Revision: 4.1 Date: 10.06.2019

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



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

1.1 Product identifier

Product Name Naphtha (petroleum), catalytic reformed

Product Description V4048-RAFFINATE-Naphtha (petroleum), catalytic reformed

Trade Name RAFFINATE
Product code RAFF
CAS No. 68955-35-1
EC No. 273-271-8

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), catalytic reformed (0 – 1	12
	% benzene content)	
2	Formulation and (re)packing of Naphtha (petroleum), catalytic	15
	reformed (0 – 1 % benzene content)	
3	Use of Naphtha (petroleum), catalytic reformed (0 − 1 %	18
	benzene content) as a fuel - Industrial	j
4	Use of Naphtha (petroleum), catalytic reformed (0 − 1 %	21
	benzene content) as a fuel - Professional	ļ
5	Use of Naphtha (petroleum), catalytic reformed (0 − 1 %	24
	benzene content) as a fuel - Consumer	

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 V4048-RAFFINATE-Naphtha (petroleum), catalytic reformed

Page: 1 of 26

Revision: 4.1 Date: 10.06.2019

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



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), catalytic reformed	68955-35-1	273-271-8	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.

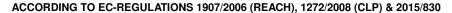
IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight

Inhalation

H2S Warning:

Page: 2 of 26

Revision: 4.1 Date: 10.06.2019





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

5.3

Suitable Extinguishing media

Unsuitable extinguishing media

Advice for fire-fighters

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.

SECTION 6: ACCIDENTAL RELEASE MEASURES

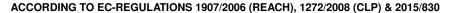
6.1 Personal precautions, protective equipment and emergency procedures Caution - spillages may be slippery. Ensure operatives are trained to minimise exposures. Ensure suitable personal protection during removal of spillages. Eliminate sources of ignition. Shut off leaks if without risk. Keep away from 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

Page: 3 of 26

Revision: 4.1 Date: 10.06.2019





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

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

6.2 Environmental precautions

Small spillages:

Large spillages:

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

7.1 Precautions for safe handling

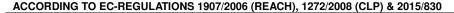
H2S Warning:

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

Revision: 4.1 Date: 10.06.2019





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 Incompatible materials

Storage temperature

7.3 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), catalytic reformed 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), catalytic reformed Derived No Effect Level	Oral	Inhalation	Dermal
Worker - Long Term - Systemic effects	-	1300 mg/m ³	-
Worker - Long Term - Local effects	-	840 mg/m ³	-
Worker - Acute - Local effects	-	1100 mg/m ³	-
Consumer - Long Term - Systemic effects	-	1200 mg/m ³	-
Consumer - Long Term - Local effects	-	180 mg/m ³	-
Consumer - Acute - Local effects	-	640 mg/m ³	-

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.

Revision: 4.1 Date: 10.06.2019





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

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

9.1 Information on basic physical and chemical

properties

Appearance Colourless liquid
Odour Hydrocarbon
Odour threshold Not established.
pH Not established.
Melting point/freezing point < - 60 °C

Initial boiling point and boiling range < 35 °C
Flash point < 0 °C
Evaporation rate Not established.

Flammability (solid, gas)

Not applicable - Liquid

Upper/lower flammability or explosive limits

Not applicable - Liquid

Flammable Limits (Lower) (%v/v) 1

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

Vapour pressure 4 - 240 kPa @ 37.8°C

Vapour density > 2

Relative density $0.62-0.88 \text{ g/cm}^3 \otimes 15 ^{\circ}\text{C}$ 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 mm²/s @ 20 °C

I mm²/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

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

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

Product may release Hydrogen Sulphide.

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

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

of ignition and flashback. Product may release Hydrogen Sulphide.

10.4 Conditions to avoid Elevated temperature. Keep away from heat, hot surfaces, sparks, open flames

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

Incompatible materials 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

10.5

11.1 Information on toxicological effects

All test data taken from existing ECHA registrations for the substances

mentioned.

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

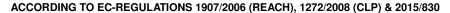
LD50 > 5000 mg/kg bw/day (rat) (OECD 401)

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

Page: 6 of 26

Acute toxicity - Skin Contact

Revision: 4.1 Date: 10.06.2019





LC50 Vapour > $5600 \text{ mg/m}^3 \text{ Air (rat) (OECD 403)}$

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

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 Naphtha (petroleum), catalytic reformed 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 Naphtha (petroleum), catalytic reformed 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 Naphtha (petroleum), catalytic reformed 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

STOT - repeated exposure 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/m³ 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

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

Page: 7 of 26

Revision: 4.1 Date: 10.06.2019

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



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	UN1268	UN1268
14.2	Proper Shipping Name	PETROLEUM DISTILLATE, Naphtha (petroleum), catalytic reformed	PETROLEUM DISTILLATE, Naphtha (petroleum), catalytic reformed
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 vapour is heavier than air; beware of pits and confined spaces.	
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	le 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: 500 ml	Limited Quantity: 500ml

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), catalytic reformed (CAS No. 68955-35-1) 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 PPB very Persistent and very Bioaccumulative

OECD Organisation for Economic Cooperation and Development

Page: 8 of 26

Revision: 4.1 Date: 10.06.2019

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



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 -

Revision: 4.1 Date: 10.06.2019

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



Naphtha (petroleum), catalytic reformed (0 -1% benzene content)

CAS Number 68955-35-1 EC Number 273-271-8

Summary of Parameters

Physical Parameters			
Vapour pressure (Pa)			4 – 240 @ 37.8 °C (Value used for exposure assessment = 340)
Partition Coefficient (log K _{ow})			2.00 - 20.43
Aqueous solubility (mg L ⁻¹)			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
vvorker	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 ⁻¹ bw/day ⁻¹)	8.8

Environmental Parameter (PNECs)

Naphtha (petroleum), catalytic reformed 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.

Page: 10 of 26

^{*} Concentration: benzene (Worst case assumption. Contains benzene. @1%).

Revision: 4.1 Date: 10.06.2019

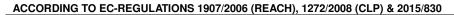




Table of Contents

Number	Title	Page:
Exposure Scenario 1	Distribution of Naphtha (petroleum), catalytic reformed (0 – 1 % benzene content)	12
Exposure Scenario 2	Formulation and (re)packing of Naphtha (petroleum), catalytic reformed (0 – 1 % benzene content)	15
Exposure Scenario 3	Use of Naphtha (petroleum), catalytic reformed $(0-1\%$ benzene content) as a fuel - Industrial	18
Exposure Scenario 4	Use of Naphtha (petroleum), catalytic reformed (0 – 1 % benzene content) as a fuel - Professional	21
Exposure Scenario 5	Use of Naphtha (petroleum), catalytic reformed (0 – 1 % benzene content) as a fuel - Consumer	24

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 facilities 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 PROC16	Use as laboratory reagent. 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
. 0.0	(Automotive refueling)
	(Scooter refueling)
	(Garden equipment refueling)
	(Garden equipment use)
	(darden equipment dee)

Revision: 4.1 Date: 10.06.2019

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



Exposure Scenario 1 – Distribution of Naphtha (petroleum), catalytic reformed (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 ERC6b ERC6c ERC6c ERC6c		
Specific Environmental Release Categories SPERC	ESVOC SpERC 1.1b v.1		

2.0 Operational conditions and risk manage 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 10	00% (≤ 1 % benzene content)		
Human factors not influenced by risk management				
Potential exposure area	Not defined	Not defined		
Frequency and duration of use				
Exposure duration per day	Covers daily exposures up to 8	Covers daily exposures up to 8 hours (unless stated differently).		
Frequency of use (days per year)	300	300		
Other operational conditions affecting work	er exposure			
	PROC3, PROC2 (Storage)	Outdoor		
Area of use	All other PROC's	Not defined (default = Indoor)		
Characteristics of the surroundings	Not defined	Not defined		

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)

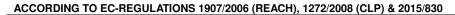
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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, PROC3	Handle substance within a closed system.		
PROC8b (Bulk)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 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 9			
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. (Inhalation - efficiency of at least 90 %)		

Revision: 4.1 Date: 10.06.2019





Risk management measures related to human heal	th		
Respiratory protection	No special measures	are required	•
	PROC2		Wear suitable gloves tested to EN374. (Efficiency of at least 80 %)
Hand and/or Skin protection	PROC8a (Maintenand	ce)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency of 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 skir	. Clear transfer lines pr	ior 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):		1.11E+07	
Fraction of Regional tonnage used locally: tons/year		2.0E-03	
Annual site tonnage (tons/year):		21,202	
Average daily use (kg/day)		70,675	
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 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	
Technical onsite conditions and measures to reduce		air emissio	ns and releases to soil
Treat air emission to provide a typical removal efficiency of (%): 90			
If there is no discharge to domestic sewage treatment			
wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):		0	
If discharging to domestic sewage treatment plant, pro- onsite wastewater removal efficiency of >= (%)	vide the required	0	
Treat soil emission to provide a typical removal efficien	cy of (%):	0	
Common practices vary across sites thus conservative wastewater treatment required.	process release estima	ates used. If	discharging to domestic sewage treatment plant, no onsite
Organisational measures to prevent/limit release fr			
Do not apply industrial sludge to natural soils. Sludge s		ontained or r	eclaimed.
Conditions and measures related to municipal sew			
Size of municipal sewage system/treatment plant (m³/d)		2000	
Degradation effectiveness (%)			
Conditions and measures related to external treatn	-		
External treatment and disposal of waste should comp		and/or nation	al regulations.
Substance release quantities after risk management	nt measures	1	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):		2.58E+06	

3. Exposure estimation and reference to its source	
3.1 Human exposure prediction	
Exposure assessment (method/calculation model)	ECETOC TRA (banzana content)

	Inha	lation	Dei	Dermal		
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	0.25	0.25	0.14	0.57	0.84	

Page: 13 of 26

Revision: 4.1 Date: 10.06.2019

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



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

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), catalytic reformed 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)	1.44 mg/L	5.06E-03 mg/L	1.45E-04 mg/L	1,68E-4 mg/kg ww	9.88E-03 mg/kg ww	9.88E-04 mg/kg ww	
Risk characterisation ratio (RCR)	1.64E-03	2.74E-02	7.50E-04	7.99E-05	9.98E-03	9.93E-03	

Human exposure prediction:

Route of Exposure	Exposure (μg/kg ⁻¹ day ⁻¹)	Risk characterisation ratio (RCR)
Oral	0.36	3.62E-03
Inhalation	5.66	6.10E-3

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

Page: 14 of 26

Revision: 4.1 Date: 10.06.2019

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



Exposure Scenario 2 – Formulation and (re)packing of Naphtha (petroleum), catalytic reformed (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	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 manage	ment						
Potential exposure area Not defined							
Frequency and duration of use							
Exposure duration per day	Covers daily exposures u	p to 8 hours (unless stated differently).					
Frequency of use (days per year)	300						
Other operational conditions affecting worker	exposure						
Area of use	PROC3	Outdoor					
Area or use	All other PROC's	Not defined (default = Indoor)					
Characteristics of the surroundings	Not defined						

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)

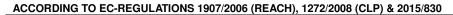
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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)	PROC3 (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	ROC15 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 %)			
Trana and/or Skiri protection	PROC8a (Maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency of			

Revision: 4.1 Date: 10.06.2019





	at least 90 %)						
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							
Amounts used							
Fraction of EU tonnage used in region:		0.1					
Regional use tonnage (tons/year):		9.97E+06					
Fraction of Regional tonnage used locally: (tons/year)		3.0E-03					
Annual site tonnage (tons/year):		3.0E+04					
Average daily use (kg/day):		1.0E+05					
Environment factors not influenced by risk manager	ment						
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):		300					
Release fraction to air from process (initial release prior		2.5E-02					
Release fraction to wastewater from process (initial release		6.4E-04					
Release fraction to soil from process (initial release prior		1.0E-04					
Technical onsite conditions and measures to reduce							
Treat air emission to provide a typical removal efficiency	. ,	0					
If there is no discharge to domestic sewage treatment pl							
wastewater (prior to receiving water discharge) to provid	le the required	95.7					
removal efficiency of (%):							
If discharging to domestic sewage treatment plant, provi	de the required	0					
onsite wastewater removal efficiency of >= (%)							
Treat soil emission to provide a typical removal efficience	• \ /	0					
wastewater treatment required.		tes 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 sh	ould be incinerated, co	ontained or reclaimed.					
Conditions and measures related to municipal sewa	ge treatment plant	T					
Size of municipal sewage system/treatment plant (m³/d)		2000					
Degradation effectiveness (%)		96.1					
Conditions and measures related to external treatme							
External treatment and disposal of waste should comply		nd/or national regulations.					
Substance release quantities after risk management							
Maximum allowable site tonnage (MSafe) based on release wastewater treatment removal (kg/d):	ase following total	1.0E+05					

3. Exposure estimation and reference to its source
3.1 Human exposure prediction

	Inhalation Dermal		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

Page: 16 of 26

Revision: 4.1 Date: 10.06.2019

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



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), catalytic reformed 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)	1.31E+00 mg/L	1.32E-01 mg/L	1.32E-02 mg/L	1.67E-03 mg/kg ww	9.00E-01 mg/kg ww	9.00E-02 mg/kg ww
Risk characterisation ratio (RCR)	1.49E-01	6.83E-01	6.83E-02	4.99E-03	9.09E-01	9.09E-02

Human exposure prediction:

Route of Exposure	Exposure (µg/kg ⁻¹ day ⁻¹)	Risk characterisation ratio (RCR)
Oral	7.79	7.79E-02
Inhalation	165	1.78E-01

4.0 Evaluation guidance to downstream user						
For scaling see	risks are managed to at least Available hazard data do not Further details on scaling an for-industries-libraries.html). Exposure calculated for ben	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.				

Revision: 4.1 Date: 10.06.2019

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



Exposure Scenario 3 – Use of Naphtha (petroleum), catalytic reformed (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 aircraft) PROC16 PROC16 PROC16 (Additive)			
Chemical product category [PC]	Not applicable			
Article Categories [AC]	Not applicable			
Environmental release categories [ERC]	ERC7			
Specific Environmental Release Categories SPERC SPERC 7.12a.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.				
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				
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 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			
Constal management annihable to all activities					

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)

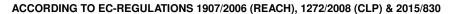
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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),	Ensure material transfers are unde	er containment or extract ventilation. (Efficiency of at least			
PROC8b (refuelling), PROC8b (refuelling aircraft)	90 %)				
Organisational measures					
	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. (Efficiency of at least 86 %)				
Risk management measures related to human heal	th				
Respiratory protection	No special measures are required				
	PPOCO	Wear suitable gloves tested to EN374. (Efficiency of at			
Hand and/or Skin protection	PROC2	least 80 %)			
	PROC8a (Maintenance)	Wear chemically resistant gloves (tested to EN374) in			

Revision: 4.1 Date: 10.06.2019





			combination with 'basic' employee training. (Efficiency of		
Eye Protection	at least 90 %) No special measures are required.				
Other operational conditions affecting worker exposure					
		or to do cou	nling. Avoid din compling		
Wear suitable coveralls to prevent exposure to the skin	i. Clear transfer lines pri	or to de-cou	ping. Avoid dip samping.		
2.2 Control of environmental exposure Amounts used					
Fraction of EU tonnage used in region:		0.1			
Regional use tonnage (tons/year):		9.38E+05			
Fraction of Regional tonnage used locally: (tons/year)		1			
Annual site tonnage (tons/year):		9.38E+05			
Average daily use (kg/day):		3.13E+06			
Environment factors not influenced by risk manage	ement	3.13L+00			
Flow rate of receiving surface water (m³/d):	ment	Not define	ed (default = 18,000)		
Local freshwater dilution factor:		10	a (default = 10,000)		
Local marine water dilution factor:		100			
Operational conditions		100			
Emission days (days/year):		300			
Release fraction to air from process (initial release prio	r to BMM):	5.00E-02			
Release fraction to wastewater from process (initial release		1.0E-05			
Release fraction to soil from process (initial release prices)		0			
Technical onsite conditions and measures to reduce		air emissio	ns and releases to soil		
Treat air emission to provide a typical removal efficiency of (%):					
If there is no discharge to domestic sewage treatment	olant, Treat onsite				
wastewater (prior to receiving water discharge) to provi	ide the required	91.1			
removal efficiency of (%):					
If discharging to domestic sewage treatment plant, pro-	vide the required	0			
onsite wastewater removal efficiency of >= (%)		U			
Treat soil emission to provide a typical removal efficien	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 fr	om site				
Do not apply industrial sludge to natural soils. Sludge s		ontained or r	eclaimed.		
Conditions and measures related to municipal sew	age treatment plant				
Size of municipal sewage system/treatment plant (m³/d)		2000			
Degradation effectiveness (%)			96.1		
Conditions and measures related to external treatn	nent of waste for dispo	sal			
External treatment and disposal of waste should compl	y with applicable local a	nd/or nation	al regulations.		
Substance release quantities after risk managemen					
Maximum allowable site tonnage (MSafe) based on rel wastewater treatment removal (kg/d):		5.30E+06			

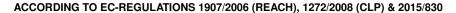
3. Exposure estimation and reference to its source

3.1 Human exposure prediction

	Inha	Inhalation		Dermal		
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	

Page: 19 of 26

Revision: 4.1 Date: 10.06.2019





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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), catalytic reformed 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.

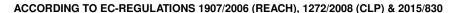
Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	6.39E-01 mg/L	6.40E-02 mg/L	6.40E-02 mg/L	5.07E-03 mg/kg ww	4.37E-01 mg/kg ww	4.37E-02 mg/kg ww
Risk characterisation ratio (RCR)	7.24E-02	3.32E-01	3.32E-02	1.52E-02	4.41E-01	4.41E-02

Human exposure prediction:

Route of Exposure	Exposure (μg/kg ⁻¹ day ⁻¹)	Risk characterisation ratio (RCR)
Oral	3.90	3.90E-02
Inhalation	511	5.51F-01

4.0 Evaluation guidance to downstream user						
For scaling see	risks are managed to at lead Available hazard data do no Further details on scaling for-industries-libraries.html Exposure calculated for be	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.				

Revision: 4.1 Date: 10.06.2019





Exposure Scenario 4 – Use of Naphtha (petroleum), catalytic reformed (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	

neasures			
Liquid with high volatility.			
	o 100% (≤ 1 % benzene content)		
t			
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			
	Covers concentrations up to t Not defined Covers daily exposures up 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)

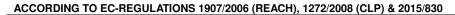
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise 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, 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	ith
Respiratory protection	No special measures are required.

Revision: 4.1 Date: 10.06.2019





	PROC2		Wear suitable gloves tested to EN374. (Efficiency of at least 80 %)	
Hand and/or Skin protection PROC8a (Maintenance)		ee)	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		
Other operational conditions affecting worker exp	osure			
Wear suitable coveralls to prevent exposure to the sk	in. Clear transfer lines pri	or to de-cou	pling. Avoid dip sampling.	
2.2 Control of environmental exposure				
Amounts used		1		
Fraction of EU tonnage used in region:		0.1		
Regional use tonnage (tons/year):		8.85E+05		
Fraction of Regional tonnage used locally: (tons/year)		5.0E-04		
Annual site tonnage (tons/year):		442		
Average daily use (kg/day):		1211		
Environment factors not influenced by risk manag	gement	1		
Flow rate of receiving surface water (m ³ /d):		Not define	ed (default = 18,000)	
Local freshwater dilution factor:		10		
Local marine water dilution factor:		100		
Operational conditions		1		
Emission days (days/year):		365		
Release fraction to air from process (initial release pri		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 p Technical onsite conditions and measures to redu		1.0E-05	no and valances to sail	
			ns and releases to soil	
Treat air emission to provide a typical removal efficiency of (%):		0		
If there is no discharge to domestic sewage treatmen		0m		
wastewater (prior to receiving water discharge) to pro	vide the required			
removal efficiency of (%):	andala tha na mandua d			
If discharging to domestic sewage treatment plant, proonsite wastewater removal efficiency of >= (%)		0		
Treat soil emission to provide a typical removal efficie		0		
Common practices vary across sites thus conservative wastewater treatment required.	re process release estima	tes used. If	discharging to domestic sewage treatment plant, no onsite	
Organisational measures to prevent/limit release	from site	•		
Do not apply industrial sludge to natural soils. Sludge	should be incinerated, co	ntained or r	eclaimed.	
Conditions and measures related to municipal set		T		
Size of municipal sewage system/treatment plant (m³/d)		2000		
Degradation effectiveness (%)		96.1		
Conditions and measures related to external treat	-			
External treatment and disposal of waste should com		nd/or nation	al regulations.	
Substance release quantities after risk manageme		1		
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):		6.06E+04		

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)	0.85	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

Revision: 4.1 Date: 10.06.2019

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



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), catalytic reformed 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)	2.48E-05 mg/L	3.64E-03 mg/L	1.42E-04 mg/L	2.18E-04 mg/kg ww	7.20E-03 mg/kg ww	3.60E-05 mg/kg ww
Risk characterisation ratio (RCR)	2.81E-05	2.00E-02	7.56E-05	1.99E-04	7.33E-03	3.59E-05

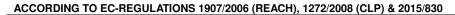
Human exposure prediction:

Route of Exposure	Exposure (µg/kg ⁻¹ day ⁻¹)	Risk characterisation ratio (RCR)	
Oral	2.79	2.79E-03	
Inhalation	5.18	5.58E-03	

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.		

Page: 23 of 26

Revision: 4.1 Date: 10.06.2019



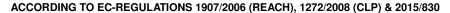


Exposure Scenario 5 – Use of Naphtha (petroleum), catalytic reformed (0 – 1 % benzene content) as a fuel - Consumer

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				

2.0 Operational conditions and risk manage	ment measures				
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid with h	Liquid with high volatility.			
Concentration of substance in product		Covers concentrations up to 100% (≤ 1 % benzene content)			
Human factors not influenced by risk manage	gement				
Detection of the Control	PC13	Automotive refueling; Scooter refueling	210 cm ²		
Potential exposure area (Skin Contact)	F013	Garden equipment use; Garden equipment refueling	420 cm ²		
Frequency and duration of use		<u> </u>	·		
	PC13	Automotive refueling; Scooter refueling	0.05		
Exposure duration (hours/Event)	PC13	Garden equipment use	0.03		
		Garden equipment refueling	2.00		
Frequency of use (days per year)	PC13	Automotive refueling; Scooter refueling	52 (Covers frequency up to: weekly use)		
Friequency of use (days per year)	1 010	Garden equipment use; Garden equipment refueling	26 (Covers frequency up to: once in two weeks.)		
		Automotive refueling	37500		
Amounts used (g/Event)	PC13	Scooter refueling	3750		
,		Garden equipment use; Garden equipment refueling	750		
Other operational conditions affecting work					
Area of use	Not defined				
Characteristics of the surroundings	PC13	Automotive refueling; Scooter refueling; Garden equipment use	Outdoor		
		Garden equipment refueling	34 m³		
Risk Management Measures			-		
Respiratory protection	No specific r	neasures identified.			
Hand and/or Skin protection		neasures identified.			
Eye Protection	No specific r	measures identified.			
2.2 Control of environmental exposure					
Amounts used					
Fraction of EU tonnage used in region:		0.1			
Regional use tonnage (tons/year):		8.15E+06	8.15E+06		
Fraction of Regional tonnage used locally: (tons/year)		5.0E-04			
Annual site tonnage (tons/year):	• /	4.08E+03			
Average daily use (kg/day):		1.12E+04			
Environment factors not influenced by risk	management	1.122107			
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		100			
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Revision: 4.1 Date: 10.06.2019





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 (%)	96.1		
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):	5.31E+05		

3. Exposure estimation and reference to its source

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), catalytic reformed 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)	2.28E-03 mg/L	3.85E-03 mg/L	2.29E-05 mg/L	5.04E-04 mg/kg ww	8.59E-03 mg/kg ww	1.56E-04 mg/kg ww
Risk characterisation ratio (RCR)	2.59E-04	2.10E-02	1.18E-04	1.24E-03	8.73E-03	1.58E-04

Human exposure prediction:

Route of Exposure	Exposure (µg/kg ⁻¹ day ⁻¹)	Risk characterisation ratio (RCR)
Oral	0.30	2.95E-03
Inhalation	5.18	5.58E-03

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 Consumer		ECETOC TRA	
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	