SAFETY DATA SHEET

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

1.1. Product identifier

Name of the substance	European Grade Gasolines - All Grades (Refer to Synonyms for Product Name)
Identification number	649-378-00-4 (Index number)
Registration number	01-2119471335-39-0088
Synonyms	En-228 European Premium Gasoline * Premium Gasoline - 60KPA DVPE 10PPM SUL * Premium Gasoline - 70KPA DVPE 10PPM SUL * Premium Gasoline - 80KPA DVPE 10PPM SUL * Premium Gasoline - 90KPA DVPE 10PPM SUL * Premium Gasoline - 95KPA DVPE 10PPM SUL * Premium Gasoline - 100KPA DVPE 10PPM SUL * En-228 European Super Gasoline * Super Gasoline - 60KPA DVPE 10PPM SUL * Super Gasoline - 70KPA DVPE 10PPM SUL * Super Gasoline - 80KPA DVPE 10PPM SUL * Super Gasoline - 90KPA DVPE 10PPM SUL * Super Gasoline - 95KPA DVPE 10PPM SUL * Super Gasoline - 100KPA DVPE 10PPM SUL * Sub Octane Prem. Gasoline Blendstock
SDS number	2000
Issue date	10-January-2020
Version number	03
Revision date	30-June-2020
Supersedes date	07-February-2020

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

Identified uses	Use as a fuel. A complete list of registered uses for this product can be found in the table of content of the exposure scenario for communication, available as an annex to the eSDS.
Uses advised against	All other uses.

1.3. Details of the supplier of the safety data sheet

Supplier

Company name	Valero Energy Ltd
Address	1 Canada Square, London E14 5AA. United Kingdom
Telephone	01/210 345 4593 (General information; US)
e-mail	CorpHSE@valero.com
Contact person	Industrial Hygienist

1.4. Emergency telephone number 0044/(0)18 65 407333

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

Physical hazards		
Flammable liquids	Category 1	H224 - Extremely flammable liquid and vapour.
Health hazards		
Skin corrosion/irritation	Category 2	H315 - Causes skin irritation.
Germ cell mutagenicity	Category 1B	H340 - May cause genetic defects.
Carcinogenicity	Category 1B	H350 - May cause cancer.
Reproductive toxicity	Category 2	H361 - Suspected of damaging fertility or the unborn child.
Specific target organ toxicity - single exposure	Category 3 narcotic effects	H336 - May cause drowsiness or dizziness.
Aspiration hazard	Category 1	H304 - May be fatal if swallowed and enters airways.

Environmental hazards

Hazardous to the aquatic environment, long-term aquatic hazard	Category 2	H411 - Toxic to aquatic life with long lasting effects.

Hazard summary May be ignited by heat, sparks or flames. May be fatal if swallowed and enters airways. May cause drowsiness and dizziness. May cause cancer. Causes skin irritation. Possible reproductive hazard. May cause genetic defects. Prolonged exposure may cause chronic effects. Dangerous for the environment if discharged into watercourses.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Contains: Gasoline

Hazard pictograms

Signal word Danger

Hazard statements

H224	Extremely flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P331	Do NOT induce vomiting.

Storage Not assigned.

Disposal Not assigned.

Supplemental label information None.

2.3. Other hazards

Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII. Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations.

SECTION 3: Composition/information on ingredients

3.1. Substances

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Gasoline	100	86290-81-5 289-220-8	01-2119471335-39-0088	649-378-00-4	
Classification: Flam. Liq. 1;H224, Asp. Tox. 1;H304, Skin Irrit. 2;H315, STOT SE 3;H336, Muta. 1B;H340, Carc. 1B;H350, Repr. 2;H361, Aquatic Chronic 2;H411					P

Composition comments This product is registered under the REACH Regulation 1907/2006 as a UVCB. All concentrations are in percent by weight unless ingredient is a gas.
Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations. The full text for all H-statements is displayed in section 16.

Note P: The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3.

SECTION 4: First aid measures

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

4.1. Description of first aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison centre or doctor/physician if you feel unwell.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Get medical attention if irritation develops and persists.

Ingestion Call a physician or poison control centre immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

4.2. Most important symptoms and effects, both acute and delayed Aspiration may cause pulmonary oedema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Direct contact with eyes may cause temporary irritation. Skin irritation. May cause redness and pain.

4.3. Indication of any immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

SECTION 5: Firefighting measures

General fire hazards Extremely flammable liquid and vapour.

5.1. Extinguishing media

Suitable extinguishing media Water fog. Alcohol resistant foam. Dry chemical powder. Carbon dioxide (CO_2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture Vapours may form explosive mixtures with air. Vapours may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.

5.3. Advice for firefighters

Special protective equipment for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Special fire fighting procedures In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist/vapours. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained.

For emergency responders Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Use personal protection recommended in Section 8 of the SDS.

6.2. Environmental precautions Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil etc) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. The product is immiscible with water and will spread on the water surface. Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers.

6.4. Reference to other sections For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Before entering storage tanks and commencing any operation in a confined area check the atmosphere for oxygen content and flammability. (Subject to applicability) If sulphur compounds are suspected to be present in the product, check the atmosphere for H2S content. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. When using do not smoke. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Avoid breathing mist/vapours. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

7.2. Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see section 10 of the SDS).

7.3. Specific end use(s)

For detailed information, see section 1.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

No exposure limits noted for ingredient(s).

Biological limit values

No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures

Follow standard monitoring procedures.

Derived no effect levels (DNELs)

General Population

Product	Value	Assessment factor	Notes
European Grade Gasolines - All Grades (Refer to Synonyms for Product Name) (CAS 86290-81-5)			
Long-term, Local, Inhalation	178.57 mg/m3	10	
Short-term, Local, Inhalation	640 mg/m3	15	
Short-term, Systemic, Inhalation	1152 mg/m3	15	

Workers

Product	Value	Assessment factor	Notes
European Grade Gasolines - All Grades (Refer to Synonyms for Product Name) (CAS 86290-81-5)			
Long-term, Local, Inhalation	837.5 mg/m3	6	
Short-term, Local, Inhalation	1066.67 mg/m3	9	
Short-term, Systemic, Inhalation	1286.4 mg/m3	9	

Predicted no effect concentrations (PNECs)

Not available.

8.2. Exposure controls

Appropriate engineering controls

Explosion-proof general and local exhaust ventilation. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

General information

Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

Eye/face protection

Wear safety glasses with side shields (or goggles). Eye protection should meet standard EN 166.

Skin protection

- Hand protection

Wear suitable gloves tested to EN374. In full contact: Glove material: Nitrile rubber. Layer thickness: 0.225 mm. Breakthrough time: >480 min. Splash contact: Glove material: Neoprene; Layer thickness: 0.75 mm; Breakthrough time: 10-30 min.

- Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

In case of inadequate ventilation or risk of inhalation of oil mist, suitable respiratory equipment with combination filter (type A2/P2) can be used.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

Hygiene measures	Observe any medical surveillance requirements. When using do not smoke. 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.
Environmental exposure controls	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. Fume scrubbers, filters or engineering modifications to the process equipment may be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Liquid.
Colour	Colourless.
Odour	Not available.
Odour threshold	Not available.
pH	Not available.
Melting point/freezing point	< -60 °C (< -76 °F)
Initial boiling point and boiling range	30 - 260 °C (86 - 500 °F)
Flash point	< 0 °C (< 32.0 °F) Closed cup
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapour pressure	<= 240 kPa
Vapour density	Not available.
Relative density	0.62 - 0.88 (15 °C (59 °F))
Solubility(ies)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	< 1 mm²/s (37.8 °C (100.04 °F))
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

9.2. Other information

Kinematic viscosity	0.4 - 0.9 cSt (40 °C (104 °F))

SECTION 10: Stability and reactivity

10.1. Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
10.2. Chemical stability	Material is stable under normal conditions.
10.3. Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
10.4. Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
10.5. Incompatible materials	Strong oxidising agents.
10.6. Hazardous decomposition products	No hazardous decomposition products are known.

SECTION 11: Toxicological information

General information	Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Inhalation	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Prolonged inhalation may be harmful.

Skin contact Causes skin irritation.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.

Symptoms Aspiration may cause pulmonary oedema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Skin irritation. May cause redness and pain.

11.1. Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways. Hydrogen sulphide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulphide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odour does not provide a reliable indicator of the presence of hazardous levels in the atmosphere.

Product	Species	Test Results
Gasoline (CAS 86290-81-5)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Inhalation		
LC50	Rat	> 5610 mg/m3, 4 hours
Oral		
LD50	Rat	> 5000 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory sensitisation Based on available data, the classification criteria are not met.

Skin sensitisation Based on available data, the classification criteria are not met.

Germ cell mutagenicity May cause genetic defects.

Carcinogenicity May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Gasoline (CAS 86290-81-5) 2B Possibly carcinogenic to humans.

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific target organ toxicity - single exposure May cause drowsiness and dizziness.

Specific target organ toxicity - repeated exposure Based on available data, the classification criteria are not met.

Aspiration hazard May be fatal if swallowed and enters airways.

Mixture versus substance information No information available.

Other information May be absorbed through the skin.

SECTION 12: Ecological information

12.1. Toxicity Toxic to aquatic life with long lasting effects.

Product		Species	Test Results
Gasoline (CAS 86290-81-5)			
Acute			
	EL50	Selenastrum capricornutum (Pseudokirchnerella subcapitata)	3.1 mg/l, 72 hours
Aquatic			
Acute			
Crustacea	EL50	Daphnia magna	4.5 mg/l, 48 hours
Fish	LL50	Oncorhynchus mykiss	10 mg/l, 96 hours
		Pimephales promelas	8.2 mg/l, 96 hours
Micro-organisms	LL50	Tetrahymena pyriformis	15.41 mg/l, 72 hours

12.2. Persistence and degradability Expected to be inherently biodegradable.

12.3. Bioaccumulative potential The product is not bioaccumulating.

Partition coefficient n-octanol/water (log Kow)	Not available.
Bioconcentration factor (BCF)	Not available.
12.4. Mobility in soil	No data available.
12.5. Results of PBT and vPvB assessment	This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.
12.6. Other adverse effects	Oil spills are generally hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.
EU waste code	The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal methods/information	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Special precautions	Dispose in accordance with all applicable regulations.

SECTION 14: Transport information

ADR

14.1. UN number	UN1203
14.2. UN proper shipping name	GASOLINE
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Hazard No. (ADR)	33
Tunnel restriction code	D/E
14.4. Packing group	II
14.5. Environmental hazards	Yes
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

RID

14.1. UN number	UN1203
14.2. UN proper shipping name	GASOLINE
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
14.4. Packing group	II
14.5. Environmental hazards	Yes
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

ADN

14.1. UN number	UN1203
14.2. UN proper shipping name	GASOLINE
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
14.4. Packing group	II
14.5. Environmental hazards	Yes
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

14.1. UN number	UN1203

14.2. UN proper shipping name	GASOLINE
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
14.4. Packing group	II
14.5. Environmental hazards	Yes
ERG Code	3H
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

14.1. UN number	UN1203
14.2. UN proper shipping name	GASOLINE
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
14.4. Packing group	II
14.5. Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-E
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.
General information	Shipping descriptions in this section are offered as examples only. Classification for transport must accurately reflect the material hazards as designated under a variety of regulations and is solely the responsibility of the person offering the material for transport into commerce.

SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EU) 2019/1021 On persistent organic pollutants (recast), as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Gasoline (CAS 86290-81-5)

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.

Gasoline (CAS 86290-81-5)

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Gasoline (CAS 86290-81-5)

Other regulations

The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006, as amended.
Directive 2012/18/EU on major accident hazards involving dangerous substances: Part 2 (Named dangerous substances) - 34. Petroleum products and alternative fuels.

National regulations

According to Directive 92/85/EEC as amended, pregnant women should not work with the product, if there is the least risk of exposure.

Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work, as amended. Follow national regulation on the protection of workers from the risks of exposure to carcinogens and mutagens at work, in accordance with Directive 2004/37/EC, as amended.

15.2. Chemical safety assessment

Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

DNEL: Derived No-Effect Level.
PNEC: Predicted No-Effect Concentration.
PBT: Persistent, bioaccumulative and toxic.
vPvB: Very Persistent and very Bioaccumulative.

References

Chemical safety report.
CONCAWE
ECHA: European Chemical Agency.

Information on evaluation method leading to the classification of mixture

Not applicable.

Full text of any H-statements not written out in full under Sections 2 to 15

H224 Extremely flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H340 May cause genetic defects.
H350 May cause cancer.
H361 Suspected of damaging fertility or the unborn child.
H411 Toxic to aquatic life with long lasting effects.

Training information

Follow training instructions when handling this material.

Disclaimer

The information in this Safety Data Sheet (SDS) was obtained from sources believed to be reliable and accurate, and is not represented as being absolutely complete. The end user of this product has the responsibility for evaluating the adequacy of the data for the intended application and conditions of use; for determining the safety, toxicity, regulatory requirements, and suitability of the product under these conditions; and for obtaining additional or clarifying data where uncertainty exists. The data serves as general guidance only, and is to be used in combination with professional judgement of persons experienced in a specific application, use or process; and additional data may be required.

Annex to the extended Safety Data Sheet (eSDS)

Table of contents

1 - Exposure Scenario Worker

1. Manufacture of substance

List of use descriptors

Sector(s) of Use	Manufacture of substance
Name of contributing environmental scenario and corresponding ERC	ERC1: Manufacture of the substance
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Manufacture of the substance

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	11000000 tonnes/year
Fraction of regional tonnage used locally	0.45
Annual site tonnage	5200000 tonnes/year
Annual amount per site	17000000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.0066	0.0001	0.00004	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 90
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 95.1. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0.
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	1000 m³/day

Treatment effectiveness	95.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 1.9e7 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	During manufacturing no waste of the substance is generated.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	During manufacturing no waste of the substance is generated.

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid
vapour pressure	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems) with sample collection: Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. General exposures (closed systems) Continuous process: Handle substance within a closed system. General exposures (closed systems) Batch process: Handle substance within a closed system. Ensure operation is undertaken outdoors. Storage: Ensure operation is undertaken outdoors. Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities: Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Bulk transfers: Ensure material transfers are under containment or extract ventilation.

Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens): 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. Equipment cleaning and maintenance: Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.
Conditions and measures related to personal protection, hygiene and health evaluations	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) with sample collection: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure Estimation

Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

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

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. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.

2 - Exposure Scenario Worker

1. Formulation & (re)packing of substances and mixtures

List of use descriptors

Sector(s) of Use	SU10: Formulation [mixing] of preparations and/or re-packaging
Name of contributing environmental scenario and corresponding ERC	ERC2: Formulation into mixture
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Formulation into mixture

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	10000000 tonnes/year
Fraction of regional tonnage used locally	0.003
Annual site tonnage	30000 tonnes/year
Maximum daily site tonnage	100000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.025	0.0001	0.0014	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 0
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 95.1. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0.
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	2000 m³/day

Treatment effectiveness	95.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 1.1e5 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid.
vapour pressure	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems) With sample collection: Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. General exposures (closed systems), Outdoor.: Handle substance within a closed system. Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Process sampling: Sample via a closed loop or other system to avoid exposure. Bulk transfers: Ensure material transfers are under containment or extract ventilation. Drum/batch transfers: Ensure material transfers are under containment or extract ventilation. Laboratory activities: Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens): 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. Equipment cleaning and maintenance: Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.
Conditions and measures related to personal protection, hygiene and health evaluations	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) with sample collection: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Storage: Wear suitable gloves tested to EN374.

3. Exposure Estimation

Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

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

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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data enable the derivation of a DNEL for other health effects. Risk Management Measures are based on qualitative risk characterisation.

3 - Exposure Scenario Worker

1. Use as an intermediate

List of use descriptors

Sector(s) of Use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Name of contributing environmental scenario and corresponding ERC	ERC6a: Use of intermediate
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Use of intermediate

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	630000 tonnes/year
Fraction of regional tonnage used locally	0.024
Annual site tonnage	15000 tonnes/year
Maximum daily site tonnage	50000 kg/day

Frequency and duration of use

Batch process	Not applicable.
Continuous process	300 days/year

Environment factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.025	0.001	0.003	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 80
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 95.5. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0.
Sediment	Not applicable.
Remarks	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	2000 m³/day
Treatment effectiveness	95.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 5.1e4 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	This substance is consumed during use and no waste of the substance is generated.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.
Remarks	Not applicable.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	This substance is consumed during use and no waste of the substance is generated.
Remarks	Not applicable.

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid.
vapour pressure	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems) with sample collection: Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. General exposures (closed systems): Handle substance within a closed system. Ensure operation is undertaken outdoors.
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities: Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Bulk transfers: Ensure material transfers are under containment or extract ventilation. Storage: Store substance within a closed system. Ensure operation is undertaken outdoors.

Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens): 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. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.
Conditions and measures related to personal protection, hygiene and health evaluations	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) with sample collection: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure Estimation

Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

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

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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data enable the derivation of a DNEL for other health effects. Risk Management Measures are based on qualitative risk characterisation.

4 - Exposure Scenario Worker

1. Distribution of substance

List of use descriptors

Sector(s) of Use	Distribution of substance
Name of contributing environmental scenario and corresponding ERC	ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC5: Use at industrial site leading to inclusion into/onto article ERC6a: Use of intermediate ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article) ERC6c: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) ERC6d: Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	11000000 tonnes/year
Fraction of regional tonnage used locally	0.002
Annual site tonnage	22000 tonnes/year
Maximum daily site tonnage	72000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.001	0.00001	0.00001	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 90
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 0. If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not applicable.

Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater. No wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	2000 m³/day
Treatment effectiveness	95.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 3.3e6 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid.
vapour pressure	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems) with sample collection: Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. General exposures (closed systems) Outdoor.: Handle substance within a closed system. Storage: Ensure operation is undertaken outdoors. Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Process sampling: Sample via a closed loop or other system to avoid exposure. Laboratory activities: Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Bulk closed loading and unloading: Ensure material transfers are under containment or extract ventilation.

Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens): 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. Equipment cleaning and maintenance: Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.
Conditions and measures related to personal protection, hygiene and health evaluations	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) with sample collection: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure Estimation

Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

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

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

5 - Exposure Scenario Worker

1. Use as a fuel, Industrial

List of use descriptors

Sector(s) of Use	Industrial uses
Name of contributing environmental scenario and corresponding ERC	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC16: Use of fuels

2.1.1. Contributing scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	1000000 tonnes/year
Fraction of regional tonnage used locally	1
Annual site tonnage	1000000 tonnes/year
Maximum daily site tonnage	3300000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days		Emission factors		
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.05	0	0.00001	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 95
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 79.8. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	2000 m³/day

Treatment effectiveness	95.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 5.4e6 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	This substance is consumed during use and no waste of the substance is generated.

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid.
vapour pressure	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems): Handle substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Use as a fuel (closed systems): Handle substance within a closed system. Storage: Store substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Technical conditions and measures to control dispersion from source towards the worker	Drum/batch transfers: Ensure material transfers are under containment or extract ventilation. Refuelling: Ensure material transfers are under containment or extract ventilation. Refuelling aircraft: Ensure material transfers are under containment or extract ventilation. Bulk closed unloading: Ensure material transfers are under containment or extract ventilation.

Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens): 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. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Conditions and measures related to personal protection, hygiene and health evaluations	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. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure Estimation

Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

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

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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data enable the derivation of a DNEL for other health effects. Risk Management Measures are based on qualitative risk characterisation.

6 - Exposure Scenario Worker

1. Use as a fuel, Professional

List of use descriptors

Sector(s) of Use	SU22: Professional uses
Name of contributing environmental scenario and corresponding ERC	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC16: Use of fuels

2.1.1. Contributing scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	960000 tonnes/year
Fraction of regional tonnage used locally	0.0005
Annual site tonnage	480 tonnes/year
Maximum daily site tonnage	1300 kg/day

Frequency and duration of use

Continuous process	Emission days (days/year): 365

Environment factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days		Emission factors		
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	365	0.01	0.00001	0.00001	

Risk management measures (RMM)

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

Air	Not applicable.
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 0. If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater. No wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	2000 m³/day

Treatment effectiveness	95.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 7.1e4 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	This substance is consumed during use and no waste of the substance is generated.

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid.
vapour pressure	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems) with sample collection: Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. General exposures (closed systems) Outdoor.: Handle substance within a closed system. Storage: Ensure operation is undertaken outdoors. Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Process sampling: Sample via a closed loop or other system to avoid exposure. Laboratory activities: Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Bulk closed loading and unloading: Ensure material transfers are under containment or extract ventilation.

Organizational measures to prevent/limit releases, dispersion and exposure	General measures (carcinogens): 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. Equipment cleaning and maintenance: Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.
Conditions and measures related to personal protection, hygiene and health evaluations	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) with sample collection: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure Estimation

Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

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

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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data enable the derivation of a DNEL for other health effects. Risk Management Measures are based on qualitative risk characterisation.

7 - Exposure Scenario Worker

1. Use as a fuel, Consumer

List of use descriptors

Sector(s) of Use	SU21: Consumer uses
Name of contributing environmental scenario and corresponding ERC	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
List of names of contributing worker scenarios and corresponding PROCs	PC13: Fuels

2.1.1. Contributing scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

Product characteristics

Physical state	Liquid.

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	8200000 tonnes/year
Fraction of regional tonnage used locally	0.0005
Annual site tonnage	4100 tonnes/year
Maximum daily site tonnage	11000 kg/day

Frequency and duration of use

Continuous process	Emission days (days/year): 365

Environment factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	365	0.01	0.00001	0.00001	

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Not available.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Not available.
Soil	Not available.
Water	Not available.
Sediment	Not available.
Organisational measures to prevent/limit release from site	Not available.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	2000 m³/day
Treatment effectiveness	95.5 %
Sludge treatment technique	Not available.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 5.9e5 kg/d

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	This substance is consumed during use and no waste of the substance is generated.

2.2.1. Contributing scenario controlling worker exposure for Fuels

Product characteristics

Physical form of the product	Liquid.
vapour pressure	Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure
Process temperature	Assumes activities are at ambient temperature (unless stated differently).

Amounts used

Liquid: automotive refuelling	< 37500 g Covers percentage substance in the product up to 1 %.
Liquid: scooter refuelling	< 3750 g Covers percentage substance in the product up to 1 %.
Liquid: garden equipment - use	< 750 g Covers percentage substance in the product up to 1 %.
Liquid: garden equipment - refuelling	< 750 g Covers percentage substance in the product up to 1 %.

Frequency and duration of use

	Duration	Frequency of use	Remarks
Liquid: automotive refuelling	< 0.05	52 days per year	(Duration unit = hour)
Liquid: scooter refuelling	< 0.03	52 days per year	(Duration unit = hour)
Liquid: garden equipment - use	< 2	26 days per year	(Duration unit = hour)
Liquid: garden equipment - refuelling	< 0.03	26 days per year	(Duration unit = hour)

Human factors not influenced by risk management

Exposed skin areas	Liquid: automotive refuelling Covers skin contact area up to 210 cm2 Liquid: scooter refuelling Covers skin contact area up to 210 cm2 Liquid: garden equipment - refuelling Covers skin contact area up to 420 cm2

Other given operational conditions affecting workers exposure

Area of use	Room size	Temperature	Ventilation rate	Remarks
Liquid: automotive refuelling	100 m³			Outdoor use
Liquid: scooter refuelling	100 m³			Outdoor use
Liquid: garden equipment - use	100 m³			Outdoor use
Liquid: garden equipment - refuelling	34 m³			Indoor use

Other relevant operational conditions

Not available.

Risk management measures (RMM)

Technical conditions and measures to control dispersion from source towards the worker	Not available.
Organizational measures to prevent/limit releases, dispersion and exposure	Not available.
Conditions and measures related to personal protection, hygiene and health evaluations	Not available.

3. Exposure Estimation

Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Health

The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC report #107 and the chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these source, then they are indicated.

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

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.

Health

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.