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

1.1 Product identifier

Product Name Naphtha (petroleum), isomerization

Product Description V4027-ISOMERATE-Naphtha (petroleum), isomerization

Trade Name ISOMERATE
Product code ISOMERAT, V4027
CAS No. 64741-70-4
EC No. 265-073-5

REACH Registration No. -

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

Identified Use(s)

No.	Exposure Scenario	Page:
1	Distribution of Naphtha (petroleum), isomerization (0 – 1 % benzene content)	12
2	Formulation and (re)packing of Naphtha (petroleum), isomerization (0 – 1 % benzene content)	15
3	Use of Naphtha (petroleum), isomerization (0 $-$ 1 % benzene content) as a fuel - Industrial	18
4	Use of Naphtha (petroleum), isomerization (0 – 1 % benzene content) as a fuel - Professional	21
5	Use of Naphtha (petroleum), isomerization (0 – 1 % benzene content) as a fuel - Consumer	24

Uses Advised Against Anything other than the above.

1.3 Details of the supplier of the safety data sheet

Company Identification Vitol SA

Place des Bergues 3 P.O. Box 2056 1211 Geneva 1 Switzerland

 Telephone
 +31 10 498 7200

 Fax
 +31 10 452 9545

 E-Mail (competent person)
 xrea ch@vitol.com

1.4 Emergency telephone number

Emergency Phone No. +44 (0) 1235 239 670, 24/7
Languages spoken All official European languages.

#### **SECTION 2: HAZARDS IDENTIFICATION**

2.1 Classification of the substance or mixture

**2.1.1 Regulation (EC) No. 1272/2008 (CLP)** Flam. Liq. 1; H224

Asp. Tox. 1; H304 Skin Irrit. 2; H315 Muta. 1B; H340 Carc. 1B; H350 Repr. 2; H361fd

STOT SE 3; H336 (Central nervous system, Inhalation)

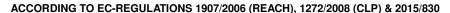
Aquatic Chronic 2; H411

2.2 Label elements According to Regulation (EC) No. 1272/2008 (CLP)

Product Description V4027-ISOMERATE-Naphtha (petroleum), isomerization

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Hazard Pictogram(s)









Signal Word(s) Danger

Hazard Statement(s)

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation. H340: May cause genetic defects.

H350: May cause cancer.

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn

child.

H336: May cause drowsiness or dizziness. (Central nervous system, Inhalation)

H411: Toxic to aquatic life with long lasting effects.

Precautionary Statement(s) P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other

ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. P301+P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.

P331: Do NOT induce vomiting.

P403+P233: Store in a well-ventilated place. Keep container tightly closed.

2.3 Other hazards

May form explosive mixture with air. The vapour is heavier than air; beware of pits and confined spaces. May cause irritation to eyes and air passages.

Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local .

circumstances.

#### **SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

#### 3.1 Substances

SUBSTANCE	CAS No.	EC No.	%W/W
Naphtha (petroleum), isomerization	64741-55-5	265-056-2	100

### **SECTION 4: FIRST AID MEASURES**



#### 4.1 Description of first aid measures

Self-protection of the first aider

Eliminate sources of ignition. If it is suspected that fumes are still present, the responder should wear an appropriate mask or self-contained breathing apparatus. Drench contaminated clothing with water before removing to avoid risk of sparks from static electricity. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Avoid all contact. Do not ingest. If swallowed then seek immediate medical assistance.

Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations.

If there is any suspicion of inhalation: A self contained breathing apparatus should be worn. Remove to fresh air immediately.

IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight

Inhalation

H2S Warning:

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Skin Contact

Eye Contact

Ingestion

4.2 Most important symptoms and effects, both acute and delayed

4.3 Indication of any immediate medical attention and special treatment needed

Notes to a physician:

clothing such as a collar, tie, belt or waistband. Get medical advice/attention if you feel unwell.

IF ON SKIN (or hair): Remove contaminated clothing immediately and wash affected skin with plenty of water or soap and water. If irritation (redness, rash, blistering) develops, get medical attention.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs. If unconscious, place in recovery position and get medical attention immediately. Do not give anything by mouth to an unconscious person. Get medical attention immediately. Do not wait for symptoms to appear. Inhalation: May cause drowsiness or dizziness. Headache, nausea and vomiting.

Skin Contact: Causes skin irritation.

Eye Contact: Causes serious eye irritation.

Ingestion: Aspiration into the lungs may cause chemical pneumonitis, which can be fatal. Ingestion may cause irritation of the gastrointestinal tract. Nausea, Vomiting and Diarrhoea.

Treat symptomatically.

IF INHALED: If unconscious, place in recovery position and get medical attention immediately. Administer oxygen if available and artificial respiration if necessary.

IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If aspiration is suspected obtain immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs.

### **SECTION 5: FIREFIGHTING MEASURES**

5.1 Extinguishing media

Suitable Extinguishing media

Unsuitable extinguishing media

5.2 Special hazards arising from the substance or mixture

Extinguish with sand or dry chemical. Foam, Carbon dioxide, Water fog or dry powder

Do not use water jet. Direct water jet may spread the fire.

Extremely flammable liquid and vapour. Will float and can be reignited on surface water. Decomposes in a fire giving off toxic fumes: A mixture of solid and liquid particulates and gases including unidentified organic and inorganic compounds. May form explosive mixture with air. Prevent liquid entering sewers, basements and any watercourses. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. If sulphur compounds are present in appreciable amounts, combustion products may include also H2S and SOx (sulfur oxides) or sulfuric acid

Fight fire with normal precautions from a reasonable distance. Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. Avoid release to the environment. Dike fire control water for later disposal.

Advice for fire-fighters

5.3

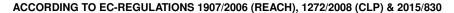
### **SECTION 6: ACCIDENTAL RELEASE MEASURES**

6.1 Personal precautions, protective equipment and emergency procedures Caution - spillages may be slippery. Ensure operatives are trained to minimise exposures. Ensure suitable personal protection during removal of spillages. Eliminate sources of ignition. Shut off leaks if without risk. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Avoid all contact with substance. Ensure adequate ventilation. Do not breathe vapour. Do not ingest. If swallowed then seek immediate medical assistance. All official European languages. Do not use sparking tools. Use non-sparking ventilation systems, approved explosion-proof equipment, and intrinsically safe electrical systems.

H2S Warning:

Product may release Hydrogen Sulphide. Exposure controls - These controls may include: Segregation of areas, Access only to authorised persons, Permit to

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work systems, Confined space working procedures, Area H2S alarms, Personal H2S alarms, Personal escape sets, H2S awareness training. Please see section 8 for appropriate personal protection equipment Small spillages:

Wear flame-resistant antistatic protective clothing.

Evacuate the area and keep personnel upwind. Drench contaminated clothing with water before removing to avoid risk of sparks from static electricity. Avoid all contact. Wear chemical protection suit and breathing apparatus. See Also Section: 8.

Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body. If necessary: Dike area to contain the spill and prevent releases to sewers, drains, or other waterways.

Provided it is safe to do so, isolate the source of the leak. Use non-sparking equipment when picking up flammable spill. The vapour is heavier than air; beware of pits and confined spaces. Ensure that the equipment is adequately grounded. Allow small spillages to evaporate provided there is adequate ventilation. Wear flame-resistant antistatic protective clothing. Wear chemical protection suit and breathing apparatus.

In case of soil contamination, remove contaminated soil and treat in accordance with local regulations. Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a lidded container for disposal or recovery. Dispose of this material and its container as hazardous waste.

Small spillages: Allow small spillages to evaporate provided there is adequate ventilation. Wear flame-resistant antistatic protective clothing.

Large spillages: Cover spillage with foam to reduce evaporation. Do not use water jet.

Collect as much as possible in clean container for reuse or disposal.

Small spillages: Contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents.

Large spillages: Open waters should be contained with floating barriers or other mechanical means and recovered, only if this is strictly necessary and if fire/explosion risks can be adequately prevented. Otherwise control the spreading of the spillage, and let the substance evaporate naturally.

See Section: 8,13

**Environmental precautions** 

Large spillages:

6.2

6.3 Methods and material for containment and cleaning

Spillages onto land:

Spillages on water or at sea:

6.4 Reference to other sections

#### **SECTION 7: HANDLING AND STORAGE**

Precautions for safe handling 7.1

H2S Warning:

7.2 Conditions for safe storage, including any incompatibilities

Obtain special instructions before use. Keep away from sources of ignition - No smoking. Use only outdoors or in a well-ventilated area. Prevent vapour build up by providing adequate ventilation during and after use. May form explosive mixtures with air. Take action to prevent static discharges. Use non-sparking tools. All parts of the plant and equipment should be electrically bonded together and connected to earth. Electrical continuity should be checked at regular intervals. Antistatic clothing and footwear should be used. The vapour is heavier than air; beware of pits and confined spaces. Avoid all contact with substance. Do not ingest. If swallowed then seek immediate medical assistance. Do not breathe vapour. See Section: 8. Keep good industrial hygiene. Wash hands thoroughly after handling. Contaminated clothing should be thoroughly cleaned. Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances. These controls may include: Segregation of areas, Access only to authorised persons, Permit to work systems, Confined space working procedures, Area H2S alarms, Personal H2S alarms, Personal escape sets, H2S awareness training.

Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Bund storage facilities to prevent soil and water pollution in the event of spillage. Keep only in original packaging. Keep containers properly sealed when not in use. Protect from sunlight. Containers of this material may be hazardous when empty since they retain!

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product residue. Empty container may contain product residue which may result in flammable or explosive vapours inside the container.

Stable at ambient temperatures.

Suitable containers: Stainless steel, Mild steel

Do not store in: Synthetic materials Keep away from oxidising agents.

See Section: 1.2 and/or Exposure Scenario.

Storage measures

Storage temperature

Incompatible materials7.3 Specific end use(s)

#### **SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

8.1 Control parameters

8.1.1 Occupational Exposure Limits

No Occupational Exposure Limit assigned. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

8.1.2 Biological limit value

8.1.3 PNECs and DNELs

Not established.

PNEC: Not established. Naphtha (petroleum), isomerization is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Naphtha (petroleum), isomerization	Oral	Inhalation	Dermal
Derived No Effect Level			
Worker - Long Term - Systemic effects	-	1300 mg/m <sup>3</sup>	-
Worker - Long Term - Local effects	-	840 mg/m <sup>3</sup>	-
Worker - Acute - Local effects	-	1100 mg/m <sup>3</sup>	-
Consumer - Long Term - Systemic effects	-	1200 mg/m <sup>3</sup>	-
Consumer - Long Term - Local effects	-	180 mg/m <sup>3</sup>	-
Consumer - Acute - Local effects	-	640 mg/m <sup>3</sup>	-

#### 8.2 Exposure controls

#### 8.2.1 Appropriate engineering controls

Provide adequate ventilation, including appropriate local extraction if dusts, fumes or vapours are likely to be evolved. Store in a cool/low-temperature, well-ventilated (dry) place away from heat and ignition sources. Guarantee that the eye flushing systems and safety showers are located close to the working place.

8.2.2 Individual protection measures, such as personal protective equipment (PPE)

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Fuels are typically used, transferred and transported in closed systems. If exposure is likely (i.e. during sampling) the following advice may be appropriate. Keep good industrial hygiene. Always wash hands before smoking, eating and drinking. Do not eat, drink or smoke at the work place.

Refer to annexes for exposure scenarios detailing use specific exposure controls

Eye/ face protection



Use eye protection according to EN 166, designed to protect against liquid splashes.

Skin protection



**Hand protection:** Wear impervious gloves (EN374). Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

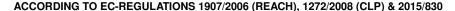
Recommended: Nitrile rubber.

Body protection: Wear anti-static clothing and shoes.

small scale: Wear suitable coveralls to prevent exposure to the skin.

large scale: Chemical protection suit.

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Respiratory protection



When the product is heated /In case of inadequate ventilation wear respiratory protection. The use of a high efficiency filter (EN143) is recommended. Filter

type A1

Closed system(s): Not normally required.

Thermal hazards Not applicable.

8.2.3 **Environmental Exposure Controls** Avoid release to the environment.

#### **SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

#### Information on basic physical and chemical 9.1

properties

Colourless liquid **Appearance** Odour Hydrocarbon Odour threshold Not established. Not established. nН

Melting point/freezing point < - 60 °C Initial boiling point and boiling range < 35 °C Flash point < 0 °C Not established. Evaporation rate

Flammability (solid, gas) Not applicable - Liquid Upper/lower flammability or explosive limits Flammable Limits (Lower) (%v/v) 1

Flammable Limits (Upper) (%v/v) 10

4 - 240 kPa @ 37.8°C Vapour pressure

Vapour density > 2

Relative density 0.62 - 0.88 g/cm3 @ 15 °C Solubility(ies) Immiscible with water.

Partition coefficient: n-octanol/water Not applicable. Substance is complex UVCB.

Auto-ignition temperature > 220 °C **Decomposition Temperature** Not established. Viscosity 1 mm<sup>2</sup>/s @ 20 °C

Explosive properties Not explosive. (Vapour may create explosive atmosphere.)

Oxidising properties Not oxidising.

9.2 Other information None known.

### **SECTION 10: STABILITY AND REACTIVITY**

Conditions to avoid

Incompatible materials

10.4

10.5

10.1 Reactivity Stable under normal conditions. Reacts with - Strong oxidising agents

Stable under normal conditions. Hazardous polymerisation will not occur. 10.2 Chemical stability

Product may release Hydrogen Sulphide.

Extremely flammable liquid and vapour. May form explosive mixture with air. 10.3 Possibility of hazardous reactions

Vapours are heavier than air and may travel considerable distances to a source

of ignition and flashback. Product may release Hydrogen Sulphide.

Elevated temperature. Keep away from heat, hot surfaces, sparks, open flames

and other ignition sources. No smoking. Keep away from direct sunlight.

Keep away from oxidising agents. Strong Acids and Alkalis.

10.6 Hazardous decomposition product(s) A mixture of solid and liquid particulates and gases including unidentified

organic and inorganic compounds. Decomposes in a fire giving off toxic fumes:

COx, H2S, SOx,

#### SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects All test data taken from existing ECHA registrations for the substances

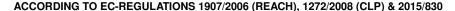
Acute toxicity - Ingestion Based upon the available data, the classification criteria are not met.

LD50 > 5000 mg/kg bw/day (rat) (OECD 401)

Acute toxicity - Inhalation Based upon the available data, the classification criteria are not met.

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LC50 Vapour > 5600 mg/m<sup>3</sup> Air (rat) (OECD 403)

Based upon the available data, the classification criteria are not met. Acute toxicity - Skin Contact

LD50 > 2000 mg/kg bw/day (rabbit) (OECD 402)

Skin corrosion/irritation Skin Irrit. 2; Causes skin irritation. Irritating to skin. (rabbit) (OECD 404)

Serious eye damage/irritation Based upon the available data, the classification criteria are not met.

Not irritating to eyes (rabbit) (OECD 405)

Respiratory or skin sensitization Based upon the available data, the classification criteria are not met.

Sensitisation (guinea pig) - Negative (OECD 406)

Germ cell mutagenicity Muta. 1B; May cause genetic defects. Harmonised Classification.

> ECHA Registration Endpoint summary: According to EU CLP Classification (EC no. 1272/2008), there is a regulatory requirement to classify gasoline and naphtha streams as hazardous for this endpoint when they contain >0.1%

benzene

Carcinogenicity Carc. 1B; May cause cancer. Harmonised Classification.

> ECHA Registration Endpoint summary: According to EU CLP Classification (EC no. 1272/2008), there is a regulatory requirement to classify gasoline and naphtha streams as hazardous for this endpoint when they contain >0.1%

benzene

Reproductive toxicity Repr. 2; Suspected of damaging fertility or the unborn child.

ECHA Registration Endpoint summary: According to EU CLP Classification (EC no. 1272/2008), there is a regulatory requirement to classify gasoline and naphtha streams as hazardous for this endpoint when they contain >0.1%

Toluene and/or n-hexane

STOT SE 3; May cause drowsiness or dizziness.

Weight of evidence approach

Based upon the available data, the classification criteria are not met.

Oral: No adverse effect observed (rat) (Halder CA, et al. (1985))

No adverse effect observed (rat) (OECD 453) Inhalation: Chronic - Systemic effects NOAEC 1402 mg/m<sup>3</sup>

No adverse effect observed. (mouse) (OECD TG 410) Dermal:

Chronic - Systemic effects NOAEL 375 mg/kg bw/day

Asp. Tox. 1; May be fatal if swallowed and enters airways. Harmonised

Classification.

Viscosity: 1 mm2/s @ 20 °C

11.2 Other information None.

#### **SECTION 12: ECOLOGICAL INFORMATION**

STOT - single exposure

Aspiration hazard

STOT - repeated exposure

12.1 **Toxicity** Aguatic Chronic 2; Toxic to aquatic life with long lasting effects.

Short Term (acute): LL50 (Fish) (96hr) 10 mg/l (OCED 203)

Long Term (Chronic): According to the EU CLP Regulation (EC No. 1272/2008) criteria, substances in the low boiling point naphtha category are classified as Chronic Category 2 (H411) for the environment based on acute invertebrate and alga toxicity.

12.2 Persistence and degradability Readily biodegradable. (OECD 301F)

12.3 Bioaccumulative potential Substance is complex UVCB. The BCF (fish) of this substance components is

well below the criteria for bioaccumulation. Therefore, this substance is not considered as bioaccumulative substance. (ECHA registration dossier: PBT

assessment 2)

12.4 Mobility in soil The product is predicted to have low mobility in soil. Immiscible with water. 12.5 Results of PBT and vPvB assessment

Substance is complex UVCB. This substance does not contain PBT constituents

included in the SVHC candidate list at concentrations above 0.1%.

12.6 Other adverse effects None known.

### **SECTION 13: DISPOSAL CONSIDERATIONS**

#### 13.1 Waste treatment methods

Dispose of this material and its container as hazardous waste. Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point. Disposal should be in accordance with local, state or national legislation. Containers of this material may be hazardous when empty since they retain product residue. Containers must not be punctured or destroyed by burning, even when empty. Allocation of a waste code number, according to the

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European Waste Catalogue, should be carried out in agreement with the regional waste disposal company. Waste code: 13 07 01

#### **SECTION 14: TRANSPORT INFORMATION**

		ADR/RID	IMDG/ADN	
14.1	UN number	UN 1268	UN 1268	
14.2	Proper Shipping Name	PETROLEUM DISTILLATES N.O.S.	PETROLEUM DISTILLATES N.O.S.	
14.3	Transport hazard class(es)	3	3+(N2, CMR,F)	
14.4	Packing group	1	1	
14.5	Environmental hazards	MILEUGEVAARLIJK / ENVIRONMENTALLY	HAZARDOUS / UMWELTGEFÄHRDEND /	
		DANGEREUX POUR L'ENVIRONNEMENT		
14.6	Special precautions for user	Vapour may create explosive atmosphere. The confined spaces.	e vapour is heavier than air; beware of pits and	
14.7	Transport in bulk according to Annex	This product is being carried under the scope of	MARPOL Annex 1. Special Precautions: Refer	
	II of MARPOL 73/78 and the IBC Code	to Chapter 7 'Handling and Storage' for special	precautions which a user needs to be aware of,	
		or needs to comply with, in connection with transport.		
14.8	Additional Information	ADR HIN: 33	EmS: F-E, S-E	
		Tunnel Restriction Code: 3 (D/E)	Limited Quantity: 500ml	
		Limited Quantity: 500 ml		

#### **SECTION 15: REGULATORY INFORMATION**

15.1 Safety, health and environmental

regulations/legislation specific for the substance or

mixture

15.1.1 EU regulations

Seveso Upper Tier: 25000 tonnes

Lower Tier: 2500 tonnes

Annex XVII (Restrictions)

In accordance with REACH Annex XVII entry 30 (c) this substance is exempt

from Entry 28 and 29 of REACH Annex XVII as it is to be sold as a fuel in a

closed system.

15.1.2 National regulations

Germany Wassergefährdungsklasse (Germany). WGK number: 3

15.2 Chemical Safety Assessment A REACH chemical safety assessment (CSA) has been carried out. Refer to

annexes for exposure scenarios detailing use specific exposure controls.

### **SECTION 16: OTHER INFORMATION**

Sections indicated with the following have been revised

Header and Section 1.3

Updated version and date. New SDS Regulation 2015/830 format, all sections have been updated to include new information. Please review SDS with care.

#### References:

Existing ECHA registration(s) for Naphtha (petroleum), isomerization (CAS No. 64741-70-4) and Chemical Safety Report.

This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830.

#### Literature References:

 Halder CA, et al., 1985, Hydrocarbon nephropathy in male rats: identification of the nephrotoxic components of unleaded gasoline., Toxicol. Ind. Health 1:67-87

#### **LEGEND**

LTEL Long Term Exposure Limit
STEL Short Term Exposure Limit
DNEL Derived No Effect Level

PNEC Predicted No Effect Concentration

PBT PBT: Persistent, Bioaccumulative and Toxic vPvB very Persistent and very Bioaccumulative

OECD Organisation for Economic Cooperation and Development

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ES Exposure Scenario

NOAEC no observed adverse effect concentration
NOAEL No Observed Adverse Effect Level

Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

#### **Disclaimers**

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Annex to the extended Safety Data Sheet (eSDS)

See below -

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## Naphtha (petroleum), isomerization (0 -1% benzene content)

CAS Number 64741-70-4 EC Number 265-073-5

### **Summary of Parameters**

Physical Parameters				
Vapour pressure (Pa)			4 – 240 @ 37.8 °C (Value used for exposure assessment = 340)	
Partition Coefficier	it (log K <sub>ow</sub> )		2.00 - 20.43	
Aqueous solubility (mg L <sup>-1</sup> )			1.6E+03 - 5.1E-18 (Value used for exposure assessment = 2.0E+02)	
Molecular weight			Not applicable	
Biodegradability			Not defined	
Human health Parameter (DNELs)				
	Short term	Inhalation (mg/m³)	1100	
Worker		Dermal (mg/kg bw/day)	Not applicable	
Worker	Long Term	Inhalation (mg/m³)	3.2 (= 1 ppm)*	
		Dermal (mg/kg bw/day)	0.234*	
		Inhalation (mg/m³)	0.0032 (=1 ppb)* (0.93 mg/kg bw/day)	
Consumer		Dermal (mg/kg bw/day)	0.234*	
		Oral (mg/kg <sup>-1</sup> bw/day <sup>-1</sup> )	8.8	

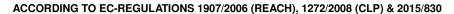
### **Environmental Parameter (PNECs)**

Naphtha (petroleum), isomerization is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

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<sup>\*</sup> Concentration: benzene (Worst case assumption. Contains benzene. @1%).

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Contributing Scenarios	
Contributing Scenarios	
Workers	
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC2 (Storage)	Use in closed, continuous process with occasional controlled exposure. Bulk product storage.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC3 (Sampling)	Use in closed, continuous process with occasional exposure. Sample collection
PROC8a (Maintenance)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilitie Clean down and maintenance of vessels and containers.
PROC8b (Bulk)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Bulk transfer in a closed system
PROC8b (Drum)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Drum or batch transfers.
PROC8b (Refueling)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Refueling vehicles, light aircraft or marine craft
PROC8b (aircraft)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Refueling aircraft
PROC15	Use as laboratory reagent.
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected.
PROC16 (Additive)	Using material as fuel sources, limited exposure to unburned product to be expected. Use as a fuel additive.
Environment	
ERC1	Manufacture of substance
ERC2	Formulation of preparations
ERC3	Formulation in materials
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC6c	Industrial use of monomers for manufacture of thermoplastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7	Industrial use of substances in closed systems
ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
Consumer	
PC13	Fuels
	(Automotive refueling)
	(Scooter refueling)
	(Garden equipment refueling)
	(Garden equipment use)

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



#### Exposure Scenario 1 – Distribution of Naphtha (petroleum), isomerization (0 – 1 % benzene content)

1.0 Contributing Scenarios			
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites		
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC3 (Sampling) PROC8a (Maintenance) PROC8b (Bulk) PROC15		
Chemical product category [PC]	Not applicable		
Article Categories [AC]	Not applicable		
Environmental release categories [ERC]	ERC1 ERC2 ERC3 ERC4 ERC5 ERC6a ERC6a ERC6c ERC6c ERC6c		
Specific Environmental Release Categories SPERC	ESVOC SpERC 1.1b v.1		

2.0 Operational conditions and risk management measures					
2.1 Control of worker exposure					
Product characteristics					
Liquid with high volatility.					
Covers concentrations up to 100	0% (≤ 1 % benzene content)				
Human factors not influenced by risk management					
Potential exposure area Not defined					
Exposure duration per day Covers daily exposures up to 8 hours (unless stated differently).					
Frequency of use (days per year) 300					
sure					
PROC3, PROC2 (Storage)	Outdoor				
All other PROC's	Not defined (default = Indoor)				
Characteristics of the surroundings Not defined					
	Liquid with high volatility. Covers concentrations up to 100  Not defined  Covers daily exposures up to 8 I 300  sure  PROC3, PROC2 (Storage)  All other PROC's				

#### General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

#### General measures (skin irritants)

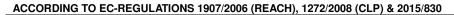
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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 scenario; clear up spills immediately and dispose of waste 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.

Hood for hor bacod health out volidation.				
Technical conditions of use				
PROC1, PROC2, PROC3	Handle substance within a closed system.			
DDOCOL (Bully)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least			
PROC8b (Bulk)	90 %)			
PROC15 Use fume cupboard. (Efficiency of at least 90 %)				
Organisational measures				
PROC3 (Sampling) Sample via a closed loop or other system to avoid exposure. (Efficiency of at least 95 %)				
	Drain down and flush system prior to equipment break-in or maintenance. Retain drain			
PROC8a (Maintenance)	downs in sealed storage pending disposal or for subsequent recycle. Clear spills			
	immediately. (Inhalation - efficiency of at least 90 %)			
Risk management measures related to human health				

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Hand and/or Skin protection  PROC2  Wear suitable gloves tested to EN374. (Efficiency of at least 80 %)  PROC8a (Maintenance)  No special measures are required.  The special measures are required.  No special measures are required.  No special measures are required.  Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency of at least 90 %)  No special measures are required.  Wear suitable coveralls of the special process of the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.  2.2 Control of environmental exposure  **Manual size to nonage (tons/year):  Fraction of EQ to Ionnage used in region:  Praction of Regional tonnage used locally: tons/year  Praction of Regional tonnage (unsylear):  Praction of Regional tonnage (unsylear):  Province and the special process (griday):  **Into,000  **Province and the special province water (mi/d):  **Environment factors not influenced by risk management  Flow rate of receiving surface water (mi/d):  **Decard marine water dilution factor:  **Operational conditions  **Emission days (days'year):  **Release fraction to air from process (initial release prior to RMM):  **Release fraction to sair from process (initial release prior to RMM):  **Release fraction to sair from process (initial release prior to RMM):  **Treat air emission to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater from process (initial release prior to required on site wastewater removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  If discharging to domestic sewage treatment plant (mi/d):  **Province of the province of the province of the required onsite wastewater removal efficiency of (%):  **Interest of the province of the province of the required	Respiratory protection	No special measures are required.				
Eye Protection No special measures are required.  Other operational conditions affecting worker exposure  Wear suitable coveralls to prevent exposure to the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.  2.2 Control of environmental exposure  **Mounts used  **Amounts used  **Treation of EU tonnage used in region:  **Regional use tonnage (tons/year):  **Fraction of Regional tonnage used locally: tons/year  **Annual site tonnage (tons/year):  **Praction of Regional tonnage used locally: tons/year  **Annual site tonnage (tons/year):  **Annual site tonnage (tons/year):  **Praction of Regional tonnage used locally: tons/year  **Annual site tonnage (tons/year):  **Inition actors on influenced by risk management  **Flow rate of receiving surface water (m³/d):  **Local freshwater dilution factor:  **Local freshwater dilution factor:  **Local freshwater dilution factor:  **Decard ton dilutions  **Treation of Regional tonnage used locally:  **Release fraction to a site from process (initial release prior to RMM):  **Release fraction to wastewater from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to wastewater from process (initial release prior to RMM):  **Release fraction to wastewater from process (initial release prior to RMM):  **Release fraction to wastewater from process (initial release prior to RMM):  **Release fraction to soli from process (initial release prior to RMM):  **Release fraction to to wastewater from priore to provide to the required on the priore of the priore		PROC2		least 80 %)		
Wear suitable coveralls to prevent exposure  Wear suitable coveralls to prevent exposure to the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.  2.2 Control of environmental exposure  Amounts used  Fraction of EU tonnage used in region:  Regional use tonnage (tons/year):  Fraction of Regional tonnage used locally: tons/year  2.0E-03  Annual site tonnage (fons/year):  110,00  Average daily use (kg/day)  Environment factors not influenced by risk management  Flow rate of receiving surface water (m²d):  Local freshwater dilution factor:  100  Coperational conditions  Emission days (days/year):  Enlession days (days/year):  Enlession days (days/year):  Release fraction to air from process (initial release prior to RMM):  Release fraction to wastewater from process (initial release prior to RMM):  1.0E-03  Release fraction to sol from process (initial release prior to RMM):  1.0E-03  Release fraction to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required onsite wastewater provide a typical removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, on onsite wastewater treatment required.  Conditions and 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 (m²d)  2000  Degradation effectiveness (%)  External treatment and disposal of waste should comply with applicable local and/or national regulations.  Substance release quantities after risk management measures	'	PROC8a (Maintenance)		combination with 'basic' employee training. (Efficiency of		
Wear suitable coveralls to prevent exposure to the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.   2.2 Control of environmental exposure	Eye Protection	No special measures	are required	l.		
2.2 Control of environmental exposure  Amounts used  Fraction of EU tonnage used in region:  Regional use tonnage (tons/year):  Fraction of Regional tonnage used locally: tons/year  2.0E-03  Annual site tonnage (tons/year):  110,00  Average daily use (kg/day)  Environment tactors not influenced by risk management  Flow rate of receiving surface water (m³/d):  Not defined (default = 18,000)  Local freshwater dilution factor:  10  Local marine water dilution factor:  100  Operational conditions  Emission days (days/year):  Enlesson days (days/year):  Release fraction to all from process (initial release prior to RMM):  Release fraction to all from process (initial release prior to RMM):  Release fraction to soil from process (initial release prior to RMM):  1.0E-03  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil  Treat air emission to provide a typical removal efficiency of (%):  1 fi discharging to domestic sewage treatment plant, provide the required emoval efficiency of (%):  1 discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >> (%):  1 o  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, on onsite wastewater treatment required.  Organisational measures to prevent/limit release from site  Do not apply industrial studge to natural soils. Studge should be incinerated, contained or reclaimed.  Conditions and measures related to external treatment plant  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  O  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant (m³/d)  90  90  90  90  90  90  90  90  90  9						
Amounts used   Fraction of EU tonnage used in region:   0.1   S.4E+05   S.	Wear suitable coveralls to prevent exposure to the skir	n. Clear transfer lines pr	or to de-cou	pling. Avoid dip sampling.		
Fraction of EU tonnage used in region:  Regional use tonnage (tons/year):  Fraction of Regional tonnage used locally: tons/year  2.0E-03  Annual site tonnage (tons/year):  110,00  Average daily use (kg/day)  110,000  Environment factors not influenced by risk management  Flow rate of receiving surface water (m³/d):  Not defined (default = 18,000)  Local freshwater dilution factor:  100  Operational conditions  Emission days (days/year):  Release fraction to air from process (initial release prior to RMM):  Release fraction to wastewater from process (initial release prior to RMM):  1.0E-03  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to over the consideration of the provide a typical removal efficiency of (%):  1 (fischarging to domestic sewage treatment plant, Treat onsite wastewater removal efficiency of (%):  1 (fischarging to domestic sewage treatment plant, provide the required removal efficiency of (%):  1 (fischarging to domestic sewage treatment plant, provide the required removal efficiency of (%):  1 (fischarging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  1 (Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, on onsite wastewater removal efficiency of (%):  1 (Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant (m³/d)  2 (Conditions and measures to prevent/limit release from site  2 (Conditions and measures verticated to external treatment of waste for disposal  2 (Conditions and measures verticated to external	2.2 Control of environmental exposure					
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Fraction of Regional tonnage used locally: tons/year  Annual site tonnage (tons/year):  110,00  Environment factors not influenced by risk management  Flow rate of receiving surface water (m³/d):  Local freshwater dilution factor:  Local freshwater dilution factor:  Local marine water dilution factor:  Loc						
Annual site tonnage (tons/year):  Average daily use (kg/day)  In 10,000  Environment factors not influenced by risk management  Flow rate of receiving surface water (m³/d):  Not defined (default = 18,000)  Local freshwater dilution factor:  100  Operational conditions  Emission days (days/year):  Release fraction to aris from process (initial release prior to RMM):  Release fraction to wastewater from process (initial release prior to RMM):  Release fraction to soil from process (initial release prior to RMM):  1.0E-03  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release from site wastewater (prior to receiving water discharge) to provide the required onsite wastewater removal efficiency of (%):  1.0E-05  Release fraction to soil from process (initial release from site wastewater removal efficiency of (%):  0.0  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational measures to prevent/limit release from site  North provided to provide a typical removal efficiency of (%):  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0			5.4E+05			
Average daily use (kg/day)  Environment factors not influenced by risk management  Flow rate of receiving surface water (m³/d):  Local freshwater dilution factor:  10  Local freshwater dilution factor:  100  Operational conditions  Emission days (days/year):  Release fraction to air from process (initial release prior to RMM):  Release fraction to air from process (initial release prior to RMM):  Release fraction to wastewater from process (initial release prior to RMM):  1.0E-03  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil  Treat air emission to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required ensite wastewater (prior to receiving water discharge) to provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater removal efficiency of become varied by industrial subdge to natural soils. Sludge should be incinerated, contained or reclaimed.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  2000			2.0E-03			
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Local marine water dilution factor: 100  Operational conditions  Emission days (days/year): 100  Release fraction to air from process (initial release prior to RMM): 1.0E-03  Release fraction to wastewater from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Release fraction to soil from process (intial re	Flow rate of receiving surface water (m³/d):		Not define	ed (default = 18,000)		
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Emission days (days/year):  Release fraction to air from process (initial release prior to RMM):  Release fraction to wastewater from process (initial release prior to RMM):  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil  Treat air emission to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  0  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total	Local marine water dilution factor:		100			
Release fraction to air from process (initial release prior to RMM):  Release fraction to wastewater from process (initial release prior to RMM):  Release fraction to soil from process (initial release prior to RMM):  Release fraction to soil from process (initial release prior to RMM):  1.0E-05  Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil  Treat air emission to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.0E-03  1.0E-05  1.0E-06  1.0E-06  1.0E-06  1.0E-06  1.0E-06  1.0E-07  1.0E-08  1.0E-0						
Release fraction to wastewater from process (initial release prior to RMM): 1.0E-05 Release fraction to soil from process (initial release prior to RMM): 1.0E-05  Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil  Treat air emission to provide a typical removal efficiency of (%): 90  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%): 0  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d) 2000  Degradation effectiveness (%) 97.0  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total 1.6E-106				100		
Release fraction to soil from process (initial release prior to RMM):  Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil  Treat air emission to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total						
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil  Treat air emission to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required onsite wastewater removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total						
Treat air emission to provide a typical removal efficiency of (%):  If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1 65,06						
If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1 6E 106			1	ns and releases to soil		
wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1 6E + 06			90			
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1 6E 106			0			
onsite wastewater removal efficiency of >= (%)  Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F. 106	removal efficiency of (%):	·				
Treat soil emission to provide a typical removal efficiency of (%):  Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F. 106		vide the required	0			
Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.  Organisational 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  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F. 106		nov of (9/ ):				
Organisational 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  Size of municipal sewage system/treatment plant (m³/d) 2000  Degradation effectiveness (%) 97.0  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F. 106	Common practices vary across sites thus conservative	. ,		discharging to domestic sewage treatment plant, no onsite		
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.  Conditions and measures related to municipal sewage treatment plant  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F. 106		om eite				
Conditions and measures related to municipal sewage treatment plant  Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F ± 06			ontained or r	eclaimed		
Size of municipal sewage system/treatment plant (m³/d)  Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F. 106			ontaniou of I	ooiaiiioa.		
Degradation effectiveness (%)  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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total	· · · · · · · · · · · · · · · · · · ·					
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.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total						
External treatment and disposal of waste should comply with applicable local and/or national regulations.  Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F. 06	· ·					
Substance release quantities after risk management measures  Maximum allowable site tonnage (MSafe) based on release following total  1.6F.06				al regulations.		
Maximum allowable site tonnage (MSafe) based on release following total				· - <del>g</del>		
	Maximum allowable site tonnage (MSafe) based on release following total			1.6E+06		

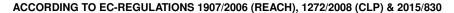
### 3.1 Human exposure prediction

Exposure assessment (method/calculation model) ECETOC TRA (benzene content)

	Inha	lation	Der	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.35	0.35	0.14	0.57	0.94
PROC3	0.70	0.70	0.03	0.15	0.85
PROC3 (Sampling)	0.05	0.05	0.03	0.15	0.20
PROC8a (Maintenance)	0.25	0.25	0.14	0.57	0.84

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PROC8b (Bulk)	0.15	0.15	0.07	0.30	0.45
PROC15	0.05	0.05	0.00	0.01	0.06

	(Bulk)	0.15	0.10	0.07	0.50	0.40
	PROC15	0.05	0.05	0.00	0.01	0.06
-						

3.2 Litvironinental exposure prediction									
Exposure assessment (method/calculation model)	The	Hydrocarbon	Block	Method	has	been	used	to	calculate
	envir	onmental expo	sure wi	th the Pet	trorisk	k mode	l.		

Naphtha (petroleum), isomerization is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment	
Predicted Environmental Exposure (PEC)	1.7E-03 mg/L	5.6E-04 mg/L	1.7E-05 mg/L	5.9E-06 mg/kg ww	1.0E-03 mg/kg ww	1.0E-04 mg/kg ww	
Risk characterisation ratio (RCR)	2.4E-04	3.7E-03	1.1e-04	3.6E-06	1.3E-03	1.3E-04	

Human exposure prediction:

Route of Exposure	Exposure (μg/kg <sup>-1</sup> day <sup>-1</sup> )	Risk characterisation ratio (RCR)		
Oral	0.034	3.4E-04		
Inhalation	0.13	1.4E-04		

4.0 Evaluation guidance to downstream user							
Where other Risk Management Measures/Operational Conditions are adopted, then users show risks are managed to at least equivalent levels.  Available hazard data do not support the need for a DNEL to be established for other health effer Further details on scaling and control technologies are provided in SpERC factsheet (http://celfor-industries-libraries.html).  Exposure calculated for benzene and assumes that the substance contains 1 % benzene. Armay be possible if the batch contains < 1 % benzene							
Exposure assessment	Worker	ECETOC TRA					
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environm exposure with the Petrorisk model.					

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



# Exposure Scenario 2 – Formulation and (re)packing of Naphtha (petroleum), isomerization (0 – 1 % benzene content)

1.0 Contributing Scenarios	
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC3 (Sampling) PROC8a (Maintenance) PROC8b (Bulk) PROC8b (Drum/batch transfers) PROC15
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC2
Specific Environmental Release Categories SPERC	ESVOC SpERC 2.2.v1

2.0 Operational conditions and risk management measures							
2.1 Control of worker exposure							
Physical form of product Liquid with high volatility.							
Concentration of substance in product Covers concentrations up to 100% (≤ 1 % benzene content)							
Human factors not influenced by risk management							
Potential exposure area Not defined							
Covers daily exposures up to 8	hours (unless stated differently).						
300							
osure							
PROC3	Outdoor						
All other PROC's	Not defined (default = Indoor)						
Not defined							
	Liquid with high volatility. Covers concentrations up to 10 t  Not defined  Covers daily exposures up to 8 300 osure  PROC3 All other PROC's						

#### General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

#### General measures (skin irritants)

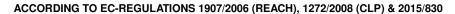
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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 scenario; clear up spills immediately and dispose of waste 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.

Technical conditions of use						
PROC1, PROC2, PROC2 (Storage), PROC3 Handle substance within a closed system.						
PROC3 (Sampling)	ROC3 (Sampling) Sample via a closed loop or other system to avoid exposure. (Efficiency of at least 95 %)					
PROC8b (Bulk), PROC8b (Drum/batch transfers)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 97 %)					
PROC15 Use fume cupboard. (Efficiency of at least 90 %)						
Organisational measures						
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. (Efficiency of at least 90 %)					
Risk management measures related to human heal	th					
Respiratory protection	No special measures are required					
Hand and/or Skin protection	PROC2, PROC2 (Storage)	Wear suitable gloves tested to EN374. (Efficiency of at least 80 %)				
Francianu/or onin protection	PROC8a (Maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency of				

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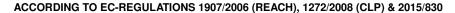
			at least 90 %)		
Eye Protection	No special measures	are required			
Other operational conditions affecting worker expo	sure				
Wear suitable coveralls to prevent exposure to the skin.	. Clear transfer lines pri	or to de-cou	pling. Avoid dip sampling.		
2.2 Control of environmental exposure					
Amounts used					
Fraction of EU tonnage used in region:		0.1			
Regional use tonnage (tons/year):		1.2E+04			
Fraction of Regional tonnage used locally: (tons/year)		1			
Annual site tonnage (tons/year):		1.2E+04			
Average daily use (kg/day):		4.1E+04			
Environment factors not influenced by risk manage	ement				
Flow rate of receiving surface water (m³/d):		Not define	d (default = 18,000)		
Local freshwater dilution factor:		10			
Local marine water dilution factor:		100			
Operational conditions					
Emission days (days/year):		300			
Release fraction to air from process (initial release prior	r to RMM):	2.5E-02			
Release fraction to wastewater from process (initial rele		2.0E-03			
Release fraction to soil from process (initial release price		1.0E-04			
Technical onsite conditions and measures to reduce		air emissio	ns and releases to soil		
Treat air emission to provide a typical removal efficienc		0			
If there is no discharge to domestic sewage treatment p					
wastewater (prior to receiving water discharge) to provi	de the required	96.9			
removal efficiency of (%):					
If discharging to domestic sewage treatment plant, prov	ride the required	0			
onsite wastewater removal efficiency of >= (%)		U			
Treat soil emission to provide a typical removal efficience	cy of (%):	0			
Common practices vary across sites thus conservative wastewater treatment required.	process release estima	ites used. If	discharging to domestic sewage treatment plant, no onsite		
Organisational measures to prevent/limit release from					
Do not apply industrial sludge to natural soils. Sludge sl		ontained or re	eclaimed.		
Conditions and measures related to municipal sewa	<del></del>				
Size of municipal sewage system/treatment plant (m³/d)	)	2000			
Degradation effectiveness (%)		97.0			
Conditions and measures related to external treatme					
External treatment and disposal of waste should comply		nd/or nation	al regulations.		
Substance release quantities after risk managemen					
Maximum allowable site tonnage (MSafe) based on rele wastewater treatment removal (kg/d):	ease following total	4.2E+04			

# Exposure estimation and reference to its source Human exposure prediction

	Inha	lation	Dei	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.50	0.50	0.03	0.12	0.62
PROC3	0.70	0.70	0.03	0.15	0.85
PROC3 (Sampling)	0.05	0.05	0.03	0.15	0.20
PROC8a (Maintenance)	0.25	0.25	0.14	0.59	0.84
PROC8b (Bulk)	0.05	0.05	0.07	0.30	0.35
PROC8b (Drum/batch transfers)	0.05	0.05	0.07	0.30	0.35
PROC15	0.05	0.05	0.00	0.01	0.06

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### 3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

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

Naphtha (petroleum), isomerization is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	1.2 mg/L	0.12 mg/L	0.012 mg/L	6.7E-04 mg/kg ww	0.78 mg/kg ww	0.077 mg/kg ww
Risk characterisation ratio (RCR)	0.18	0.82	0.082	2.1E-03	0.97	0.097

Human exposure prediction:

Route of Exposure	Exposure (μg/kg <sup>-1</sup> day <sup>-1</sup> )	Risk characterisation ratio (RCR)
Oral	7.1	0.071
Inhalation	7.0	0.075

4.0 Evaluation guidance to downstream user			
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  Available hazard data do not support the need for a DNEL to be established for other health effects.  Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reachfor-industries-libraries.html).  Exposure calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling may be possible if the batch contains < 1 % benzene		
Exposure assessment	Worker	ECETOC TRA	
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



# Exposure Scenario 3 – Use of Naphtha (petroleum), isomerization (0 – 1 % benzene content) as a fuel-Industrial

1.0 Contributing Scenarios	
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC8a (Maintenance) PROC8b (Bulk) PROC8b (Drum/batch transfers) PROC8b (refuelling) PROC8b (refuelling) PROC8b (refuelling aircraft) PROC16 PROC16 (Additive)
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC7
Specific Environmental Release Categories SPERC	ESVOC SpERC 7.12a.v1

2.0 Operational conditions and risk manage	ement measures		
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid with high volatility.		
Concentration of substance in product	Covers concentrations up	to 100% (≤ 1 % benzene content)	
Human factors not influenced by risk mana	ngement		
Potential exposure area	Not defined		
Frequency and duration of use			
Exposure duration per day	Covers daily exposures up	to 8 hours (unless stated differently).	
Frequency of use (days per year)	300		
Other operational conditions affecting work	ker exposure		
A	PROC3	Outdoor	
Area of use	All other PROC's	Not defined (default = Indoor)	
Characteristics of the surroundings	Not defined	Not defined	
Canaral magauras applicable to all activitie			

#### General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

#### General measures (skin irritants)

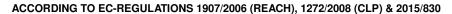
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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 scenario; clear up spills immediately and dispose of waste 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.

Technical conditions of use			
PROC1, PROC2, PROC2 (Storage), PROC3, PROC16, PROC16 (Additive)	Handle substance within a closed system.		
PROC8b (Bulk), PROC8b (Drum/batch transfers), PROC8b (refuelling), PROC8b (refuelling aircraft)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 90 %)		
Organisational measures	,		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. (Efficiency of at least 86 %)		
Risk management measures related to human heal	th		
Respiratory protection	No special measures are required		
Hand and/or Skin protection	PROC2	Wear suitable gloves tested to EN374. (Efficiency of at least 80 %)	
	PROC8a (Maintenance)	Wear chemically resistant gloves (tested to EN374) in	

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			combination with 'basic' employee training. (Efficiency of at least 90 %)
Eye Protection N	No special measures are required.		
Other operational conditions affecting worker exposu	re		
Wear suitable coveralls to prevent exposure to the skin. C	Clear transfer lines prior to	de-coup	oling. Avoid dip sampling.
2.2 Control of environmental exposure			
Amounts used			
Fraction of EU tonnage used in region:	0.	1	
Regional use tonnage (tons/year):	1.	6E+03	
Fraction of Regional tonnage used locally: (tons/year)	1		
Annual site tonnage (tons/year):	1.	6E+03	
Average daily use (kg/day):	1.	6E+04	
Environment factors not influenced by risk management	ent		
Flow rate of receiving surface water (m³/d):		ot defined	d (default = 18,000)
Local freshwater dilution factor:	10		
Local marine water dilution factor:	10	00	
Operational conditions			
Emission days (days/year):	10	00	
Release fraction to air from process (initial release prior to	RMM): 5.	5.00E-02	
Release fraction to wastewater from process (initial releas		1.0E-05	
Release fraction to soil from process (initial release prior t			
Technical onsite conditions and measures to reduce of		emission	ns and releases to soil
Treat air emission to provide a typical removal efficiency of		5.0	
If there is no discharge to domestic sewage treatment plan			
wastewater (prior to receiving water discharge) to provide	the required 0		
removal efficiency of (%):			
If discharging to domestic sewage treatment plant, provide	e the required 0		
onsite wastewater removal efficiency of $>=$ (%)			
Treat soil emission to provide a typical removal efficiency		0	
Common practices vary across sites thus conservative provided wastewater treatment required.		used. If c	discharging to domestic sewage treatment plant, no onsite
Organisational measures to prevent/limit release from			
Do not apply industrial sludge to natural soils. Sludge sho		ined or re	eclaimed.
Conditions and measures related to municipal sewage	<u> </u>		
Size of municipal sewage system/treatment plant (m³/d)		2000	
Degradation effectiveness (%)		97.0	
Conditions and measures related to external treatment			
External treatment and disposal of waste should comply w		or nationa	al regulations.
Substance release quantities after risk management re			
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):		2E+06	

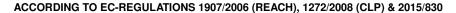
#### 3. Exposure estimation and reference to its source

#### 3.1 Human exposure prediction

	Inhalation		Dei	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.35	0.35	0.14	0.59	0.94
PROC3	0.70	0.70	0.03	0.15	0.85
PROC8a (Maintenance)	0.35	0.35	0.14	0.59	0.94
PROC8b (Bulk)	0.09	0.09	0.07	0.30	0.39
PROC8b (Drum/batch transfers)	0.15	0.15	0.07	0.30	0.45
PROC8b (refuelling)	0.15	0.15	0.07	0.30	0.45

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PROC8b (refuelling aircraft)	0.15	0.15	0.07	0.30	0.45
PROC16	0.25	0.25	0.03	0.15	0.40
PROC16 (Additive)	0.25	0.25	0.03	0.15	0.40

## 3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

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

Naphtha (petroleum), isomerization is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.5E-03 mg/L	6.40E-04 mg/L	2.5E-05 mg/L	8.4E-06 mg/kg ww	1.5E-03 mg/kg ww	1.5E-04 mg/kg ww
Risk characterisation ratio (RCR)	3.5E-04	4.3E-03	1.6E-04	2.6E-05	1.9E-03	1.9e-04

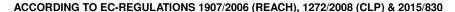
Human exposure prediction:

Route of Exposure	Exposure (µg/kg <sup>-1</sup> day <sup>-1</sup> )	Risk characterisation ratio (RCR)
Oral	0.036	3.6E-04
Inhalation	0.89	9.6E-04

4.0 Evaluation guidance to d	ownstream user		
For scaling see	risks are managed to at l Available hazard data do Further details on scalin- for-industries-libraries.ht Exposure calculated for	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  Available hazard data do not support the need for a DNEL to be established for other health effects.  Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reachfor-industries-libraries.html).  Exposure calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling may be possible if the batch contains < 1 % benzene	
Exposure assessment	Worker	ECETOC TRA	
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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# Exposure Scenario 4 – Use of Naphtha (petroleum), isomerization (0 – 1 % benzene content) as a fuel - Professional

1.0 Contributing Scenarios	
Sector of uses SU	SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC8a (Maintenance) PROC8b (Bulk) PROC8b (Drum/batch transfers) PROC8b (refuelling) PROC16
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC9a ERC9b
Specific Environmental Release Categories SPERC	ESVOC SpERC 9.12b.v1

2.0 Operational conditions and risk management measures				
2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid with high volatility.	Liquid with high volatility.		
Concentration of substance in product	Covers concentrations up	to 100% (≤ 1 % benzene content)		
Human factors not influenced by risk mana	gement			
Potential exposure area	Not defined	Not defined		
Frequency and duration of use				
Exposure duration per day	Covers daily exposures up	Covers daily exposures up to 8 hours (unless stated differently).		
Frequency of use (days per year)	300	300		
Other operational conditions affecting world	ker exposure			
A === = = = = = = = = = = = = = = = = =	PROC3	Outdoor		
Area of use	All other PROC's	Not defined (default = Indoor)		
Characteristics of the surroundings	Not defined	Not defined		
Canaval magaziras applicable to all activitie				

#### General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

#### General measures (skin irritants)

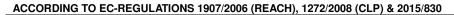
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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 scenario; clear up spills immediately and dispose of waste 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.

Technical conditions of use	
PROC1, PROC2, PROC2 (Storage), PROC3, PROC16	Handle substance within a closed system.
PROC2 (Storage)	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. (Efficiency of at least 30 %)
PROC8b (Bulk), PROC8b (Drum/batch transfers), PROC8b (refuelling)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 90 %)
Organisational measures	
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. (Efficiency of at least 83 %)
Risk management measures related to human hea	lth
Respiratory protection	No special measures are required.

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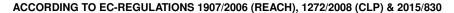


	PROC2		Wear suitable gloves tested to EN374. (Efficiency of at least 80 %)
Hand and/or Skin protection	PROC8a (Maintenan	ce)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency of at least 98 %)
Eye Protection	No special measures	are required	d.
Other operational conditions affecting worker exp	osure		
Wear suitable coveralls to prevent exposure to the ski	n. Clear transfer lines pr	rior to de-cou	ıpling. Avoid dip sampling.
2.2 Control of environmental exposure			
Amounts used			
Fraction of EU tonnage used in region:		0.1	
Regional use tonnage (tons/year):		4.5E+02	
Fraction of Regional tonnage used locally: (tons/year)		5.0E-04	
Annual site tonnage (tons/year):		0.23	
Average daily use (kg/day):		0.62	
Environment factors not influenced by risk manag	iement	•	
Flow rate of receiving surface water (m³/d):		Not define	ed (default = 18,000)
Local freshwater dilution factor:		10	. ,
Local marine water dilution factor:		100	
Operational conditions			
Emission days (days/year):		365	
Release fraction to air from process (initial release prior to RMM):		1.0E-02	
Release fraction to wastewater from process (initial release prior to RMM):		1.0E-05	
Release fraction to soil from process (initial release prior to RMM):		1.0E-05	
Technical onsite conditions and measures to redu			
Treat air emission to provide a typical removal efficien	• ,	Not applic	cable
If there is no discharge to domestic sewage treatment plant, Treat onsite			
wastewater (prior to receiving water discharge) to provide the required		0	
removal efficiency of (%):			
If discharging to domestic sewage treatment plant, pro	ovide the required	0	
onsite wastewater removal efficiency of >= (%)		U	
Treat soil emission to provide a typical removal efficient		0	
Common practices vary across sites thus conservative wastewater treatment required.	e process release estim	ates used. If	discharging to domestic sewage treatment plant, no onsite
Organisational measures to prevent/limit release f			
Do not apply industrial sludge to natural soils. Sludge		ontained or	reclaimed.
Conditions and measures related to municipal sev	•		
Size of municipal sewage system/treatment plant (m³/d)		2000	
Degradation effectiveness (%)		97.0	
Conditions and measures related to external treati			
External treatment and disposal of waste should comp		and/or natior	nal regulations.
Substance release quantities after risk manageme			
Maximum allowable site tonnage (MSafe) based on rewastewater treatment removal (kg/d):	elease following total	1100	

3.1 Human exposure prediction

Inhalation		Der	Combined		
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.35	0.35	0.14	0.59	0.94
PROC3	0.70	0.70	0.03	0.15	0.85
PROC8a (Maintenance)	0.85	0.85	0.03	0.12	0.97
PROC8b (Bulk)	0.25	0.25	0.07	0.30	0.55
PROC8b (Drum/batch	0.25	0.25	0.07	0.30	0.55

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transfers)					
PROC8b (refuelling)	0.25	0.25	0.07	0.30	0.55
PROC16	0.50	0.50	0.03	0.15	0.65

3.2 Environmental exposure prediction Exposure assessment (method/calculation model)

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

Naphtha (petroleum), isomerization is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

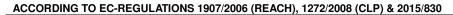
Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	9.4E-08 mg/L	3.9E-04 mg/L	9.2E-07 mg/L	5.7E-06 mg/kg ww	7.6E-04 mg/kg ww	1.6E-06 mg/kg ww
Risk characterisation ratio (RCR)	1.3E-08	2.6E-03	6.1E-06	2.9E-06	9.5E-04	2.1E-06

Human exposure prediction:

Route of Exposure	Exposure (µg/kg <sup>-1</sup> day <sup>-1</sup> )	Risk characterisation ratio (RCR)
Oral	0.031	3.1E-04
Inhalation	0.1	1.1E-04

4.0 Evaluation guidance to down	stream user		
For scaling see	risks are managed to at least Available hazard data do not Further details on scaling an for-industries-libraries.html).	support the need for a DNEL to be established for other health effects.  Indicate the control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-  zene and assumes that the substance contains 1 % benzene. Arithmetic scaling	
Exposure assessment	Worker	ECETOC TRA	
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmen exposure with the Petrorisk model.	

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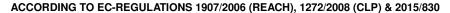


# Exposure Scenario 5 – Use of Naphtha (petroleum), isomerization (0 – 1 % benzene content) as a fuel - Consumer

1.0 Contributing Scenarios			
Sector of uses SU	SU21 Consumer uses: Private households (= general public = consumers)		
Process category [PROC]	Not applicable		
Chemical product category [PC]	PC13 PC13 (Automotive refueling) PC13 (Scooter refueling) PC13 (Garden equipment refueling) PC13 (Garden equipment use)		
Article Categories [AC]	Not applicable		
Environmental release categories [ERC]	ERC9a ERC9b		
Specific Environmental Release Categories SPERC	ESVOC SpERC 9.12c.v1		

Product characteristics Physical form of product Dencentration of substance in product Dencentration of substance area (Skin Contact) Dencentration of use Dencentration of use Dence Den	2.0 Operational conditions and risk management measures					
Physical form of product Concentration of substance in product Covers concentrations up to 100% (≤ 1 % benzene content)    Covers concentrations up to 100% (≤ 1 % benzene content)	2.1 Control of worker exposure					
Concentration of substance in product   Covers concentrations up to 100% (≤ 1 % benzene content)	Product characteristics					
Potential exposure area (Skin Contact)  PC13  Automotive refueling; Garden equipment use; Garden equipment refueling Garden equipment use; Garden equipment refueling  PC13  Automotive refueling; Scooter refueling Garden equipment use; Garden equipment use; Garden equipment refueling; Scooter						
Potential exposure area (Skin Contact)  PC13  Automotive refueling: Garden equipment use; Garden equipment refueling; Scooter refueling; Garden equipment use; Garden equipment refueling 37500  Automotive refueling 37500  Automotive refueling 37500  Scooter refueling 37500  Scooter refueling 37500  Scooter refueling 3750  Other operational conditions affecting worker exposure  Automotive refueling 3750  Characteristics of the surroundings  PC13  Automotive refueling Garden equipment use; Garden equipment refueling  No specific measures identified.  Automotive refueling: Scooter ref			entrations up to 100% (≤ 1 % benzene o	content)		
Potential exposure area (Skin Contact)  Potential exposure duration of use  Exposure duration (hours/Event)  Potential exposure expo	Human factors not influenced by risk managemen	nt	1			
Garden equipment use; Garden equipment refueling  Exposure duration (hours/Event)  PC13  PC13  Automotive refueling; Scooter refueling; Garden equipment use Garden equipment use Garden equipment refueling  Covers frequency up to: weekly use)  PC13  Automotive refueling; Covers frequency up to: weekly use)  Garden equipment use; Garden equipment refueling  PC13  Automotive refueling Scooter refueling 37500  Scooter refueling 37500  Scooter refueling 37500  Scooter refueling 37500  Scooter refueling 3750  Scooter refueling 3750  Covers frequency up to: once in two weeks.)  Automotive refueling Garden equipment refueling 3750  Scooter refueling Garden equipment refueling 3750  Covers frequency up to: once in two weeks.  Automotive refueling Garden equipment refueling 3750  Covers frequency up to: once in two weeks.  Automotive refueling Garden equipment refueling  Covers frequency up to: once in two weeks.  To outdoor Garden equipment refueling  Covers frequency up to: once in two weeks.  To outdoor Garden equipment refueling  Covers frequency up to: once in two weeks.  To outdoor Garden equipment refueling  Covers frequency up to: once in two weeks.  To outdoor Garden equipment use; Garden equipment use; Garden equipment use; Garden equipment refueling; Scooter refueling Scooter refueling To outdoor Garden equipment use; Garden equipment use; Garden equipment use; Garden equipment refueling To outdoor Garden equipment use; Garden equipment use; Garden equipment refueling To outdoor Garden equipment use; Garden equipment u				210 cm <sup>2</sup>		
Garden equipment refuelling   420 cm²	Potential exposure area (Skin Contact)	PC13				
Exposure duration (hours/Event)  PC13  Automotive refueling; Scooter refueling Garden equipment use 0.03 Garden equipment refueling 2.00  Automotive refueling 5.2 (Covers frequency up to: weekly use)  PC13  Automotive refueling 2.00  Automotive refueling 5.2 (Covers frequency up to: weekly use)  Garden equipment use; Garden equipment refueling in two weeks.)  Amounts used (g/Event)  PC13  Automotive refueling 37500  Garden equipment use; Other operational conditions affecting worker exposure  Area of use  Characteristics of the surroundings  PC13  Automotive refueling 3750  Garden equipment use; Garden equipment refueling  Total and and conditions affecting worker exposure  Characteristics of the surroundings  PC13  Automotive refueling; Scooter refue				420 cm <sup>2</sup>		
Automotive refueling; Scooter refueling; Scooter refueling; Scooter refueling; Scooter refueling and scooter refueling seed scooter refueling scoot	Frequency and duration of use		Carden equipment reliceling			
PC13   Scooter refueling   D.05	requeries and duration of doc		Automotive refueling:			
PC13   Garden equipment use   0.03   2.00		5040		0.05		
Automotive refueling; Scooter refueling; Scooter refueling; Scooter refueling weekly use)  Amounts used (g/Event)  Amounts used (g/Event)  PC13  Automotive refueling  Automotive refueling  Automotive refueling  Automotive refueling  Automotive refueling  Scooter refueling  Area of use  Characteristics of the surroundings  PC13  Automotive refueling  Scooter refueling  Automotive refueling  Area of use  Not defined  Automotive refueling  Automotive refueling  Area of use  Not defined  Automotive refueling  Automotive refueling  Automotive refueling  Automotive refueling  Scooter refueling  Automotive refueling  Scooter refueling  Scooter refueling;  Scooter refueling  Automotive	Exposure duration (hours/Event)	PC13		0.03		
Amounts used (g/Event)  PC13  Automotive refueling  Garden equipment use; Garden equipment use; Garden equipment use; Garden equipment refueling  750  PC13  Automotive refueling  37500  Automotive refueling  750  Automotive refueling  Automotive refueling  Characteristics of the surroundings  PC13  Automotive refueling; Scooter refueling; Scooter refueling; Garden equipment use  Garden equipment use  Garden equipment refueling  34 m³  Risk Management Measures  Respiratory protection  No specific measures identified.  No specific measures identified.  PC12 Control of environmental exposure  Amounts used  Fraction of EU tonnage used in region:  0.1			Garden equipment refueling	2.00		
Scooter refueling (Covers frequency up to: weekly use)  Garden equipment use; Garden equipment refueling (Covers frequency up to: once in two weeks.)  Amounts used (g/Event)  PC13  Automotive refueling 37500 Scooter refueling 37500 Garden equipment use; Garden equipment refueling 750  PC13  Cher operational conditions affecting worker exposure  Automotive refueling 3750 Garden equipment use; Garden equipment refueling 750  PC13  Automotive refueling 750  Outdoor Garden equipment use Gard			Automotive refueling:			
Frequency of use (days per year)  PC13  Garden equipment use; Garden equipment refueling  Automotive refueling  PC13  Automotive refueling  Garden equipment use; Garden equipment refueling  PC13  PC13  Automotive refueling  FC14  Automotive refueling  FC15  Automotive refueling; Scooter refueling; Scooter refueling; Garden equipment use Garden equipment use Garden equipment use Garden equipment use  FC16  Garden equipment use Garden equipmen						
Garden equipment use; (Covers frequency up to: once in two weeks.)  Amounts used (g/Event)  Amounts used (g/Event)  PC13  Automotive refueling  Scooter refueling  Garden equipment use; (Tovers frequency up to: once in two weeks.)  Scooter refueling  Garden equipment use; (Tovers)  Garden equipment use; (Tovers)  Garden equipment refueling  Tovers of use  Not defined  Characteristics of the surroundings  PC13  Automotive refueling; (Tovers)  Scooter refueling; (Tovers)  Garden equipment use (	Frequency of use (days per year)	PC13	Cooter relacing			
Amounts used (g/Event)  PC13  Automotive refueling Scooter refueling Garden equipment use; Garden equipment refueling 37500  Scooter refueling 3750  Garden equipment use; Garden equipment refueling 750  Pther operational conditions affecting worker exposure Area of use  Characteristics of the surroundings  PC13  Automotive refueling; Scooter refueling; Garden equipment use Garden equipment use Garden equipment use Garden equipment refueling 34 m³  Risk Management Measures  Respiratory protection No specific measures identified.  No specific measures identified.  Reprotection No specific measures identified.	· · · · · · · · · · · · · · · · · · ·		Garden equipment use;			
Amounts used (g/Event)  PC13  Automotive refueling Scooter refueling Garden equipment use; Garden equipment refueling  PC13  Automotive refueling Garden equipment use; Garden equipment refueling  Automotive refueling; Characteristics of the surroundings  PC13  Automotive refueling; Scooter refueling; Garden equipment use Garden equipment use Garden equipment refueling  Garden equipment refueling  Automotive refueling; Scooter refueling; Garden equipment use Garden equipment use Garden equipment refueling  Automotive refueling; Scooter refueling; Scooter refueling; Scooter refueling; Garden equipment use Garden equipment use Garden equipment refueling  No specific measures identified.  No specific measures identified.  PC13  No specific measures identified.  PC14  PC15  Automotive refueling  Scooter refueling  Automotive refueling  Automotive refueling  For a cooter refueling  Scooter refueling  Automotive refueling  For a cooter refueling  Scooter refueling  For a cooter refueling  Total Cooter Refuelin			Garden equipment refueling			
Amounts used (g/Event)  PC13  Scooter refueling Garden equipment use; Garden equipment refueling  PC13  Automotive refueling; Scooter refueling; Scooter refueling; Outdoor Garden equipment use Garden equipment refueling; Scooter refueling; Garden equipment use Garden equipment refueling  3750  Outdoor Garden equipment refueling  34 m3  Risk Management Measures Respiratory protection No specific measures identified.  No specific measures identified.  Eye Protection No specific measures identified.  Control of environmental exposure  Amounts used  Fraction of EU tonnage used in region:  Outdoor Garden equipment refueling  Automotive refueling  Scooter refueling  Scooter refueling  Automotive refueling  Scooter refueling  Scooter refueling  Automotive refueling  Scooter refueling  Scooter refueling  Scooter refueling  Scooter refueling  Automotive refueling  Scooter refueling  Scooter refueling  Scooter refueling  Scooter refueling  Automotive refueling  Scooter refue			Automotive refueling			
Garden equipment use; Garden equipment refueling  Characteristics of the surroundings  Characteristics of the surroundings						
Characteristics of the surroundings  Respiratory protection And and/or Skin protection And a	Amounts used (g/Event)	PC13				
Area of use  Characteristics of the surroundings  PC13  Automotive refueling; Scooter refueling; Garden equipment use  Garden equipment refueling  Respiratory protection And and/or Skin protection And and/or Skin protection No specific measures identified.  Respiratory protection No specific measures identified.				750		
Automotive refueling; Scooter refueling; Garden equipment use Garden equipment refueling  Respiratory protection And and/or Skin protection And and/or Skin protection No specific measures identified.  Respiratory protection No specific measures identified.	Other operational conditions affecting worker exp	osure		·		
Characteristics of the surroundings  PC13  Scooter refueling; Garden equipment use  Garden equipment refueling  34 m³  Risk Management Measures  Respiratory protection No specific measures identified. Hand and/or Skin protection No specific measures identified.  Eye Protection No specific measures identified.  Eye Protection No specific measures identified.  Eye Protection Outdoor	Area of use	Not defined				
Characteristics of the surroundings  PC13  Garden equipment use  Garden equipment refueling  34 m³  Risk Management Measures  Respiratory protection  No specific measures identified.  Hand and/or Skin protection  No specific measures identified.  Eye Protection  No specific measures identified.  Pospecific measures identified.						
Garden equipment use  Garden equipment refueling 34 m³  Risk Management Measures Respiratory protection No specific measures identified. Hand and/or Skin protection No specific measures identified. Eye Protection No specific measures identified.  2.2 Control of environmental exposure  Amounts used Fraction of EU tonnage used in region: 0.1	Characteristics of the surroundings	DC12		Outdoor		
Respiratory protection	Characteristics of the surroundings	FO13				
Respiratory protection And and/or Skin protection No specific measures identified. No specific measures identified. No specific measures identified.  Public Protection No specific measures identified.			Garden equipment refueling	34 m³		
Hand and/or Skin protection  No specific measures identified.  No specific measures identified.  Control of environmental exposure  Amounts used  Fraction of EU tonnage used in region:  0.1	Risk Management Measures					
Protection  No specific measures identified.  2.2 Control of environmental exposure  Amounts used  Fraction of EU tonnage used in region:  0.1						
2.2 Control of environmental exposure Amounts used Fraction of EU tonnage used in region:  0.1						
Amounts used Fraction of EU tonnage used in region:  0.1	Eye Protection	No specific m	neasures identified.			
Fraction of EU tonnage used in region: 0.1	2.2 Control of environmental exposure					
	Regional use tonnage (tons/year):			·		
	Fraction of Regional tonnage used locally: (tons/year)			5.0E-04		
Annual site tonnage (tons/year): 5.1			5.1	5.1		
	Average daily use (kg/day):		14			
Environment factors not influenced by risk management		gement				
Flow rate of receiving surface water (m³/d):  Not defined (default = 18,000)	Flow rate of receiving surface water (m³/d):		Not defined (default = 18,00	Not defined (default = 18,000)		
	Local freshwater dilution factor:					
ocal marine water dilution factor:	Local marine water dilution factor:		100			
Operational conditions	Operational conditions		ı			

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Emission days (days/year):	365			
Release fraction to air from process (initial release prior to RMM):	1.0E-02			
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05			
Release fraction to soil from process (initial release prior to RMM):	1.0E-05			
Conditions and measures related to municipal sewage treatment plant				
Size of municipal sewage system/treatment plant (m³/d)	2000			
Degradation effectiveness (%)	97.0			
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.				
Substance release quantities after risk management measures				
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	2400			

#### 3.1 Human exposure prediction

Exposure assessment (method/calculation model)

ECETOC TRA (benzene content)

Yearly Use (Chronic)

Inhalation		Dermal		Combined	
Chemical product category [PC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PC13 (Automotive refueling)	0.002	0.69	0.00	0.01	0.70
PC13 (Scooter refueling)	0.001	0.46	0.00	0.01	0.47
PC13 (Garden equipment use)	0.003	0.87	0.00	0.00	0.87
PC13 (Garden equipment refueling)	0.001	0.18	0.00	0.02	0.20

### 3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

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

Naphtha (petroleum), isomerization is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.1E-06 mg/L	3.9E-04 mg/L	9.4E-07 mg/L	5.9E-06 mg/kg ww	7.6E-04 mg/kg ww	1.8E-06 mg/kg ww
Risk characterisation ratio (RCR)	3.0E-07	2.6E-03	6.3E-06	3.6E-06	9.5E-04	2.2E-06

Human exposure prediction:

Route of Exposure	of Exposure Exposure (μg/kg <sup>-1</sup> day <sup>-1</sup> ) Risk characterisation ι (RCR)	
Oral	0.031	3.1E-04
Inhalation	0.44	1.1E-04

4.0 Evaluation guidance to downstream user				
	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that			
For scaling see	risks are managed to at least equivalent levels.			
	Available hazard data do not support the need for a DNEL to be established for other health effects.			
	Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-			
	for-industries-libraries.html).			
	Exposure calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling			

Revision: 4.1 Date: 10.06.2019

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



	may be possible if the batch contains < 1 % benzene		
Exposure assessment instrument/tool/method	Consumer	ECETOC TRA	
	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	