

Product Name: MOTOR GASOLINE (ADDITIZED)
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SAFETY DATA SHEET

SECTION 1

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

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

1.1. PRODUCT IDENTIFIER

Product Name: MOTOR GASOLINE (ADDITIZED)
Product Description: Hydrocarbons and Additives
Product Code: 708593-60

Trade Names	Trade Names
MGBLEND	SYNERGY SUPREME+ UNLEADED 97
SYNERGY UNLEADED 95	

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

Intended Use: Fuel

Identified Uses:

Manufacture of substance
Distribution of substance
Formulation and (re)packing of substances and mixtures
Use as a fuel - Industrial
Use as a fuel - Professional
Use as a fuel - Consumer

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

Uses advised against: This product is not recommended for any industrial, professional or consumer use other than the Identified Uses above.

1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Supplier: Esso Petroleum Company Ltd.
Ermyn Way
Ermyn House
KT22 8UX LEATHERHEAD, SURREY
Great Britain

Supplier General Contact:
MSDS Internet Address:
E-Mail:

(UK) (+44) (0) 1372 222 000
www.msds.exxonmobil.com
sds.uk@exxonmobil.com

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1.4. EMERGENCY TELEPHONE NUMBER

24 Hour Emergency Telephone:

(UK) (+44) (0) 1372 222 000

National Poison Control Centre:

(UK) 111 / (IE) 01 809 2166

SECTION 2

HAZARDS IDENTIFICATION

2.1. CLASSIFICATION OF SUBSTANCE OR MIXTURE

Classification according to Regulation (EC) No 1272/2008

Flammable liquid: Category 1.

Skin irritation: Category 2. Germ Cell Mutagen: Category 1B. Carcinogen: Category 1B. Reproductive toxicant (developmental): Category 2. Specific target organ toxicant (central nervous system): Category 3. Aspiration toxicant: Category 1.

Chronic aquatic toxicant: Category 2.

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 the unborn child.

H411: Toxic to aquatic life with long lasting effects.

2.2. LABEL ELEMENTS

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

Pictograms:



Signal Word: Danger

Hazard Statements:

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 the unborn child.

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H411: Toxic to aquatic life with long lasting effects.

Precautionary Statements:

P101: If medical advice is needed, have product container or label at hand. P102: Keep out of reach of children.

P103: Read label before use.

P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P261: Avoid breathing mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish. P391: Collect spillage.

P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.

P501: Dispose of contents and container in accordance with local regulations.

Contains: Gasoline

2.3. OTHER HAZARDS

Physical / Chemical Hazards:

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Small leaks of this material can result in groundwater contamination levels above taste and odor thresholds for ether oxygenates (methyl tertiary butyl ether, ethyl tertiary butyl ether, tertiary amyl methyl ether or diisopropyl ether).

Groundwater becomes unpalatable well below ether oxygenate concentrations that could affect human health.

Health Hazards:

High-pressure injection under skin may cause serious damage. May be irritating to the eyes, nose, throat, and lungs. Exposure to benzene is associated with cancer (acute myeloid leukaemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders (see Section 11).

Environmental Hazards:

Ether oxygenates are significantly more soluble than other components of gasoline like benzene, toluene, ethyl benzene and xylenes (BTEX) if released into groundwater. Ether oxygenates may also biodegrade more slowly, have the potential to move farther and faster in groundwater and have the potential to contaminate larger areas of groundwater than BTEX if released into groundwater. Material does not meet the criteria for PBT or vPvB in accordance with REACH Annex XIII.

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3.1. SUBSTANCES Not Applicable. This material is regulated as a mixture.

3.2. MIXTURES

This material is defined as a mixture.

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

Name	CAS#	EC#	Registration#	Concentration *	GHS/CLP classification
ethanol	64-17-5	200-578-6	01-2119457610-43	0 - 5%	Eye Irrit. 2 H319, Flam. Liq. 2 H225
2-ethoxy-2-methylpropane	637-92-3	216-653-1	01-2119452785-29	0 - 15%	Asp. Tox. 1 H304, Flam. Liq. 2 H225, Skin Irrit. 2 H315
Gasoline	86290-81-5	289-220-8	01-2119471335-39	> 85 %	[Aquatic Acute 2 H401], Aquatic Chronic 2 H411, Asp. Tox. 1 H304, Carc. 1B H350, Flam. Liq. 1 H224, Muta. 1B H340, Repr. 2 H361d, STOT SE 3 H336, Skin Irrit. 2 H315
ISOBUTYL ALCOHOL	78-83-1	201-148-0	NE	0 - 10%	Flam. Liq. 3 H226, STOT SE 3 H335, STOT SE 3 H336, Skin Irrit. 2 H315, Eye Dam. 1 H318
propan-2-ol	67-63-0	200-661-7	01-2119457558-25	0 - 10%	[Asp. Tox. 2 H305], Flam. Liq. 2 H225, STOT SE 3 H336, Eye Irrit. 2 H319
Methanol	67-56-1	200-659-6	01-2119433307-44	0 - < 3%	Acute Tox. 3 H301, Acute Tox. 3 H311, Acute Tox. 3 H331, Flam. Liq. 2 H225, STOT SE 1 H370
2-methoxy-2-methylpropane	1634-04-4	216-653-1	01-2119452786-27	0 - 15%	[Acute Tox. 5 H303], [Asp. Tox. 2 H305], Flam. Liq. 2 H225, Skin Irrit. 2 H315
TERT-BUTYL ALCOHOL	75-65-0	200-889-7	NE	0 - 7%	[Acute Tox. 5 H303], [Asp. Tox. 2 H305], Acute Tox. 4 H332, Flam. Liq. 2 H225, STOT SE 3 H335, STOT SE 3 H336

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

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

Name	CAS#	EC#	Concentration *	GHS/CLP Classification
Benzene	71-43-2	200-753-7	0.1 - 1.0%	[Acute Tox. 5 H303], Asp. Tox. 1 H304, Carc. 1A H350, Flam. Liq. 2 H225, Muta. 1B H340,

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				[Aquatic Acute 2 H401], Skin Irrit. 2 H315, Eye Irrit. 2 H319, STOT RE 1 H372, Note E
Toluene	108-88-3	203-625-9	> 5.0 %	[Aquatic Acute 2 H401], Aquatic Chronic 3 H412, Asp. Tox. 1 H304, Flam. Liq. 2 H225, Repr. 2 H361d, STOT SE 3 H336, Skin Irrit. 2 H315, STOT RE 2 H373

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

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

NOTE: Oxygenates may be present up to the maximum permitted by European Standard EN228.

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

SECTION 4 FIRST AID MEASURES

4.1. DESCRIPTION OF FIRST AID MEASURES

INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

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

INGESTION

Seek immediate medical attention. Do not induce vomiting.

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

Itching, pain, redness, swelling of skin. Local necrosis as evidenced by delayed onset of pain and tissue damage a few hours after injection. Headache, dizziness, drowsiness, nausea and other CNS effects. Blurring or complete loss of vision 10 to 30 hours after exposure.

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

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

SECTION 5 FIRE FIGHTING MEASURES

5.1. EXTINGUISHING MEDIA

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

Unsuitable Extinguishing Media: Straight streams of water

5.2. SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

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

5.3. ADVICE FOR FIRE FIGHTERS

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

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: <-35°C (-31°F) [IP 170/70]

Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 7.6 LEL: 1.4 [test method unavailable]

Autoignition Temperature: >250°C (482°F) [test method unavailable]

SECTION 6 ACCIDENTAL RELEASE MEASURES

6.1. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

NOTIFICATION PROCEDURES

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

PROTECTIVE MEASURES

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

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

6.2. ENVIRONMENTAL PRECAUTIONS

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

6.3. METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

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

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

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken. This product contains ether oxygenates and it is important to respond quickly to any spills or leaks. Even a small release, if not quickly cleaned up, can contaminate large volumes of surface or groundwater. Personnel handling, transferring or dispensing this product should be trained to respond immediately to any spills or leaks to prevent contamination of groundwater.

6.4. REFERENCES TO OTHER SECTIONS

See Sections 8 and 13.

SECTION 7

HANDLING AND STORAGE

7.1. PRECAUTIONS FOR SAFE HANDLING

Avoid all personal contact. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground

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procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

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

7.2. CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Consistent with regulatory control requirements, storage and handling equipment and systems should be capable of preventing soil and groundwater contamination by liquid spills and vapor emissions. Leak detection systems and programs are recommended. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Keep away from incompatible materials. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.

7.3. SPECIFIC END USES

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

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. CONTROL PARAMETERS

EXPOSURE LIMIT VALUES

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

Substance Name	Form	Limit/Standard			Note	Source
2-ethoxy-2-methylpropane		STEL	367 mg/m3	100 ppm		UK EH40
2-ethoxy-2-methylpropane		TWA	183.5 mg/m3	50 ppm		UK EH40
2-ethoxy-2-methylpropane		TWA	25 ppm			ACGIH
2-methoxy-2-methylpropane		STEL	367 mg/m3	100 ppm		UK EH40
2-methoxy-2-methylpropane		TWA	183.5 mg/m3	50 ppm		UK EH40
2-methoxy-2-methylpropane		TWA	50 ppm			ACGIH
Benzene		TWA	3.25 mg/m3	1 ppm	Skin	UK EH40
Benzene		STEL	1 ppm			ExxonMobil
Benzene		TWA	0.5 ppm			ExxonMobil
ethanol		TWA	1920 mg/m3	1000 ppm		UK EH40
ethanol		STEL	1000 ppm			ACGIH

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Gasoline		STEL	200 ppm			ExxonMobil
Gasoline		TWA	100 ppm			ExxonMobil
ISOBUTYL ALCOHOL		STEL	231 mg/m3	75 ppm		UK EH40
ISOBUTYL ALCOHOL		TWA	154 mg/m3	50 ppm		UK EH40
ISOBUTYL ALCOHOL		TWA	50 ppm			ACGIH
Methanol		STEL	333 mg/m3	250 ppm	Skin	UK EH40
Methanol		TWA	266 mg/m3	200 ppm	Skin	UK EH40
Methanol		STEL	250 ppm		Skin	ACGIH
Methanol		TWA	200 ppm		Skin	ACGIH
propan-2-ol		STEL	1250 mg/m3	500 ppm		UK EH40
propan-2-ol		TWA	999 mg/m3	400 ppm		UK EH40
propan-2-ol		STEL	400 ppm			ACGIH
propan-2-ol		TWA	200 ppm			ACGIH
TERT-BUTYL ALCOHOL		STEL	462 mg/m3	150 ppm		UK EH40
TERT-BUTYL ALCOHOL		TWA	308 mg/m3	100 ppm		UK EH40
TERT-BUTYL ALCOHOL		TWA	100 ppm			ACGIH
Toluene		STEL	384 mg/m3	100 ppm	Skin	UK EH40
Toluene		TWA	191 mg/m3	50 ppm	Skin	UK EH40
Toluene		TWA	20 ppm			ACGIH

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

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

UK Health and Safety Executive (HSE)

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

Worker

Substance Name	Dermal	Inhalation
2-methoxy-2-methylpropane	5100 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	178.5 mg/m3 DNEL, Chronic Exposure, Systemic Effects
propan-2-ol	888 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	500 mg/m3 DNEL, Chronic Exposure, Systemic Effects
Gasoline	NA	840 mg/m3 DNEL, Chronic Exposure, Local Effects

Consumer

Substance Name	Dermal	Inhalation	Oral
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2-methoxy-2-methylpropane	3570 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	53.6 mg/m3 DNEL, Chronic Exposure, Systemic Effects	7.1 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects
propan-2-ol	319 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	89 mg/m3 DNEL, Chronic Exposure, Systemic Effects	26 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects
Gasoline	NA	180 mg/m3 DNEL, Chronic Exposure, Local Effects	NA

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

PREDICTED NO EFFECT CONCENTRATION (PNEC)

Substance Name	Aqua (fresh water)	Aqua (marine water)	Aqua (intermittent release)	Sewage treatment plant	Sediment	Soil	Oral (secondary poisoning)
2-methoxy-2-methylpropane	5.1 mg/l	0.26 mg/l	47.2 mg/l	71 mg/l	23 mg/kg (dry wt)	1.62 mg/kg	NA
propan-2-ol	140.9 mg/l	140.9 mg/l	140.9 mg/l	2251 mg/l	552 mg/kg (dry wt)	28 mg/kg	160 mg / kg (food)
Gasoline	NA	NA	NA	NA	NA	NA	NA

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

8.2. EXPOSURE CONTROLS

ENGINEERING CONTROLS

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

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

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

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a

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level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

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

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

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

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

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

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

Chemical/oil resistant clothing is recommended.

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

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

ENVIRONMENTAL CONTROLS

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

Consistent with regulatory control requirements, storage and handling equipment and systems should be capable of preventing soil and groundwater contamination by liquid spills and vapor emissions. Leak detection systems and programs are recommended. Personnel handling, transferring or dispensing this product should be trained to respond immediately to any spills or leaks to prevent contamination of groundwater.

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

9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Colour: Pale Yellow

Odour: Characteristic

Odour Threshold: No data available

pH: Not technically feasible

Melting Point: No data available

Freezing Point: No data available

Initial Boiling Point / and Boiling Range: 28°C (82°F) - 210°C (410°F) [ASTM D86]

Flash Point [Method]: <-35°C (-31°F) [IP 170/70]

Evaporation Rate (n-butyl acetate = 1): No data available

Flammability (Solid, Gas): Not technically feasible

Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 7.6 LEL: 1.4 [test method unavailable]

Vapour Pressure: [N/D at 20 °C] | 4 kPa (30 mm Hg) at 37.8 °C - 240 kPa (1800 mm Hg) at 37.8°C [test method unavailable]

Vapour Density (Air = 1): > 1 at 101 kPa [test method unavailable]

Relative Density (at 15 °C): < 1 [test method unavailable]

Solubility(ies): water Negligible for the hydrocarbon components. Ether oxygenates are significantly more soluble.

Partition coefficient (n-Octanol/Water Partition Coefficient): > 3.5 [test method unavailable]

Autoignition Temperature: >250°C (482°F) [test method unavailable]

Decomposition Temperature: No data available

Viscosity: <1 cSt (1 mm²/sec) at 40°C [test method unavailable]

Explosive Properties: None

Oxidizing Properties: None

9.2. OTHER INFORMATION

Density (at 15 °C): 620 kg/m³ (5.17 lbs/gal, 0.62 kg/dm³) - 880 kg/m³ (7.34 lbs/gal, 0.88 kg/dm³) [test method unavailable]

SECTION 10

STABILITY AND REACTIVITY

10.1. REACTIVITY: See sub-sections below.

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

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

10.4. CONDITIONS TO AVOID: Heat, sparks, flame, and build up of static electricity.

10.5. INCOMPATIBLE MATERIALS: Alkalies, Halogens, Strong Acids, Strong oxidisers

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

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SECTION 11 TOXICOLOGICAL INFORMATION

11.1. INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) LC50 > 5000 mg/m3 (Vapour) Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation (Rabbit): Data available. Test scores or other study results meet criteria for classification.	Irritating to the skin. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation (Rabbit): Data available. Test scores or other study results do not meet criteria for classification.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Caused genetic effects in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475 476
Carcinogenicity: Data available.	Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Caused damage to the fetus in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 416 421
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	May cause drowsiness or dizziness.
Repeated Exposure: Data available. Test scores or other study results do not meet criteria for classification.	Contains a substance that may cause damage to organs from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD

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Guideline 410 412 453

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
2-methoxy-2-methylpropane	Oral Lethality: LD 50 4000 mg/kg (Rat)
TERT-BUTYL ALCOHOL	Oral Lethality: LD 50 3046 mg/kg (Rat)

OTHER INFORMATION

For the product itself:

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapours in the same boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats, male and female mice, or in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. In 1991, The U.S. EPA determined that the male rat kidney is not useful for assessing human risk. Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug. Gasoline unleaded: Carcinogenic in animal tests. Chronic inhalation studies resulted in liver tumours in female mice and kidney tumours in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations in-vitro or in-vivo. Negative in inhalation developmental studies and reproductive tox studies. Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing).

Contains:

BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer in laboratory animal studies.

ETHANOL: Prolonged or repeated exposure to high concentrations of ethanol vapour or overexposure by ingestion may produce adverse effects to brain, kidney, liver, and reproductive organs, birth defects in offspring, and developmental toxicity in offspring. **METHANOL:** Human exposure to methanol may result in illness, systemic poisoning, blindness, optic nerve damage and perhaps death, after being ingested, absorbed through the skin or inhaled. Death due to cardiac or respiratory failure has been reported in some cases from consumption of as little as 30 mls. Exposure to high concentrations of methanol has been shown to cause developmental effects in rodent offspring.

Methyl tertiary butyl ether (MTBE): Carcinogenic in animal tests. Inhalation exposure to high concentrations resulted in higher than expected mortality in male mice due to urinary tract obstructions and female mice displayed benign liver tumors. Inhalation exposure to high concentrations resulted in higher than expected mortality in male rats due to progressive kidney damage as well as increased benign and malignant kidney tumors, and benign testicular tumors. Drinking water exposure to high concentrations resulted in progressive kidney damage in rats and a marginally increased statistical trend of brain tumors in male rats. Tumor incidence was within historical control levels and concluded to not be related to MTBE exposure. Did not cause mutations In Vitro or In vivo. Rabbits exposed to high vapor concentrations did not have any offspring with adverse developmental effects. Mice exposed to high vapor concentrations (maternally toxic) had offspring with embryo/fetal toxicity and birth defects. Rats exposed to high vapor concentrations did not display any treatment-related effects in a two generation reproduction study. The significance of the animal findings at high exposures are not believed to be directly related to potential human health hazards.

TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal

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developmental effects.

SECTION 12 ECOLOGICAL INFORMATION

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

12.1. TOXICITY

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

12.2. PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable
Components -- Ether oxygenates may biodegrade slowly.

Atmospheric Oxidation:

Majority of components -- Expected to degrade rapidly in air

12.3. BIOACCUMULATIVE POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

12.4. MOBILITY IN SOIL

Majority of components -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Low molecular wt. component -- Moderate potential to migrate through soil.

High molecular wt. component -- Low potential to migrate through soil.

Components -- Ether oxygenates are significantly more soluble than other components of gasoline like benzene, toluene, ethyl benzene and xylenes (BTEX) if released into groundwater. Ether oxygenates have the potential to move farther and faster in groundwater and have the potential to contaminate larger areas of groundwater than BTEX if released into groundwater.

12.5. PERSISTENCE, BIOACCUMULATION AND TOXICITY FOR SUBSTANCE(S)

This product is not, or does not contain, a substance that is a PBT or a vPvB.

12.6. OTHER ADVERSE EFFECTS

No adverse effects are expected.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	EL50 1 - 100 mg/l: data for similar materials
Aquatic - Acute Toxicity	96 hour(s)	Fish	LL50 1 - 100 mg/l: data for similar materials

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Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	EL50 1 - >1000 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 - 10 mg/l: data for similar materials
Aquatic - Chronic Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	NOELR 1 - 100 mg/l: data for similar materials

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results: Basis
Water	Ready Biodegradability	28 day(s)	Percent Degraded < 60 : similar material

SECTION 13

DISPOSAL CONSIDERATIONS

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

13.1. WASTE TREATMENT METHODS

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

REGULATORY DISPOSAL INFORMATION

European Waste Code: 13 07 02*

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

This material is considered as hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.

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

SECTION 14

TRANSPORT INFORMATION

LAND (ADR/RID)

14.1. UN Number: 1203

14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL

14.3. Transport Hazard Class(es): 3

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

INLAND WATERWAYS (ADNR/ADN)

14.1. UN (or ID) Number: 1203
14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: II
14.5. Environmental Hazards: Yes
14.6. Special Precautions for users:
Hazard ID Number: 33
Label(s) / Mark(s): 3 (N2, CMR, F), EHS

SEA (IMDG)

14.1. UN Number: 1203
14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: II
14.5. Environmental Hazards: Marine Pollutant
14.6. Special Precautions for users:
Label(s): 3
EMS Number: F-E, S-E
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-35°C c.c.), MARINE POLLUTANT

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

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not classified according to Annex II

AIR (IATA)

14.1. UN Number: 1203
14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: II
14.5. Environmental Hazards: Yes
14.6. Special Precautions for users:
Label(s) / Mark(s): 3
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II

SECTION 15

REGULATORY INFORMATION

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

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Listed or exempt from listing/notification on the following chemical inventories: KECI, NDSL, TSCA

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

Applicable EU Directives and Regulations:

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

Annex XVII restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles identified in Regulation 1907/2006/EC [...on the Registration, Evaluation, Authorisation and Restrictions of Chemicals ... and amendments thereto]

92/85/EEC [...pregnant workers...recently given birth or...breastfeeding directive]

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

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

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

111/2005/EC [...laying down rules for drug precursors ...]

2004/37/EC [... on the protection of workers from the risks related to carcinogens or mutagens...]

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

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

15.2. CHEMICAL SAFETY ASSESSMENT

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

SECTION 16	OTHER INFORMATION
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IDENTIFIED USES:

Manufacture of substance (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU10, SU3, SU8, SU9)

Distribution of substance (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU3, SU8, SU9)

Formulation and (re)packing of substances and mixtures (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU10, SU3)

Use as a fuel - Industrial (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU3)

Use as a fuel - Professional (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU22)

Use as a fuel - Consumer (PC13, SU21)

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

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

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

Classification according to Regulation (EC) No 1272/2008

Classification according to Regulation (EC) No 1272/2008	Classification procedure
Aquatic Chronic 2; H411	Calculation
Carc. 1B; H350	Bridging, structurally similar materials
Flam. Liq. 1; H224	Based on test data
Muta. 1B; H340	Bridging, structurally similar materials
Repr. 2; H361d	Bridging, structurally similar materials
Skin Irrit. 2; H315	Bridging, structurally similar materials

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

Flam. Liq. 1 H224: Extremely flammable liquid and vapor; Flammable Liquid, Cat 1

Flam. Liq. 2 H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2

Flam. Liq. 3 H226: Flammable liquid and vapor; Flammable Liquid, Cat 3

Acute Tox. 3 H301: Toxic if swallowed; Acute Tox Oral, Cat 3

[Acute Tox. 5 H303]: May be harmful if swallowed; Acute Tox Oral, Cat 5

Asp. Tox. 1 H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

[Asp. Tox. 2 H305]: May be harmful if swallowed and enters airways; Aspiration, Cat 2

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Acute Tox. 3 H311: Toxic in contact with skin; Acute Tox Dermal, Cat 3
Skin Irrit. 2 H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
Eye Dam. 1 H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
Eye Irrit. 2 H319: Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2
Acute Tox. 3 H331: Toxic if inhaled; Acute Tox Inh, Cat 3
Acute Tox. 4 H332: Harmful if inhaled; Acute Tox Inh, Cat 4
STOT SE 3 H335: May cause respiratory irritation; Target Organ Single, Resp Irr
STOT SE 3 H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
Muta. 1B H340: May cause genetic defects; Germ Cell Mutagenicity, Cat 1B
Carc. 1A H350: May cause cancer; Carcinogenicity, Cat 1A
Carc. 1B H350: May cause cancer; Carcinogenicity, Cat 1B
Repr. 2 H361d: Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
STOT SE 1 H370: Causes damage to organs; Target Organ, Single, Cat 1
STOT RE 1 H372: Causes damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 1
STOT RE 2 H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
[Aquatic Acute 2 H401]: Toxic to aquatic life; Acute Env Tox, Cat 2
Aquatic Chronic 2 H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
Aquatic Chronic 3 H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Composition: Component Table for REACH information was modified.
Composition: Component Table information was modified.
dnel table - consumer information was modified.
dnel table - worker information was modified.
GHS Physical Hazards information was modified.
GHS Precautionary Statements - Prevention information was modified.
GHS Precautionary Statements - Response information was modified.
PNEC table information was modified.
Section 01: Company Emergency Contact information was modified.
Section 01: Company Mailing Address information was modified.
Section 04: First Aid Notes information was modified.
Section 08: Exposure Limits Table information was modified.
Section 09: Vapour Pressure information was modified.
Section 11 Substance Toxicology table information was modified.
Section 11: Other Health Effects information was modified.

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Internal Use Only

MHC: 1A, 0B, 0, 0, 4, 1

PPEC: CF

DGN: 7105919XGB (1017738)

ANNEX

Section 1 Exposure Scenario Title

Title:

Manufacture of substance

Use Descriptor

Sector(s) of Use SU10, SU3, SU8, SU9

Process Categories PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b

Environmental Release Categories ERC1

Specific Environmental Release Category ESVOC 1.1.v1

Processes, tasks, activities covered

Manufacture of the substance or use as an intermediate, process chemical or extracting agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

Section 2 Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Product Characteristic

Liquid

Duration, frequency and amount

Covers daily exposures up to 8 hours (unless stated differently)[G2]

Covers percentage substance in the product up to 100 %[G13]

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented [G1]

Operation is carried out at elevated temperature (>20 C above ambient temperature)[OC7]

Contributing Scenarios/

Specific Risk Management Measures and Operating Conditions

(only required controls to demonstrate safe use listed)

General measures (Aspiration Hazard)

The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard.

Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting.

General measures (Flammable Liquid)

Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level.

Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of

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explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.

General measures (skin irritants)

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

General 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.

General exposures (closed systems) Continuous process PROC1

Handle substance within a closed system.

General exposures (closed systems) with sample collection PROC2

Wear suitable gloves tested to EN374.

Sample via a closed loop or other system to avoid exposure.

Handle substance within a closed system.

General exposures (closed systems) Batch process PROC3

Ensure operation is undertaken outdoors.

Handle substance within a closed system.

Laboratory activities PROC15

Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Bulk transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

Equipment cleaning and maintenance PROC8a

Drain down and flush system prior to equipment break-in or maintenance.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Clear spills immediately.

Storage PROC2

Ensure operation is undertaken outdoors.

Store substance within a closed system.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 600000 tons/yr

Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.027

Maximum daily site tonnage (kg/d): 2000000 kg / day

Regional use tonnage (tonnes/year): 22000000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

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Local marine water dilution factor: [EF2] 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.05
Release fraction to soil from process (initial release prior to RMM): 0.0001
Release fraction to wastewater from process (initial release prior to RMM): 0.003
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: 94.7 %
Risk from environmental exposure is driven by freshwater sediment.
Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90 %
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: 99.8 %
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils.
Prevent discharge of undissolved substance to or recover from wastewater.
Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 10000 m3/day
Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 %
Not applicable as there is no release to wastewater.
The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 2000000 kg / day
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 99.8 %
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
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32]
Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]
Risk Management Measures are based on qualitative risk characterisation. [G37]
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
If scaling reveals a condition of unsafe use (i.e. RCRs >1), additional RMMs or a site-specific chemical safety assessment is required.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in

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combination.

Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - 'Site-Specific Production' worksheet. [DSU6]

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Section 1 Exposure Scenario Title	
Title:	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	SU3, SU8, SU9
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC4, ERC6A, ERC6B, ERC6C, ERC6D, ERC7
Specific Environmental Release Category	ESVOC 1.1b.v1
Processes, tasks, activities covered	
Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2]	
Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1]	
Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/	
Specific Risk Management Measures and Operating Conditions	
(only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard)	
The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard.	
Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting.	
General measures (Flammable Liquid)	
Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level.	
Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.	
General measures (skin irritants)	
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 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	

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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 scenario; 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.

General exposures (closed systems) PROC1

Handle substance within a closed system.

General exposures (closed systems) with sample collection PROC2

Handle substance within a closed system.

Sample via a closed loop or other system to avoid exposure.

Wear suitable gloves tested to EN374.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system.

Process sampling PROC3

Sample via a closed loop or other system to avoid exposure.

Laboratory activities PROC15

Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Bulk closed loading and unloading PROC8b

Ensure material transfers are under containment or extract ventilation.

Equipment cleaning and maintenance PROC8a

Drain down and flush system prior to equipment break-in or maintenance.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Clear spills immediately.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Storage PROC2

Ensure operation is undertaken outdoors.

Store substance within a closed system.

Bulk closed loading PROC8b

Ensure material transfers are under containment or extract ventilation.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 51000 tons/yr

Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.002

Maximum daily site tonnage (kg/d): 170000 kg / day

Regional use tonnage (tonnes/year): 25000000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM): 0.001

Release fraction to soil from process (initial release prior to RMM): 0.00001

Release fraction to wastewater from process (initial release prior to RMM): 0.00001

Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used.

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

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

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If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$ Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of $\geq 83.3\%$
Organisation measures to prevent/limit release from site Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8% Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 670000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 95.8%
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]
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 Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33] Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment Further details on scaling and control technologies are provided in factsheet Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

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

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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 scenario; 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.

General exposures (closed systems) PROC1

Handle substance within a closed system.

General exposures (closed systems) with sample collection PROC2

Handle substance within a closed system.

Sample via a closed loop or other system to avoid exposure.

Wear suitable gloves tested to EN374.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system.

Process sampling PROC3

Sample via a closed loop or other system to avoid exposure.

Laboratory activities PROC15

Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Bulk transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

Equipment cleaning and maintenance PROC8a

Drain down and flush system prior to equipment break-in or maintenance.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Clear spills immediately.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Storage PROC2

Store substance within a closed system.

Wear suitable gloves tested to EN374.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 30000 tons/yr

Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.0022

Maximum daily site tonnage (kg/d): 100000 kg / day

Regional use tonnage (tonnes/year): 14000000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements): [OOC11] 0.025

Release fraction to soil from process (initial release prior to RMM): 0.0001

Release fraction to wastewater from process (initial release prior to RMM): 0.002

Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used.

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Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: 68 % Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: 98.7 %
Organisation measures to prevent/limit release from site Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 100000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 98.7 %
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]
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 Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment Further details on scaling and control technologies are provided in factsheet Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

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

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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 scenario; 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.

Bulk closed unloading PROC8b

Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

refuelling PROC8b

Ensure material transfers are under containment or extract ventilation.

refuelling aircraft PROC8b

Ensure material transfers are under containment or extract ventilation.

General exposures (closed systems) PROC1

Handle substance within a closed system.

General exposures (closed systems) PROC2

Handle substance within a closed system.

Wear suitable gloves tested to EN374.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system.

Use as a fuel (closed systems) PROC16

Handle substance within a closed system.

Equipment cleaning and maintenance PROC8a

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.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

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.

Storage PROC2

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.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 1500000 tons/yr

Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.89

Maximum daily site tonnage (kg/d): 5000000 kg / day

Regional use tonnage (tonnes/year): 1700000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM): 0.05

Release fraction to soil from process (initial release prior to RMM): 0

Release fraction to wastewater from process (initial release prior to RMM): 0.00001

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Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).
Treat air emissions to provide a typical removal (or abatement?) efficiency of: 95%
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of $\geq 94.6\%$
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils.
Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is: [STP5] 2000 m ³ /day
Estimated substance removal from wastewater via domestic sewage treatment is: 95.8%
Not applicable as there is no release to wastewater.
The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 5000000 kg / day
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 95.8%
Conditions and measures related to external treatment of waste for disposal
Combustion emissions considered in regional exposure assessment [ETW2]
Combustion emissions limited by required exhaust emission controls [ETW1]
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]
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
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32]
Available hazard data do not support the need for a DNEL to be established for other health effects. [G36]
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]
Risk Management Measures are based on qualitative risk characterisation. [G37]
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

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

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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 scenario; 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.

General exposures (closed systems) PROC1

Handle substance within a closed system.

General exposures (closed systems) PROC2

Wear suitable gloves tested to EN374.

Handle substance within a closed system.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system.

Bulk closed unloading PROC8b

Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

refuelling PROC8b

Ensure material transfers are under containment or extract ventilation.

Use as a fuel (closed systems) PROC16

Handle substance within a closed system.

Equipment maintenance PROC8a

Drain down system prior to equipment break-in or maintenance.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

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.

Ensure operatives are trained to minimise exposures.

Storage PROC2

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.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 590 tons/yr

Continuous release.

Emission Days (days/year): 365

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.0005

Maximum daily site tonnage (kg/d): 1600

Regional use tonnage (tonnes/year): 1200000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

Release fraction to air from wide dispersive use (regional only): 0.01

Release fraction to soil from wide dispersive use (regional only): 0.00001

Release fraction to wastewater from wide dispersive use: 0.00001

Technical conditions and measures at process level (source) to prevent release

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Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
Risk from environmental exposure is driven by freshwater.
Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of $\geq 81.8\%$
Organisation measures to prevent/limit release from site
Do not apply industrial sludge to natural soils.
Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m ³ /day
Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 %
Not applicable as there is no release to wastewater.
The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 7000 kg / day
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 95.8 %
Conditions and measures related to external treatment of waste for disposal
Combustion emissions considered in regional exposure assessment [ETW2]
Combustion emissions limited by required exhaust emission controls [ETW1]
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]
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
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32]
Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]
Risk Management Measures are based on qualitative risk characterisation. [G37]
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

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Section 1 Exposure Scenario Title	
Title:	
Use as a fuel - Consumer	
Use Descriptor	
Sector(s) of Use	SU21
Product Categories	PC13
Environmental Release Categories	ERC9A, ERC9B
Specific Environmental Release Category	ESVOC 9.12c.v1
Processes, tasks, activities covered	
Covers consumer uses in liquid fuels.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of consumer exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Not applicable	
Other given operational conditions affecting consumer exposure	
Not applicable	
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)	
General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. Just a sip of lamp oil - or even sucking the wick of lamps may lead to life threatening lung damage. Keep lamps filled with this liquid out of the reach of children. General measures (Flammable Liquid) Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For flammable substances a selection of the following measures need to be implemented to control unintended ignition of flammable substances. These measures are expected to be suitable to prevent minor accidents which might occur during consumer use. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, it is anticipated that there is no immediate concern as the risk should be controlled to an acceptable level. Use only with adequate ventilation. Avoid ignition sources – No Smoking. Review SDS for additional advice. Liquid: Automotive Refuelling PC13 Covers concentrations up to 1 % Covers use up to 1 times per day Covers use up to 52 days/yr Covers skin contact area up to 210 cm² For each use event, covers use amounts up to 37500 grams Covers outdoor use. Covers use in room size of 100 m³ Covers exposure up to 0.05 hour(s) Covers use at ambient temperatures. Liquid, vapour pressure > 10 kPa at STP. Liquid Scooter Refuelling PC13	

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Covers concentrations up to 1 %
Covers use up to 1 times per day
Covers use up to 52 days/yr
Covers skin contact area up to 210 cm²
For each use event, covers use amounts up to 3750 grams
Covers outdoor use.

Covers use in room size of 100 m³
Covers exposure up to 0.03 hour(s)
Covers use at ambient temperatures.
Liquid, vapour pressure > 10 kPa at STP.

Liquid, Garden Equipment - Use PC13

Covers concentrations up to 1 %
Covers use up to 1 times per day
Covers use up to 26 days/yr
For each use event, covers use amounts up to 750 grams
Covers outdoor use.

Covers use in room size of 100 m³
Covers exposure up to 2 hour(s)
Covers skin contact area up to 420 cm²
Covers use at ambient temperatures.
Liquid, vapour pressure > 10 kPa at STP.

Liquid: Garden Equipment - Refueling PC13

Covers concentrations up to 1 %
Covers use up to 1 times per day
Covers use up to 26 days/yr
Covers skin contact area up to 420 cm²
For each use event, covers use amounts up to 750 grams
Covers use in a one car garage (34 m³) under typical ventilation. 1.5 Air changes per hour
Covers use in room size of 34 m³
Covers exposure up to 0.03 hour(s)
Covers use at ambient temperatures.
Liquid, vapour pressure > 10 kPa at STP.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.
Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 4600 tons/yr
Continuous release.
Emission Days (days/year): 365 days/yr
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used Locally: 0.0005
Maximum daily site tonnage (kg/d): 12000 kg / day
Regional use tonnage (tonnes/year): 9100000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10
Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

Release fraction to air from wide dispersive use (regional only): 0.01
Release fraction to soil from wide dispersive use (regional only): 0.00001
Release fraction to wastewater from wide dispersive use: 0.00001

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Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m ³ /day
Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 %
Not applicable as there is no release to wastewater.
The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 54000 kg / day
Conditions and measures related to external treatment of waste for disposal
Combustion emissions considered in regional exposure assessment [ETW2]
Combustion emissions limited by required exhaust emission controls [ETW1]
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 consumer exposures unless otherwise indicated.[G30]
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]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.



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