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

### 1.1 Product identifier

| | | |
|---|---|---|
| Trade name | : | Naphtha |
| REACH Registration Number | : | 01-2119474679-18-xxxx |
| Substance name | : | Naphtha (petroleum), full range straight run |
| EC-No. | : | 265-042-6 |

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

| | | |
|---|---|---|
| Use of the Substance/Mixture | : | Industrial use, Use as an intermediate |
| Recommended restrictions on use | : | Use in coatings, Use in cleaning agents |

### 1.3 Details of the supplier of the safety data sheet

| | | |
|---|---|---|
| Supplier | : | Borealis AG<br>Wagramer Strasse 17-19, 1220 Vienna, Austria<br>Telephone: +43 1 22400 0 |
| E-mail address | : | sds@borealisgroup.com |

### 1.4 Emergency telephone number

+358 9 39493416 Shift supervisor, Olefins (24h)
+358 10 4582267 Fire department, Kilpilahti industrial area (24h)
+358 9 471977 / +358 9 4711 (Poison Information Centre)
+44 (0) 1235 239 670 (NCEC Carechem 24)

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**Classification (REGULATION (EC) No 1272/2008)**

| | |
|---|---|
| Flammable liquids, Category 1 | H224: Extremely flammable liquid and vapour. |
| Skin irritation, Category 2 | H315: Causes skin irritation. |
| Germ cell mutagenicity, Category 1B | H340: May cause genetic defects. |

| | |
|---|---|
| Carcinogenicity, Category 1B | H350: May cause cancer. |
| Reproductive toxicity, Category 2 | H361: Suspected of damaging fertility or the unborn child. |
| Specific target organ toxicity - single exposure, Category 3, Central nervous system | H336: May cause drowsiness or dizziness. |
| Aspiration hazard, Category 1 | H304: May be fatal if swallowed and enters airways. |
| Long-term (chronic) aquatic hazard, Category 2 | H411: Toxic to aquatic life with long lasting effects. |

### 2.2 Label elements

**Labelling (REGULATION (EC) No 1272/2008)**

Hazard pictograms :

Signal word : Danger

Hazard statements :

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

Precautionary statements :

**Prevention:**

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

**Response:**

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

P331 Do NOT induce vomiting.

**Storage:**

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

**Additional Labelling**

Contains benzene, n-hexane. Restricted to professional users.

### 2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

| | | |
|---|---|---|
| Substance name | : | Naphtha (petroleum), full range straight run |
| EC-No. | : | 265-042-6 |
| Chemical nature | : | Naphtha (petroleum), full-range straight-run; Low boiling point naphtha; [A complex combination of hydrocarbons produced by distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C 4 through C 11 and boiling in the range of approximately – 20 °C to 220 °C (– 4 °F to 428 °F).] |

**Components**

| Chemical name | CAS-No.<br>EC-No. | Concentration (% w/w) |
|---|---|---|
| Substance of unknown or variable composition, complex reaction products or biological material (UVCB) : | | |
| Naphtha (petroleum), full-range straight-run; Low | 64741-42-0<br>265-042-6 | <= 100 |

| | | |
|---|---|---|
| boiling point naphtha | | |
| Main constituents : | | |
| pentane | 109-66-0<br>203-692-4 | >= 0 - < 70 |
| isopentane | 78-78-4<br>201-142-8 | >= 0 - < 45 |
| n-hexane | 110-54-3<br>203-777-6 | >= 0 - < 40 |
| 2-methylpentane | 107-83-5<br>203-523-4 | >= 0 - < 15 |
| n-heptane | 142-82-5<br>205-563-8 | >= 0 - < 20 |
| toluene | 108-88-3<br>203-625-9 | >= 0 - < 5 |
| benzene | 71-43-2<br>200-753-7 | >= 0,1 - < 5 |

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

General advice : Do not ingest. If swallowed then seek immediate medical assistance.

If inhaled : Move to fresh air.
Keep patient warm and at rest.
Oxygen or artificial respiration if needed.
Seek medical advice immediately.

In case of skin contact : Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.
If symptoms persist, call a physician.

In case of eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
If easy to do, remove contact lens, if worn.
Get medical attention if irritation develops and persists.

If swallowed : If swallowed, call a poison control centre or doctor immediately.
Rinse mouth with water.
Do NOT induce vomiting.
Never give anything by mouth to an unconscious person.

### 4.2 Most important symptoms and effects, both acute and delayed

Symptoms : Symptoms of poisoning:
Dizziness
Headache
Nausea
Shortness of breath
Convulsions
Unconsciousness

Inhalation:
Headache
Nausea
Vomiting
Unconsciousness

Skin contact:
Redness
Irritation

Eye contact:
Irritation

Ingestion:
Few or no symptoms expected.
Nausea
Diarrhoea

Risks : May be fatal if swallowed and enters airways.
Causes skin irritation.
May cause drowsiness or dizziness.
May cause genetic defects.
May cause cancer.
Suspected of damaging fertility or the unborn child.

### 4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Symptoms of poisoning may not appear for several hours.
Keep under medical supervision for at least 48 hours.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Dry powder
Carbon dioxide (CO2)
Foam
Water mist
Sand

| | | |
|---|---|---|
| Unsuitable extinguishing media | : | High volume water jet |

### 5.2 Special hazards arising from the substance or mixture

| | | |
|---|---|---|
| Specific hazards during firefighting | : | Vapours may form explosive mixtures with air.<br>Vapours are heavier than air and may spread along floors.<br>Flash back possible over considerable distance.<br>Fire will produce dense black smoke containing hazardous combustion products (see section 10). |
| Hazardous combustion products | : | Carbon monoxide<br>Carbon dioxide (CO2)<br>Nitrogen oxides (NOx)<br>Hydrogen sulphide<br>Sulphur oxides |

### 5.3 Advice for firefighters

| | | |
|---|---|---|
| Special protective equipment for firefighters | : | Wear self-contained breathing apparatus and protective suit. |
| Further information | : | Observe the risk of explosion.<br>Cool containers/tanks with water spray.<br>In the event of fire and/or explosion do not breathe fumes.<br>Prevent fire extinguishing water from contaminating surface water or the ground water system. |

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Eliminate all ignition sources if safe to do so.
Avoid and prevent all contact and exposure.
Keep people away from and upwind of spill/leak.
Attempt to stop leakage without personal risk.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Ensure adequate ventilation, especially in confined areas.
Use personal protective equipment.
See chapter 8.
Remove all sources of ignition.
Do not use sparking tools.
Pay attention to flashback.

### 6.2 Environmental precautions

Prevent product from entering environment and drains.
If major spillage occurs, contact the proper local authorities.

### 6.3 Methods and material for containment and cleaning up

Soak up with inert absorbent material.
Collect mechanically and dispose in suitable container for disposal.
Non-sparking tools should be used.
Remove from surface water (e.g. by skimming or siphoning).

### 6.4 Reference to other sections

For personal protection see section 8.
For disposal considerations see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

| | | |
|---|---|---|
| Advice on safe handling | : | Avoid exposure - obtain special instructions before use.<br>Do not handle until all safety precautions have been read and understood.<br>Avoid contact with skin, eyes and clothing.<br>Avoid inhalation of vapour or mist.<br>Vapours may form explosive mixtures with air.<br>Use only outdoors or in a well-ventilated area.<br>The following actions are recommended: Closed systems for handling, process and storage.<br><br>Keep away from food, drink and animal feedingstuffs.<br>When using do not eat, drink or smoke.<br>Wash hands before breaks and immediately after handling the product.<br>Take off contaminated clothing and wash before reuse. |
| Advice on protection against fire and explosion | : | Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. All equipment shall be grounded. No sparking tools should be used. Use explosion-proof equipment. |
| Hygiene measures | : | Handle in accordance with good industrial hygiene and safety practice for diagnostics. Avoid and prevent all spillage, contact and exposure. |

### 7.2 Conditions for safe storage, including any incompatibilities

| | | |
|---|---|---|
| Requirements for storage | : | Keep containers tightly closed in a cool, well-ventilated place. |

| | | |
|---|---|---|
| areas and containers | | Keep locked up or in an area accessible only to qualified or authorised persons. Protect from sunlight. Suitable materials for containers: Mild steel Stainless steel |
| Further information on storage conditions | : | Keep away from sources of ignition - No smoking. |
| Advice on common storage | : | Incompatible with oxidizing agents<br>Keep away from food, drink and animal feedingstuffs. |

### 7.3 Specific end use(s)

Specific use(s) : For professional users only.

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Occupational Exposure Limits**

| Components | CAS-No. | Value type (Form of exposure) | Control parameters | Basis |
|---|---|---|---|---|
| pentane | 109-66-0 | TWA | 1.000 ppm<br>3.000 mg/m3 | 2006/15/EC |
| Further information | Indicative | | | |
| | | HTP-arvot 15 min | 630 ppm<br>1.900 mg/m3 | FI OEL |
| | | HTP-arvot 8h | 500 ppm<br>1.500 mg/m3 | FI OEL |
| | | TWA | 1.000 ppm<br>3.000 mg/m3 | 2006/15/EC |
| Further information | Indicative | | | |
| isopentane | 78-78-4 | TWA | 1.000 ppm<br>3.000 mg/m3 | 2006/15/EC |
| Further information | Indicative | | | |
| | | HTP-arvot 15 min | 630 ppm<br>1.900 mg/m3 | FI OEL |
| | | HTP-arvot 8h | 500 ppm<br>1.500 mg/m3 | FI OEL |
| n-hexane | 110-54-3 | TWA | 20 ppm<br>72 mg/m3 | 2006/15/EC |
| Further information | Indicative | | | |
| | | HTP-arvot 8h | 20 ppm<br>72 mg/m3 | FI OEL |
| Further information | The health risk of absorbed amounts of compounds which can pass through the skin to the body cannot be evaluated from their atmospheric | | | |

| | | | | |
|---|---|---|---|---|
| | concentration. Therefore these compounds have the notification 'skin'in the list. Many compounds can be irritating or coorosive when in contact with the skin, especially strong acids and bases. | | | |
| 2-methylpentane | 107-83-5 | HTP-arvot 8h | 500 ppm<br>1.800 mg/m3 | FI OEL |
| | | HTP-arvot 15 min | 630 ppm<br>2.300 mg/m3 | FI OEL |
| n-heptane | 142-82-5 | TWA | 500 ppm<br>2.085 mg/m3 | 2000/39/EC |
| Further information | Indicative | | | |
| | | HTP-arvot 8h | 300 ppm<br>1.200 mg/m3 | FI OEL |
| | | HTP-arvot 15 min | 500 ppm<br>2.100 mg/m3 | FI OEL |
| toluene | 108-88-3 | TWA | 50 ppm<br>192 mg/m3 | 2006/15/EC |
| Further information | Indicative, Identifies the possibility of significant uptake through the skin | | | |
| | | STEL | 100 ppm<br>384 mg/m3 | 2006/15/EC |
| Further information | Indicative, Identifies the possibility of significant uptake through the skin | | | |
| | | HTP-arvot 8h | 25 ppm<br>81 mg/m3 | FI OEL |
| Further information | 'Noise': substances that are known to amplify the harmful effects of noise on hearing, The health risk of absorbed amounts of compounds which can pass through the skin to the body cannot be evaluated from their atmospheric concentration. Therefore these compounds have the notification 'skin'in the list. Many compounds can be irritating or coorosive when in contact with the skin, especially strong acids and bases. | | | |
| | | HTP-arvot 15 min | 100 ppm<br>380 mg/m3 | FI OEL |
| Further information | 'Noise': substances that are known to amplify the harmful effects of noise on hearing, The health risk of absorbed amounts of compounds which can pass through the skin to the body cannot be evaluated from their atmospheric concentration. Therefore these compounds have the notification 'skin'in the list. Many compounds can be irritating or coorosive when in contact with the skin, especially strong acids and bases. | | | |
| benzene | 71-43-2 | TWA | 1 ppm<br>3,25 mg/m3 | 2004/37/EC |
| Further information | Substantial contribution to the total burden via dermal exposure possible, Skin, Carcinogens or mutagens | | | |

**Biological occupational exposure limits**

| Substance name | CAS-No. | Control parameters | Sampling time | Basis |
|---|---|---|---|---|
| toluene | 108-88-3 | toluene: 500 Nanomoles per liter (Blood) | Morning after working day | FI BAT |

**Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:**

| Substance name | End Use | Exposure routes | Potential health effects | Value |
|---|---|---|---|---|
| Naphtha | Workers | Inhalation | Acute systemic effects | 1300 mg/m3 |
| | Workers | Inhalation | Long-term local effects | 840 mg/m3 |
| | Workers | Inhalation | Acute local effects | 1100 mg/m3 |
| | Consumers | Inhalation | Acute systemic effects | 1200 mg/m3 |
| | Consumers | Inhalation | Long-term local effects | 180 mg/m3 |
| | Consumers | | Acute local effects | 640 mg/m3 |

**Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:**

| Substance name | Environmental Compartment | Value |
|---|---|---|
| Naphtha | | |
| Remarks: | Substance is a hydrocarbon with a complex, unknown or variable composition (UVCB)., Conventional methods of deriving PNECs are not appropriate and it is not possible to identify a single representative PNEC for such substances., The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model. | |

## 8.2 Exposure controls

### Engineering measures

The following actions are recommended: Closed systems for handling, process and storage.
Use personal protective equipment.
Avoid inhalation of vapour or mist.
Provide adequate ventilation.

### Personal protective equipment

Eye protection : Tightly fitting safety goggles
Face-shield
(EN 166)

Hand protection
Material : PVA
Break through time : > 480 min

Material : Nitrile rubber
Break through time : > 480 min

Remarks : Wear suitable gloves.
The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it. Take note of the information given by the producer concerning permeability and break through

| | | |
|---|---|---|
| | | times, and of special workplace conditions (mechanical strain, duration of contact). |
| Skin and body protection | : | Wear suitable protective clothing and rubber boots. |
| Respiratory protection | : | In case of insufficient ventilation: Respirator with AX filter or self-contained breathing apparatus.<br>(EN 371/EN 14387:2004) |

**Environmental exposure controls**

| | | |
|---|---|---|
| General advice | : | Prevent product from entering environment and drains. If major spillage occurs, contact the proper local authorities. |

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| Physical state | : | liquid (20 °C, 101,3 kPa) |
| Colour | : | clear |
| Odour | : | No data available |
| Odour Threshold | : | No data available |
| Melting point | : | Not applicable |
| Boiling range | : | -20 - 180 °C |
| Flammability | : | Extremely flammable. |
| Flash point | : | < 0 °C |
| Decomposition temperature | : | No data available |
| pH | : | No data available |
| Viscosity | | |
| Viscosity, dynamic | : | < 7 Pa.s |
| Solubility(ies) | | |
| Water solubility | : | < 0,1 g/l |
| Solubility in other solvents | : | Not applicable |

| | | |
|---|---|---|
| Partition coefficient: n-octanol/water | : | Not applicable |
| Vapour pressure | : | 2 - 240 kPa |
| Relative density | : | 0,63 - 0,75 |
| Density | : | 686 g/cm³ |
| Bulk density | : | No data available |

### 9.2 Other information

| | | |
|---|---|---|
| Explosives | : | Not explosive |
| Oxidizing properties | : | Not applicable |
| Self-ignition | : | 280 - 470 °C |
| Evaporation rate | : | No data available |
| Molecular weight | : | Not applicable |

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

No dangerous reaction known under conditions of normal use.

### 10.2 Chemical stability

Stable under recommended storage conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions : Vapours may form explosive mixture with air.

### 10.4 Conditions to avoid

Conditions to avoid : Keep away from open flames, hot surfaces and sources of ignition.

### 10.5 Incompatible materials

Materials to avoid : Oxidizing agents

### 10.6 Hazardous decomposition products

Under fire conditions:
Carbon monoxide
Carbon dioxide (CO2)
Nitrogen oxides (NOx)
Sulphur oxides
Hydrogen sulphide

## SECTION 11: Toxicological information

### 11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

**Acute toxicity**

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

**Product:**

| | | |
|---|---|---|
| Acute oral toxicity | : | LD50 (Rat): > 5.000 mg/kg<br>Method: OECD Test Guideline 401<br>Remarks: Read-across (Analogy) |
| Acute inhalation toxicity | : | LC50 (Rat): > 5,61 mg/l<br>Test atmosphere: vapour<br>Method: OECD Test Guideline 403<br>Remarks: Read-across (Analogy) |
| Acute dermal toxicity | : | LD50 (Rabbit): > 2.000 mg/kg<br>Method: OECD Test Guideline 402<br>Remarks: Read-across (Analogy) |

**Skin corrosion/irritation**

Causes skin irritation.

**Product:**

Species: Rabbit
Assessment: Irritating to skin.
Method: OECD Test Guideline 404
Read-across (Analogy)

**Serious eye damage/eye irritation**

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

**Product:**

Species: Rabbit
Assessment: No eye irritation
Method: OECD Test Guideline 405

Read-across (Analogy)

**Respiratory or skin sensitisation**

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

**Product:**

Test Type: Buehler Test
Species: Guinea pig
Assessment: Does not cause skin sensitisation.
Method: OECD Test Guideline 406
Read-across (Analogy)

**Germ cell mutagenicity**

May cause genetic defects.

**Product:**

Genotoxicity in vitro : Test Type: in vitro assay
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Remarks: Read-across (Analogy)

: Test Type: In vitro gene mutation study in mammalian cells
Method: OECD Test Guideline 476
Result: negative
Remarks: Read-across (Analogy)

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Rat
Method: OECD Test Guideline 474
Result: negative

Test Type: in vivo assay
Species: Rat
Method: OECD Test Guideline 475
Result: negative

**Components:**

**benzene:**

Genotoxicity in vitro : Test Type: Ames test
Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471
Result: negative

: Test Type: Chromosome aberration test in vitro
Metabolic activation: with and without metabolic activation
Result: positive

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse
Application Route: inhalation (vapour)
Method: OECD Test Guideline 474
Result: positive

Species: Human
Result: Positive results were obtained in some in vivo tests.

**Carcinogenicity**

May cause cancer.

**Product:**

Species: Mouse
Application Route: Dermal
NOAEL: NOEL: 0,5 ml
Method: OECD Test Guideline 451
Remarks: Read-across (Analogy)

Species: Rat
Application Route: Inhalation
NOAEL: NOEL: 292 ppm
Method: OECD Test Guideline 453
Remarks: Read-across (Analogy)

**Components:**

**benzene:**
Species: Rat, (male and female)
Application Route: Oral
Exposure time: 103 wks
Dose: 25 mg/kg bw/d
Frequency of Treatment: 1/d, 5 d/wk
Method: OECD Test Guideline 453

Species: Mouse, (male and female)
Application Route: Inhalation
Exposure time: 2 - 16 wks
Dose: 960 mg/m3
Frequency of Treatment: 6 h/d, 5 d/wk

**Reproductive toxicity**

Suspected of damaging fertility or the unborn child.

**Product:**

| | | |
|---|---|---|
| Effects on fertility | : | Species: Rat<br>General Toxicity - Parent: No observed adverse effect level: > 24.700 mg/m³<br>General Toxicity F1: No observed adverse effect level: > 24.700 mg/m³<br>Method: OECD Test Guideline 421 |
| Effects on foetal development | : | General Toxicity Maternal: NOAEL: 23.900 mg/m³<br>Developmental Toxicity: NOAEL: 23.900 mg/m³<br>Method: OECD Test Guideline 414<br><br>Teratogenicity: NOAEL: > 20.000 mg/m³<br>Developmental Toxicity: NOAEL: > 20.000 mg/m³<br>Method: OECD Test Guideline 416 |

**STOT - single exposure**

May cause drowsiness or dizziness.

**Product:**

Exposure routes: Inhalation
Remarks: May cause drowsiness or dizziness.

**STOT - repeated exposure**

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

**Product:**

Species: Rat
NOAEL: 20 mg/l
Application Route: inhalation (vapour)
Exposure time: 90 d
Method: EPA OPPTS 870.3465
Remarks: Systemic effects
Read-across (Analogy)

Species: Rat
NOAEL: 9,84 mg/l
Application Route: inhalation (vapour)
Method: OECD Test Guideline 412
Remarks: Read-across (Analogy)

Species: Rat
NOAEL: 1402 mg/l
Application Route: inhalation (vapour)

Method: OECD Test Guideline 453
Remarks: Read-across (Analogy)

Species: Rat
NOAEL: 3750 mg/kg
Application Route: Dermal
Method: OECD Test Guideline 410
Remarks: Read-across (Analogy)

**Aspiration toxicity**

May be fatal if swallowed and enters airways.

**Product:**

May be fatal if swallowed and enters airways.

### 11.2 Information on other hazards

**Endocrine disrupting properties**

**Product:**

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

**Further information**

**Product:**

Remarks: Components of the product may be absorbed into the body by inhalation and through the skin.

## SECTION 12: Ecological information

### 12.1 Toxicity

**Product:**

Toxicity to fish : LL50 (Oncorhynchus mykiss (rainbow trout)): 10 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Read-across (Analogy)

LL50 (fathead minnow (Pimephales promelas)): 8,2 mg/l

| | | |
|---|---|---|
| | | Exposure time: 96 h<br>Method: EPA 66013-75-009<br>Remarks: Read-across (Analogy) |
| Toxicity to daphnia and other aquatic invertebrates | : | EL50 (Daphnia magna (Water flea)): 4,5 mg/l<br>Exposure time: 48 h<br>Method: OECD Test Guideline 202<br>Remarks: Read-across (Analogy) |
| Toxicity to algae | : | EL50 (Pseudokirchneriella subcapitata (green algae)): 3,1 mg/l<br>End point: Growth rate<br>Exposure time: 72 h<br>Method: OECD Test Guideline 201<br>Remarks: Read-across (Analogy)<br><br>NOELR (Pseudokirchneriella subcapitata (green algae)): 0,5 mg/l<br>End point: Growth rate<br>Exposure time: 72 h<br>Method: OECD Test Guideline 201<br>Remarks: Read-across (Analogy)<br><br>EL50 (Pseudokirchneriella subcapitata (microalgae)): 3,7 mg/l<br>End point: Growth rate<br>Exposure time: 96 h<br>Method: OECD Test Guideline 201<br>Remarks: Read-across (Analogy) |
| Toxicity to fish (Chronic toxicity) | : | Remarks: No data available |
| Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) | : | NOELR: 2,6 mg/l<br>Exposure time: 21 d<br>Species: Daphnia magna (Water flea)<br>Method: OECD Test Guideline 211<br>Remarks: Read-across (Analogy)<br>toxic effects for reproduction |
| Toxicity to bacteria | : | EC50 (Tetrahymena pyriformis): 15,41 mg/l<br>Exposure time: 40 h<br>Test Type: Growth inhibition<br>Method: QSAR |
| Ecotoxicology Assessment<br>Long-term (chronic) aquatic hazard | : | Toxic to aquatic life with long lasting effects. |

**Components:**

**benzene:**

| | | |
|---|---|---|
| Toxicity to fish (Chronic toxicity) | : | LOEC: 1,6 mg/l<br>Exposure time: 32 d<br>Species: Pimephales promelas (fathead minnow)<br>Test Type: flow-through test |
| Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) | : | NOEC: 3 mg/l<br>Exposure time: 7 d<br>Species: Ceriodaphnia dubia (water flea)<br>Test Type: semi-static test |

### 12.2 Persistence and degradability

**Product:**

| | | |
|---|---|---|
| Biodegradability | : | Remarks: Not applicable<br>Substance is complex UVCB. |

### 12.3 Bioaccumulative potential

**Product:**

| | | |
|---|---|---|
| Bioaccumulation | : | Remarks: Not applicable<br>Substance is complex UVCB. |

### 12.4 Mobility in soil

**Product:**

| | | |
|---|---|---|
| Mobility | : | Remarks: Not applicable |

**Components:**

**n-heptane:**

| | | |
|---|---|---|
| Mobility | : | Remarks: After release, disperses into the air. |

### 12.5 Results of PBT and vPvB assessment

**Product:**

| | | |
|---|---|---|
| Assessment | : | This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.. |

### 12.6 Endocrine disrupting properties

**Product:**

| | | |
|---|---|---|
| Assessment | : | The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher. |

### 12.7 Other adverse effects

**Product:**

| | | |
|---|---|---|
| Additional ecological information | : | Prone to photochemical degradation, reacting with OH radicals and ozone. |

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

| | | |
|---|---|---|
| Product | : | Dispose of as hazardous waste in compliance with local and national regulations.<br>List of suggested waste codes/waste designations in accordance with the EWC:<br>13 07 02 (petrol)<br>13 07 03 (other fuels (including mixtures)) |
| Contaminated packaging | : | Empty containers should be taken to an approved waste handling site for recycling or disposal. |

## SECTION 14: Transport information

### 14.1 UN number or ID number

| | | |
|---|---|---|
| **ADR** | : | UN 1268 |
| **IMDG** | : | UN 1268 |

### 14.2 UN proper shipping name

| | | |
|---|---|---|
| **ADR** | : | PETROLEUM PRODUCTS, N.O.S.<br>(Naphtha, petroleum, full-range straight-run) |
| **IMDG** | : | PETROLEUM PRODUCTS, N.O.S.<br>(Naphtha, petroleum, full-range straight-run) |

### 14.3 Transport hazard class(es)

| | | |
|---|---|---|
| **ADR** | : | 3 |
| **IMDG** | : | 3 |

### 14.4 Packing group

**ADR**

| | | |
|---|---|---|
| Packing group | : | I |
| Classification Code | : | F1 |
| Hazard Identification Number | : | 33 |
| Labels | : | 3 |
| Tunnel restriction code | : | (D/E) |

**IMDG**

| | | |
|---|---|---|
| Packing group | : | I |
| Labels | : | 3 |
| EmS Code | : | F-E, S-E |

### 14.5 Environmental hazards

**ADR**

| | | |
|---|---|---|
| Environmentally hazardous | : | yes |

**IMDG**

| | | |
|---|---|---|
| Marine pollutant | : | yes |

**IATA (Cargo)**

| | | |
|---|---|---|
| Environmentally hazardous | : | yes |

### 14.6 Special precautions for user

| | | |
|---|---|---|
| Remarks | : | SDS: No specific instructions needed. |

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

### 14.7 Maritime transport in bulk according to IMO instruments

| | | |
|---|---|---|
| Remarks | : | Not applicable |

## SECTION 15: Regulatory information

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

| | | |
|---|---|---|
| REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII) | : | Conditions of restriction for the following entries should be considered:<br>Number on list 3 |

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

| Category | | Quantity 1 | Quantity 2 |
|---|---|---|---|
| 34 | Petroleum products: (a) gasolines and naphthas, (b) kerosenes (including jet fuels), (c) gas oils (including diesel fuels, home heating oils and gas oil blending streams),(d) heavy fuel oils | 2.500 t | 25.000 t |

**Other regulations:**

Europe. Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work
Take note of Dir 92/85/EEC on the safety and health at work of pregnant workers.
Take note of Dir 94/33/EC on the protection of young people at work.

### 15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

## SECTION 16: Other information

| | | |
|---|---|---|
| EUH066 | : | Repeated exposure may cause skin dryness or cracking. |

**Full text of other abbreviations**

| | | |
|---|---|---|
| 2000/39/EC | : | Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values |
| 2004/37/EC | : | Europe. Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work |
| 2006/15/EC | : | Europe. Indicative occupational exposure limit values |
| FI BAT | : | Finland. Biological limit values |
| FI OEL | : | Finland. HTP Values - Concentrations Known to be Harmful |
| 2000/39/EC / TWA | : | Limit Value - eight hours |
| 2004/37/EC / TWA | : | Long term exposure limit |
| 2006/15/EC / TWA | : | Limit Value - eight hours |
| 2006/15/EC / STEL | : | Short term exposure limit |
| FI OEL / HTP-arvot 8h | : | Long term exposure limit |
| FI OEL / HTP-arvot 15 min | : | Short term exposure limit |

**Further information**

| | | |
|---|---|---|
| Issuer | : | Borealis, Group Product Stewardship / Mikaela Eriksson. |

| | | |
|---|---|---|
| Sources of key data used to compile the Safety Data Sheet | : | Chemical Safety Report, Naphthas (petroleum), full-range straight-run, CONCAWE REACH Consortium, 2020 |

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

**Disclaimer**

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication; however we do not assume any liability whatsoever for the accuracy and completeness of such information.

**Borealis makes no warranties which extend beyond the description contained herein. Nothing herein shall constitute any warranty of merchantability or fitness for a particular purpose.**

**It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.**

No liability can be accepted in respect of the use of Borealis' products in conjunction with other materials. The information contained herein relates exclusively to our products when not used in conjunction with any third party materials.

# Annex

## Exposure Scenario

| Number | Title |
|---|---|
| **ES1** | Use at industrial sites, Use as an intermediate |

## ES1: Use as an intermediate

### 1.1. Title section

| | | |
|---|---|---|
| **Structured Short Title** | : | Use at industrial sites |

| | | |
|---|---|---|
| **Environment** | | |
| **CS1** | **Environment** | ERC6a |
| **Worker** | | |
| **CS2** | **General measures (flammability), General measures (aspiration), General measures (skin irritants), General measures (carcinogens), General measures applicable to all activities** | PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15, PROC28 |
| **CS3** | **General exposures (closed systems)** | PROC1 |
| **CS4** | **General exposures (closed systems)** | PROC2 |
| **CS5** | **General exposures, Batch process, Closed systems** | PROC3 |
| **CS6** | **Laboratory activities** | PROC15 |
| **CS7** | **Bulk transfers, Closed systems, Loading and unloading** | PROC8b |
| **CS8** | **Equipment cleaning and maintenance** | PROC8a, PROC28 |
| **CS9** | **Storage** | PROC1 |
| **CS10** | **Storage** | PROC2 |

### 1.2. Conditions of use affecting exposure

#### 1.2.1. Control of environmental exposure: Use of intermediate (ERC6a)

| | | |
|---|---|---|
| **Amount used, frequency and duration of use (or from service life)** | | |
| Annual amount per site | : | 15000 t |

| | | |
|---|---|---|
| Daily amount per site | : | 50000 kg |
| Maximum allowable site tonnage (MSafe) | : | 68.000 kg |
| Emission days | : | 300 |
| **Technical and organisational conditions and measures** | | |
| Treat air emission to provide a typical removal efficiency of (%):<br>Air - minimum efficiency of 80 % | | |
| Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):<br>Water - minimum efficiency of 94,2 % | | |
| Risk from environmental exposure is driven by freshwater sediment. | | |
| Prevent discharge of undissolved substance to or recover from onsite wastewater. | | |
| If discharging to domestic sewage treatment plant, no on-site wastewater treatment required. | | |
| Do not apply industrial sludge to natural soils. | | |
| Sewage sludge should be incinerated, contained or reclaimed. | | |
| **Conditions and measures related to sewage treatment plant** | | |
| STP type | : | Municipal Sewage Treatment Plant |
| STP effluent | : | 2.000 m³/d |
| Not applicable as there is no release to wastewater. | | |
| Estimated substance removal from wastewater via domestic sewage treatment:<br>Water - minimum efficiency of 95,7 % | | |
| **Other conditions affecting environmental exposure** | | |
| Local freshwater dilution factor | : | 10 |
| Local marine water dilution factor | : | 100 |

**1.2.2. Control of worker exposure: General measures (flammability), General measures (aspiration), General measures (skin irritants), General measures (carcinogens), General measures applicable to all activities**
**Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Transfer of substance or mixture (charging/discharging) at non dedicated-**

**facilities (PROC8a) / Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Use as laboratory reagent (PROC15) / Manual maintenance (cleaning and repair) of machinery (PROC28)**

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | Liquid, vapour pressure > 10 kPa at Standard Temperature and Pressure |
| **Amount used, frequency and duration of use (or from service life)** | | |
| Use frequency | : | Covers use up to 8 hours/day |
| **Technical and organisational conditions and measures** | | |
| Provide a basic standard of general ventilation (1 to 3 air changes per hour). | | |
| Occupational Health and Safety Management System: Advanced | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| General measures (flammability)<br>Use in contained systems<br>Keep away from sources of ignition - No smoking.<br>Use only in well-ventilated areas.<br>To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded.<br>No sparking tools should be used. | | |
| General measures (aspiration)<br>Do not ingest. If swallowed then seek immediate medical assistance. | | |
| General measures (skin irritants)<br>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.<br>Use suitable eye protection and gloves. | | |
| General measures (carcinogens)<br>Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. | | |

| |
|---|
| Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. |
| **Other conditions affecting workers exposure** |
| Assumes a good basic standard of occupational hygiene is implemented |

**1.2.3. Control of worker exposure: General exposures (closed systems)**
**Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)**

| | | |
|---|---|---|
| **Technical and organisational conditions and measures** | | |
| Handle substance within a closed system. | | |
| Sample via a closed loop or other system to avoid exposure. | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |

**1.2.4. Control of worker exposure: General exposures (closed systems)**
**Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)**

| |
|---|
| **Technical and organisational conditions and measures** |
| Handle substance within a closed system. |
| Sample via a closed loop or other system to avoid exposure. |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % |
| **Conditions and measures related to personal protection, hygiene and health evaluation** |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % |
| **Other conditions affecting workers exposure** |

| | | |
|---|---|---|
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |

**1.2.5. Control of worker exposure: General exposures, Batch process, Closed systems**
**Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)**

| **Technical and organisational conditions and measures** | | |
|---|---|---|
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| Handle substance within a closed system. | | |
| Sample via a closed loop or other system to avoid exposure. | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |

**1.2.6. Control of worker exposure: Laboratory activities**
**Use as laboratory reagent (PROC15)**

| **Technical and organisational conditions and measures** | | |
|---|---|---|
| Local exhaust ventilation<br>Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.<br>Inhalation - minimum efficiency of 99 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |

| **Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply** |
|---|
| Put lids on containers immediately after use. |

**1.2.7. Control of worker exposure: Bulk transfers, Closed systems, Loading and unloading**
**Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**

| **Technical and organisational conditions and measures** | | |
|---|---|---|
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 95 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |

**1.2.8. Control of worker exposure: Equipment cleaning and maintenance**
**Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Manual maintenance (cleaning and repair) of machinery (PROC28)**

| **Amount used, frequency and duration of use (or from service life)** | | |
|---|---|---|
| Use frequency | : | Covers use up to 4 hours/day |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| Drain down and flush system prior to equipment break-in or maintenance.<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| Wear suitable coveralls to prevent exposure to the skin. | | |
| Wear suitable respiratory protection. | | |

| | | |
|---|---|---|
| Efficiency: APF 10<br>Inhalation - minimum efficiency of 90 % | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |
| **Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply** | | |
| Clear spills immediately. | | |

**1.2.9. Control of worker exposure: Storage**
**Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)**

| | | |
|---|---|---|
| **Technical and organisational conditions and measures** | | |
| Store substance within a closed system. | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |

**1.2.10. Control of worker exposure: Storage**
**Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)**

| | | |
|---|---|---|
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| Store substance within a closed system. | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |

| **Other conditions affecting workers exposure** | | |
|---|---|---|
| Indoor or outdoor use | : | Indoor use |
| Temperature | : | Assumes process temperature up to 20 °C |

## 1.3. Exposure estimation and reference to its source

### 1.3.1. Environmental release and exposure: Use of intermediate (ERC6a)

| Compartment | Exposure level | RCR |
|---|---|---|
| Air | 0,068 mg/m³ (Petrorisk) | |
| Freshwater | 0,22 mg/L (Petrorisk) | 0,55 |
| Marine water | 0,022 mg/L (Petrorisk) | 0,055 |
| Freshwater sediment | 0,78 mg/kg wet weight (Petrorisk) | 0,74 |
| Marine sediment | 0,078 mg/kg wet weight (Petrorisk) | 0,074 |
| Agricultural soil | 0,00027 mg/kg wet weight (Petrorisk) | < 0,001 |
| Top predator's prey (marine water) | 0,033 mg/kg wet weight (Petrorisk) | < 0,004 |

| **Additional information on exposure estimation** |
|---|
| The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model. |

### 1.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 0,00163 mg/m³ (ECETOC TRA worker v3) | < 0,01 | Benzene |
| inhalative | systemic | short-term | 0,167 mg/m³ (ECETOC TRA worker v3) | < 0,01 | |

| | | | | | |
|---|---|---|---|---|---|
| inhalative | systemic | short-term | 0,00651 mg/m³ (ECETOC TRA worker v3) | < 0,01 | Benzene |
| inhalative | local | long-term | 0,042 mg/m³ (ECETOC TRA worker v3) | < 0,01 | |
| inhalative | local | short-term | 0,167 mg/m³ (ECETOC TRA worker v3) | < 0,01 | |
| dermal | systemic | long-term | 0,00017 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |
| dermal | local | long-term | 0,000992 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,0000496 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| dermal | local | short-term | 0,000992 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,0000496 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| combined routes | systemic | short-term | | < 0,01 | |

**1.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)**

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 0,407 mg/m³ (ECETOC TRA worker v3) | 0,212 | Benzene |
| inhalative | systemic | short-term | 41,67 mg/m³ (ECETOC TRA worker v3) | 0,032 | |
| inhalative | systemic | short-term | 1,627 mg/m³ (ECETOC TRA worker v3) | | Benzene |
| inhalative | local | long-term | 10,42 mg/m³ | 0,012 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | (ECETOC TRA worker v3) | | |
| inhalative | local | short-term | 41,67 mg/m³ (ECETOC TRA worker v3) | 0,039 | |
| dermal | systemic | long-term | 0,00685 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |
| dermal | local | long-term | 0,02 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,000999 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| dermal | local | short-term | 0,02 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,000999 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| combined routes | | | | 0,032 | |

**1.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)**

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 0,814 mg/m³ (ECETOC TRA worker v3) | 0,424 | Benzene |
| inhalative | systemic | short-term | 83,33 mg/m³ (ECETOC TRA worker v3) | 0,065 | |
| inhalative | systemic | short-term | 3,255 mg/m³ (ECETOC TRA worker v3) | | Benzene |
| inhalative | local | long-term | 20,83 mg/m³ (ECETOC TRA worker v3) | 0,025 | |
| inhalative | local | short-term | 83,33 mg/m³ | 0,078 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | (ECETOC TRA worker v3) | | |
| dermal | systemic | long-term | 0,00345 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |
| dermal | local | long-term | 0,02 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,00101 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| dermal | local | short-term | 0,02 mg/m³ (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,00101 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| combined routes | systemic | short-term | | 0,065 | |

### 1.3.6. Worker exposure: Use as laboratory reagent (PROC15)

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 0,814 mg/m³ (ECETOC TRA worker v3) | 0,424 | Benzene |
| inhalative | systemic | short-term | 83,33 mg/m³ (ECETOC TRA worker v3) | 0,065 | |
| inhalative | systemic | short-term | 3,255 mg/m³ (ECETOC TRA worker v3) | | Benzene |
| inhalative | local | long-term | 20,83 mg/m³ (ECETOC TRA worker v3) | 0,025 | |
| inhalative | local | short-term | 83,33 mg/m³ (ECETOC TRA worker v3) | 0,078 | |
| dermal | systemic | long-term | 0,0017 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |

| | | | | | |
|---|---|---|---|---|---|
| dermal | local | long-term | 0,00992 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,000496 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| dermal | local | short-term | 0,00992 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,000496 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| combined routes | systemic | short-term | | 0,065 | |

**1.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 1,22 mg/m³ (ECETOC TRA worker v3) | 0,636 | Benzene |
| inhalative | systemic | short-term | 125 mg/m³ (ECETOC TRA worker v3) | 0,097 | |
| inhalative | systemic | short-term | 4,882 mg/m³ (ECETOC TRA worker v3) | | Benzene |
| inhalative | local | long-term | 31,25 mg/m³ (ECETOC TRA worker v3) | 0,037 | |
| inhalative | local | short-term | 125 mg/m³ (ECETOC TRA worker v3) | 0,117 | |
| dermal | systemic | long-term | 0,069 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |
| dermal | local | long-term | 0,1 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,005 mg/cm2 | | Benzene |

| | | | | | |
|---|---|---|---|---|---|
| | | | (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,1 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,005 mg/cm2 | | Benzene |
| combined routes | systemic | short-term | | 0,097 | |

**1.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Manual maintenance (cleaning and repair) of machinery (PROC28)**

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 0,244 mg/m³ (ECETOC TRA worker v3) | 0,127 | Benzene |
| inhalative | systemic | short-term | 41,67 mg/m³ (ECETOC TRA worker v3) | 0,032 | |
| inhalative | systemic | short-term | 1,627 mg/m³ (ECETOC TRA worker v3) | | Benzene |
| inhalative | local | long-term | 6,25 mg/m³ (ECETOC TRA worker v3) | < 0,01 | |
| inhalative | local | short-term | 41,67 mg/m³ (ECETOC TRA worker v3) | 0,039 | |
| dermal | systemic | long-term | 0,041 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |
| dermal | local | long-term | 0,06 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,003 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| dermal | local | short-term | 0,06 mg/cm2 (ECETOC TRA worker v3) | | |

| | | | | | |
|---|---|---|---|---|---|
| dermal | local | short-term | 0,003 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| combined routes | systemic | short-term | (ECETOC TRA worker v3) | 0,032 | |

**1.3.9. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)**

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 0,00163 mg/m³ (ECETOC TRA worker v3) | < 0,01 | Benzene |
| inhalative | systemic | short-term | 0,167 mg/m³ (ECETOC TRA worker v3) | < 0,01 | |
| inhalative | systemic | short-term | 0,00651 mg/m³ (ECETOC TRA worker v3) | | Benzene |
| inhalative | local | long-term | 0,042 mg/m³ (ECETOC TRA worker v3) | < 0,01 | |
| inhalative | local | short-term | 0,167 mg/m³ (ECETOC TRA worker v3) | < 0,01 | |
| dermal | systemic | long-term | 0,00017 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |
| dermal | local | long-term | 0,000992 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,0000496 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| dermal | local | short-term | 0,000992 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,0000496 mg/cm2 (ECETOC TRA worker v3) | | |

| | | | | | |
|---|---|---|---|---|---|
| combined routes | systemic | short-term | | < 0,01 | |

**1.3.10. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)**

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR | Remarks |
|---|---|---|---|---|---|
| inhalative | systemic | long-term | 0,407 mg/m³ (ECETOC TRA worker v3) | 0,212 | Benzene |
| inhalative | systemic | short-term | 41,67 mg/m³ (ECETOC TRA worker v3) | 0,032 | |
| inhalative | systemic | short-term | 1,627 mg/m³ (ECETOC TRA worker v3) | | Benzene |
| inhalative | local | long-term | 10,42 mg/m³ (ECETOC TRA worker v3) | 0,012 | |
| inhalative | local | short-term | 41,67 mg/m³ (ECETOC TRA worker v3) | 0,039 | |
| dermal | systemic | long-term | 0,00685 mg/kg bw/day (ECETOC TRA worker v3) | | Benzene |
| dermal | local | long-term | 0,02 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | long-term | 0,000999 mg/cm2 (ECETOC TRA worker v3) | | Benzene |
| dermal | local | short-term | 0,02 mg/cm2 (ECETOC TRA worker v3) | | |
| dermal | local | short-term | 0,000999 mg/cm2 (ECETOC TRA worker v3) | | |
| combined routes | systemic | short-term | | 0,032 | |

### 1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.
Available hazard data do not support the need for a DNEL to be established for other health effects.
Risk management measures are based on qualitative risk characterisation.