hydrophobic. [PrC4a]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	8,3E+05
Fraction of Regional tonnage used locally	5,4E+00
Annual site tonnage (tonnes/year)	4,5E+06
Maximum daily site tonnage (kg/day)	1,5E+07
Frequency and duration of use	
Continuous release. [FD2]	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1,0E-04
Release fraction to wastewater from process (initial release prior to RMM)	1,0E-06
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Common practices vary across sites thus conservative process release estimates used. [TCS1]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). [TCR1j]	
Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	9,0E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	85,7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [OMS2] Sludge should be incinerated, contained or reclaimed. [OMS3]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [STP1]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,0
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,0E+07
Assumed domestic sewage treatment plant flow (m3/d)	1,0E+04
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 exposure with the PETRORISK model. [EE2]	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. G33. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

4.2. Environment

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. [DSU1] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [DSU2] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [DSU3] Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). [DSU4]

Maximum Risk Characterisation Ratio for Air Emissions RCR _{air}	5,4E-01
--	---------

Maximum Risk Characterisation Ratio for Wastewater Emissions RCR _{water}	4,2E-01
---	---------

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

2. Use of atmospheric residue as intermediate – Industrial

Section 1 Exposure scenario title: Atmospheric residue (viscosity > 20.5 mm²/s at 40°C)	
Title	
01b - Use of substance as intermediate	
Use Descriptor	
Sector(s) of Use	8, 9
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	6a
Specific Environmental Release Category	ESVOC SpERC 6.1a.v1
Processes, tasks, activities covered	
Use of substance as an intermediate. Includes material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). OC7. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
General measures (carcinogens) G18	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20
CS15 General exposures (closed systems).	Handle substance within a closed system E47. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

CS15 General exposures (closed systems). + CS2 Process sampling. +OC9 Outdoor	Handle substance within a closed system E47. Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 15 minutes OC26. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS85 Bulk product storage.	Store substance within a closed system E84. Avoid carrying out activities involving exposure for more than 4 hours OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure E12. Wear suitable gloves tested to EN374 PPE15.
CS510 Marine vessel/barge (un)loading	Avoid carrying out activities involving exposure for more than 4 hours OC28. Transfer via enclosed lines E52. Clear transfer lines prior to de-coupling E39. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENV4. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS511 Road tanker/Railcar loading	Avoid carrying out activities involving exposure for more than 1 hour OC27, or: G9 Ensure material transfers are under containment or extract ventilation E66. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance E55. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENV4.
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [PrC3] Predominantly hydrophobic. [PrC4a]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	7,6E+05
Fraction of Regional tonnage used locally	2,0E-02
Annual site tonnage (tonnes/year)	1,5E+04
Maximum daily site tonnage (kg/day)	5,0E+04
Frequency and duration of use	
Continuous release. [FD2]	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1,0E-04

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Release fraction to wastewater from process (initial release prior to RMM)	1,3E-04
Release fraction to soil from process (initial release prior to RMM)	0.001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used. [TCS1]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment. [TCR1b]	
Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	8,0E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	93,4
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [OMS2] Sludge should be incinerated, contained or reclaimed. [OMS3]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [STP1]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,0
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5,5E+04
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03
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 exposure with the PETRORISK model. [EE2]	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. G33. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.

4.2. Environment

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. [DSU1] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [DSU2] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [DSU3] Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). [DSU4]

Maximum Risk Characterisation Ratio for Air Emissions RCR _{air}	4,3E-03
--	---------

Maximum Risk Characterisation Ratio for Wastewater Emissions RCR _{water}	9,1E-01
---	---------

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

3. Distribution of atmospheric residue – Industrial

Section 1 Exposure scenario title: Atmospheric residue (viscosity > 20.5 mm²/s at 40°C)	
Title	
01a - Distribution of substance	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	4, 5, 6a, 6b, 6c, 6d, 7
Specific Environmental Release Category	ESVOC SpERC 1.1b.v1
Processes, tasks, activities covered	
Bulk 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, and associated laboratory activities. Excludes emissions during transport.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20oC above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
General measures (carcinogens) G18	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20
CS2 Process sampling. + OC9 Outdoor	Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 15 minutes OC26. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

CS15 General exposures (closed systems).	Handle substance within a closed system E47. Avoid carrying out activities involving exposure for more than 4 hours OC28. Sample via a closed loop or other system to avoid exposure E8. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS85 Bulk product storage.	Store substance within a closed system E84. Avoid carrying out activities involving exposure for more than 4 hours OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS137 Product sampling	Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 15 minutes OC26. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure E12. Wear suitable gloves tested to EN374 PPE15.
CS510_Marine vessel/barge (un)loading	Avoid carrying out activities involving exposure for more than 4 hours OC28. Transfer via enclosed lines E52. Clear transfer lines prior to de-coupling E39. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENVT4. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS511 Road tanker/Railcar loading	Ensure material transfers are under containment or extract ventilation E66. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance E55. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENVT4.
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [PrC3] Predominantly hydrophobic. [PrC4a]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	1,4E+06
Fraction of Regional tonnage used locally	2,0E-03
Annual site tonnage (tonnes/year)	2,8E+03
Maximum daily site tonnage (kg/day)	2,8E+04
Frequency and duration of use	
Continuous release. [FD2]	
Emission days (days/year)	100
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1,0E-04

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Release fraction to wastewater from process (initial release prior to RMM)	8,4E-06
Release fraction to soil 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. [TCS1]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). [TCR1j]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	9,0E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	85,8
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [OMS2] Sludge should be incinerated, contained or reclaimed. [OMS3]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [STP1]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,0
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6,5E+04
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03
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 and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

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 exposure with the PETRORISK model. [EE2]	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. G33. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
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. [DSU1] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [DSU2] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [DSU3] Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [DSU4]	
Maximum Risk Characterisation Ratio for Air Emissions RCR _{air}	3,9E-03
Maximum Risk Characterisation Ratio for Wastewater Emissions RCR _{water}	4,2E-01

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

4. Use of atmospheric residue as a fuel – Industrial

Section 1 Exposure scenario title: Atmospheric residue (viscosity > 20.5 mm²/s at 40°C)	
Title	
12a - Use as a fuel: Industrial	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	7
Specific Environmental Release Category	ESVOC SpERC 7.12a.v1
Processes, tasks, activities covered	
Covers the use as a fuel or in fuels (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20oC above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
General measures (carcinogens) G18	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20
CS15 General exposures (closed systems).	Handle substance within a closed system E47. Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 4 hours OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

CS15 General exposures (closed systems). + CS137 Product sampling.	Handle substance within a closed system E47. Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 1 hour OC27. Provide a good standard of controlled ventilation (10 to 15 air changes per hour) E40. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS502 Bulk closed unloading + OC9 Outdoor	Transfer via enclosed lines E52. Avoid carrying out activities involving exposure for more than 4 hours OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation E66. , or (G9): Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11. Avoid carrying out activities involving exposure for more than 1 hour OC27. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS 117 Operation of solids filtering equipment	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11. Avoid carrying out activities involving exposure for more than 4 hours OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS85 Bulk product storage.	Store substance within a closed system E84. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11. Avoid carrying out activities involving exposure for more than 4 hours OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
GEST_12I Use as a fuel. CS 107 (closed system)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance E55. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENV4.
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [PrC3] Predominantly hydrophobic. [PrC4a]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	5,0E+05
Fraction of Regional tonnage used locally	1,0E+00
Annual site tonnage (tonnes/year)	5,0E+05
Maximum daily site tonnage (kg/day)	1,7E+06
Frequency and duration of use	
Continuous release. [FD2]	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Release fraction to air from process (initial release prior to RMM)	2,0E-03
Release fraction to wastewater from process (initial release prior to RMM)	3,9E-06
Release fraction to soil 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. [TCS1]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment. [TCR1b]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	9,5E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	93,4
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [OMS2] Sludge should be incinerated, contained or reclaimed. [OMS3]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [STP1]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,0
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,8E+06
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. [ETW1] Combustion emissions considered in regional exposure assessment. [ETW2] 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	
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.	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model. [EE2]

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. G33. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.

4.2. Environment

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. [DSU1] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [DSU2] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [DSU3] Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). [DSU4]

Maximum Risk Characterisation Ratio for Air Emissions RCR_{air}

6,6E-01

Maximum Risk Characterisation Ratio for Wastewater Emissions RCR_{water}

9,1E-01

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

5. Use of atmospheric residue as a fuel – Professional

Section 1 Exposure scenario title: Atmospheric residue (viscosity > 20.5 mm²/s at 40°C)	
Title	
12b - Use as a fuel: Professional	
Use Descriptor	
Sector(s) of Use	
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC SpERC 9.12b.v1
Processes, tasks, activities covered	
Covers the use as a fuel or in fuels (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20oC above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	
Specific Risk Management Measures and Operating Conditions	
General measures (carcinogens) G18	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20
CS15 General exposures (closed systems). + CS137 Product sampling.	Handle substance within a closed system E47. Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 1 hour OC27. Provide a good standard of controlled ventilation (10 to 15 air changes per hour) E40. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17.

Product		ATMOSPHERIC RESIDUE	Date: 2018/11/30
			Edition: 4
CS15 General exposures (closed systems).	Handle substance within a closed system E47. Sample via a closed loop or other system to avoid exposure E8. Avoid carrying out activities involving exposure for more than 1 hour OC27. Provide a good standard of controlled ventilation (10 to 15 air changes per hour) E40. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.		
CS502 Bulk closed unloading	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) E40. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16. Avoid carrying out activities involving exposure for more than 1 hour OC27. , or G9: Ensure material transfers are under containment or extract ventilation E66.		
CS8 Drum/batch transfers	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) E40. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16. Avoid carrying out activities involving exposure for more than 1 hour OC27. , or G9: Ensure material transfers are under containment or extract ventilation E66.		
CS507 Refuelling	Ensure material transfers are under containment or extract ventilation E66. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16. Avoid carrying out activities involving exposure for more than 1 hour OC27.		
GEST_12I Use as a fuel. CS 107 (closed system)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.		
CS39 Equipment cleaning and maintenance	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17. Drain down system prior to equipment break-in or maintenance E65. Retain drain downs in sealed storage pending disposal or for subsequent recycle ENVT4. Clear spills immediately C&H13.		
Section 2.2 Control of environmental exposure			
Product characteristics			
Substance is complex UVCB. [PrC3] Predominantly hydrophobic. [PrC4a]			
Amounts used			
Fraction of EU tonnage used in region	0,1		
Regional use tonnage (tonnes/year)	1,3E+05		
Fraction of Regional tonnage used locally	5,0E-04		
Annual site tonnage (tonnes/year)	6,4E+01		
Maximum daily site tonnage (kg/day)	1,7E+02		
Frequency and duration of use			
Continuous release. [FD2]			
Emission days (days/year)	365		
Environmental factors not influenced by risk management			
Local freshwater dilution factor	10		
Local marine water dilution factor	100		
Other given operational conditions affecting environmental exposure			

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

Release fraction to air from wide dispersive use (regional use only)	1,0E-04
Release fraction to wastewater from wide dispersive use	8,4E-06
Release fraction to soil from wide dispersive use (regional use only)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used. [TCS1]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). [TCR1j]	
No wastewater treatment required [TCR6]	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	0,0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [OMS2] Sludge should be incinerated, contained or reclaimed. [OMS3]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [STP1]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,0
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	4,1E+02
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. [ETW1] Combustion emissions considered in regional exposure assessment. [ETW2] 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	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	

Product	ATMOSPHERIC RESIDUE	Date:	2018/11/30
		Edition:	4

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 exposure with the PETRORISK model. [EE2]	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. G33. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
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. [DSU1] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [DSU2] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [DSU3] Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [DSU4]	
Maximum Risk Characterisation Ratio for Air Emissions RCR _{air}	4,2E-01
Maximum Risk Characterisation Ratio for Wastewater Emissions RCR _{water}	6,6E-03