HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Date of issue: 7/7/2017 Supersedes: 6/6/2016 Version: 13.2

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

1.1. Product identifier

Product form	:	Substance
Substance name	:	HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING
Chemical name	:	Naphtha (petroleum), steam-cracked middle arom., Low boiling point naphtha - unspecified, [A complex combination of hydrocarbons produced by the distillation of products from a steam-cracking process. It consists predominantly of aromatic hydrocarbons having carbon numbers predominantly in the range of C7 through C12 and boiling in the range of approximately 130°C to 220°C (266°F to 428°F).]
EC-No.	:	271-138-9
CAS-No.	:	68516-20-1
REACH registration No	:	TP France (01-2119485811-33-0001) -
Synonyms	:	68516-20-1
Product group	:	-

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

1.2.1. Relevant identified uses

Main use category	:	Professional use
Use of the substance/mixture	:	Manufacture of substances Distribution of substance Formulation & (re)packing of substances and mixtures Intermediates Use as a fuel. For the detailed uses of the product see annex of the safety data sheet

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

REFINING & CHEMICALS BRANCH
TOTAL PETROCHEMICALS & REFINING SA/NV
Rue de l'Industrie 52 Nijverheidsstraat - B-1040 BRUSSELS - BELGIUM
T +32 (0)2.288.91.11
rc.fer-sds@total.com - www.total.com

1.4. Emergency telephone number

Emergency number : Emergency call Carechem 24 International :
• for English speaking countries: +44 (0) 1235 239 670
• for Europe (in local languages): + 33 1 49 00 00 49
• for Africa and Middle East: + 44 (0) 1235 239 671• for China:
+ 86 10 5100 3039
• for Asia Pacific (Hong-Kong, Singapore, Taiwan, Philippines, India, Vietnam, Sri Lanka, Japan, Korea, Malaysia, Indonesia, Thailand) :
+ 65 3158 1074

Country	Organisation/Company	Address	Emergency number	Comment
	National Poisons Emergency number		08 45 46 47	
Ireland	National Poisons Information Centre Beaumont Hospital	PO Box 1297 Beaumont Road 9 Dublin	+353 1 809 2566 (Healthcare professionals-24/7) +353 1 809 2166 (public, 8am - 10pm, 7/7)	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flammable liquids, Category 2	H225
Skin corrosion/irritation, Category 2	H315
Germ cell mutagenicity, Category 1B	H340
Carcinogenicity, Category 1B	H350

Reproductive toxicity, Category 2	H361d
Specific target organ toxicity — Single exposure, Category 3, Narcosis	H336
Specific target organ toxicity — Repeated exposure, Category 2	H373
Aspiration hazard, Category 1	H304
Hazardous to the aquatic environment — Chronic Hazard, Category 2	H411

Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

Highly flammable liquid and vapour. May cause cancer. May cause genetic defects. Suspected of damaging the unborn child. May be fatal if swallowed and enters airways. Causes skin irritation. May cause drowsiness or dizziness. Toxic to aquatic life with long lasting effects.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS02 GHS08 GHS07 GHS09

Signal word (CLP) : Danger

Hazard statements (CLP) :
H225 - Highly 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
H361d - Suspected of damaging the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure
H411 - Toxic to aquatic life with long lasting effects

Precautionary statements (CLP) :
P201 - Obtain special instructions before use
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P243 - Take precautionary measures against static discharge
P262 - Do not get in eyes, on skin, or on clothing
P273 - Avoid release to the environment
P281 - Use personal protective equipment as required
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P309+P311 - IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician
P403+P233 - Store in a well-ventilated place. Keep container tightly closed

2.3. Other hazards

Other hazards not contributing to the classification : In use, may form flammable/explosive vapour-air mixture. Handling this product may result in electrostatic accumulation. Use proper grounding procedures.

SECTION 3: Composition/information on ingredients

3.1. Substances

Comments : UVCB

Chemical name : Naphtha (petroleum), steam-cracked middle arom., Low boiling point naphtha - unspecified, [A complex combination of hydrocarbons produced by the distillation of products from a steam-cracking process. It consists predominantly of aromatic hydrocarbons having carbon numbers predominantly in the range of C7 through C12 and boiling in the range of approximately 130°C to 220°C (266°F to 428°F).]

CAS-No. : 68516-20-1

EC-No. : 271-138-9

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Ethylbenzene	(CAS-No.) 100-41-4 (EC-No.) 202-849-4	< 60	Flam. Liq. 2, H225 Acute Tox. 4 (Inhalation:vapour), H332 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
Styrene	(CAS-No.) 100-42-5 (EC-No.) 202-851-5 (EC Index-No.) 601-026-00-0 (REACH-no) 01-2119457861-32	< 40	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Repr. 2, H361d STOT SE 3, H335 STOT RE 1, H372 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
Toluene	(CAS-No.) 108-88-3 (EC-No.) 203-625-9	< 35	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361d STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
xylene	(CAS-No.) 1330-20-7 (EC-No.) 215-535-7 (EC Index-No.) 601-022-00-9	< 25	Flam. Liq. 3, H226 Acute Tox. 4 (Dermal), H312 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
Benzene	(CAS-No.) 71-43-2 (EC-No.) 200-753-7	< 5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372 Asp. Tox. 1, H304
Naphthalene	(CAS-No.) 91-20-3 (EC-No.) 202-049-5 (EC Index-No.) 601-052-00-2	< 5	Acute Tox. 4 (Oral), H302 Carc. 2, H351 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Get medical advice/attention if you feel unwell.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a physician immediately. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration. Place under medical observation.

First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Wash with plenty of soap and water. Get medical advice if skin irritation persists.

First-aid measures after eye contact : Immediately rinse with water for a prolonged period while holding the eyelids wide open. Consult an eye specialist.

First-aid measures after ingestion : Do not give anything to drink. Do not induce vomiting. If swallowed, rinse mouth with water (only if the person is conscious). Take immediately victim to hospital.

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

Symptoms/effects : Refer to § 11 for more details on effects.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide. Dry powder. Foam.

Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Explosion hazard : Heavier than air, vapours may travel long distances along ground, ignite and flash back to source. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Hazardous decomposition products in case of fire : Toxic fumes. Carbon oxides (CO, CO2). Aldehydes. Polycyclic-aromatic hydrocarbons (PAH). Carbon (C). Ketones.

5.3. Advice for firefighters

Protection during firefighting : Complete protective clothing. Do not enter fire area without proper protective equipment, including respiratory protection.

Other information : Notify fire brigade and environmental authorities. Evacuate unnecessary personnel. Use water spray or fog for cooling exposed containers.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : No flames, no sparks. Eliminate all sources of ignition. Do not smoke. Use special care to avoid static electric charges. Prevent any contact with hot surfaces.

6.1.1. For non-emergency personnel

Protective equipment : Do not attempt to take action without suitable protective equipment. Gloves. Safety glasses.

Emergency procedures for non-emergency personnel : Avoid contact with skin and eyes.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. Breathing apparatus.

Emergency procedures for emergency responders : Evacuate unnecessary personnel. Eliminate all ignition sources if safe to do so.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment : If spilled, may cause the floor to be slippery. Sweep up or vacuum up the product. Dike for recovery or absorb with appropriate material. Take up liquid spill into absorbent material, e.g.: sand, saw dust. On water, recover/skim from surface and pour out in disposal container.

Other information : Dispose of contaminated material at an authorized site. Notify authorities if product enters sewers or public waters.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Ensure good ventilation of the work station. In use, may form flammable/explosive vapour-air mixture. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take precautionary measures against static discharge during blending and transfer operations. Explosion-free electrical equipment and lighting with earth.

Hygiene measures : Do not eat, drink or smoke when using this product. Keep away from food and drink. Always wash hands after handling the product. Take off contaminated clothing and wash before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.

Storage conditions : Store in a well-ventilated place. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Containers (tanks) should be grounded and provided with adequate pressure relief valve. Explosive vapour/air mixtures may be formed. Isolate, drain, wash and purge the systems or equipments before any maintenance or repair.

Storage area : Store away from heat. Earth the equipment. Store in a well-ventilated place.

Packaging materials : Stainless steel.

7.3. Specific end use(s)

Recommended to professional users.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Toluene (108-88-3)		
EU	IOELV TWA (mg/m³)	192 mg/m³
EU	IOELV TWA (ppm)	50 ppm

Toluene (108-88-3)		
EU	IOELV STEL (mg/m³)	384 mg/m³
EU	IOELV STEL (ppm)	100 ppm
Ireland	OEL (8 hours ref) (mg/m³)	192 mg/m³
Ireland	OEL (8 hours ref) (ppm)	50 ppm
Ireland	OEL (15 min ref) (mg/m3)	384 mg/m³
Ireland	OEL (15 min ref) (ppm)	100 ppm
United Kingdom	WEL TWA (mg/m³)	191 mg/m³
United Kingdom	WEL TWA (ppm)	50 ppm
United Kingdom	WEL STEL (mg/m³)	384 mg/m³
United Kingdom	WEL STEL (ppm)	100 ppm
USA - ACGIH	ACGIH TWA (ppm)	20 ppm
USA - ACGIH	Biological Exposure Indices (BEI)	0.02 mg/l (Medium: blood - Time: prior to last shift of workweek - Parameter: Toluene) 0.03 mg/l (Medium: urine - Time: end of shift - Parameter: Toluene) 0.3 mg/g Kreatinin (Medium: urine - Time: end of shift - Parameter: o-Cresol with hydrolysis (background)

Benzene (71-43-2)		
Ireland	OEL (8 hours ref) (mg/m³)	3 mg/m³
Ireland	OEL (8 hours ref) (ppm)	1 ppm
United Kingdom	WEL TWA (mg/m³)	3.25 mg/m³
United Kingdom	WEL TWA (ppm)	1 ppm
United Kingdom	WEL STEL (mg/m³)	9.75 mg/m³ (calculated)
United Kingdom	WEL STEL (ppm)	3 ppm (calculated)
USA - ACGIH	ACGIH TWA (ppm)	0.5 ppm
USA - ACGIH	ACGIH STEL (ppm)	2.5 ppm
USA - ACGIH	Biological Exposure Indices (BEI)	25 µg/g creatinine (Medium: urine - Time: end of shift - Parameter: S-Phenylmercapturic acid (background) 500 µg/g creatinine (Medium: urine - Time: end of shift - Parameter: t,t-Muconic acid (background)

Xylene (mixture of isomers) (1330-20-7)		
EU	IOELV TWA (mg/m³)	221 mg/m³ (pure)
EU	IOELV TWA (ppm)	50 ppm (pure)
EU	IOELV STEL (mg/m³)	442 mg/m³ (pure)
EU	IOELV STEL (ppm)	100 ppm (pure)
Ireland	OEL (8 hours ref) (mg/m³)	221 mg/m³
Ireland	OEL (8 hours ref) (ppm)	50 ppm
Ireland	OEL (15 min ref) (mg/m3)	442 mg/m³
Ireland	OEL (15 min ref) (ppm)	100 ppm
United Kingdom	WEL TWA (mg/m³)	220 mg/m³
United Kingdom	WEL TWA (ppm)	50 ppm
United Kingdom	WEL STEL (mg/m³)	441 mg/m³
United Kingdom	WEL STEL (ppm)	100 ppm
USA - ACGIH	ACGIH TWA (ppm)	100 ppm
USA - ACGIH	ACGIH STEL (ppm)	150 ppm
USA - ACGIH	Biological Exposure Indices (BEI)	1.5 g/g Kreatinin (Medium: urine - Time: end of shift - Parameter: Methylhippuric acids)

Ethylbenzene (100-41-4)		
EU	IOELV TWA (mg/m³)	442 mg/m³
EU	IOELV TWA (ppm)	100 ppm
EU	IOELV STEL (mg/m³)	884 mg/m³
EU	IOELV STEL (ppm)	200 ppm
Ireland	OEL (8 hours ref) (mg/m³)	442 mg/m³
Ireland	OEL (8 hours ref) (ppm)	100 ppm
Ireland	OEL (15 min ref) (mg/m3)	884 mg/m³
Ireland	OEL (15 min ref) (ppm)	200 ppm

Ethylbenzene (100-41-4)		
United Kingdom	WEL TWA (mg/m³)	441 mg/m³
United Kingdom	WEL TWA (ppm)	100 ppm
United Kingdom	WEL STEL (mg/m³)	552 mg/m³
United Kingdom	WEL STEL (ppm)	125 ppm
USA - ACGIH	ACGIH TWA (ppm)	20 ppm
USA - ACGIH	Biological Exposure Indices (BEI)	0.7 g/g Kreatinin (Medium: urine - Time: end of shift at end of workweek - Parameter: Sum of mandelic acid and phenylglyoxylic acid (nonspecific, semi-quantitative) (Medium: end-exhaled air - Time: not critical - Parameter: Ethyl benzene (semi-quantitative)

Styrene (100-42-5)		
Ireland	OEL (8 hours ref) (mg/m³)	85 mg/m³
Ireland	OEL (8 hours ref) (ppm)	20 ppm
Ireland	OEL (15 min ref) (mg/m3)	170 mg/m³
Ireland	OEL (15 min ref) (ppm)	40 ppm
United Kingdom	WEL TWA (mg/m³)	430 mg/m³
United Kingdom	WEL TWA (ppm)	100 ppm
United Kingdom	WEL STEL (mg/m³)	1080 mg/m³
United Kingdom	WEL STEL (ppm)	250 ppm
USA - ACGIH	ACGIH TWA (ppm)	20 ppm
USA - ACGIH	ACGIH STEL (ppm)	40 ppm
USA - ACGIH	Biological Exposure Indices (BEI)	400 mg/g Kreatinin (Medium: urine - Time: end of shift - Parameter: Mandelic acid plus phenylglyoxylic acid (nonspecific) 0.2 mg/l (Medium: venous blood - Time: end of shift - Parameter: Styrene (semi-quantitative)

Naphthalene (91-20-3)		
EU	IOELV TWA (mg/m³)	50 mg/m³
EU	IOELV TWA (ppm)	10 ppm
Ireland	OEL (8 hours ref) (mg/m³)	50 mg/m³
Ireland	OEL (8 hours ref) (ppm)	10 ppm
Ireland	OEL (15 min ref) (mg/m3)	75 mg/m³
Ireland	OEL (15 min ref) (ppm)	15 ppm
USA - ACGIH	ACGIH TWA (ppm)	10 ppm
USA - ACGIH	Biological Exposure Indices (BEI)	(Time: end of shift - Parameter: 1-Naphthol with hydrolysis plus 2-Naphthol with hydrolysis (nonquantitative, nonspecific)

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING (68516-20-1)	
DNEL/DMEL (Workers)	
Acute - systemic effects, inhalation	1300 mg/m³
Acute - local effects, inhalation	1100 mg/m³
Long-term - local effects, inhalation	840 mg/m³
DNEL/DMEL (General population)	
Acute - systemic effects, inhalation	1200 mg/m³
Acute - local effects, inhalation	640 mg/m³
Long-term - local effects, inhalation	180 mg/m³

8.2. Exposure controls

Appropriate engineering controls:

The substance is flammable and therefore the following conditions must be met to ensure safe use: “Risks are controlled by storage and use under conditions which avoid all ignition sources.”
. Ensure adequate ventilation. Safety shower. Eye fountain.

Personal protective equipment:

Gas mask A.

Hand protection:

hydrocarbons resistant gloves. In case of repeated or prolonged contact wear gloves. recommended material: fluorinated polymer. polyvinyl alcohol. Layer thickness : all thicknesses. Breakthrough time : > 480 min. EN 374-3. In the event of contact with the liquid: Nitrile rubber gloves. Layer thickness : > 0,30 mm. Breakthrough time : > 60 min. EN 374-3. Gloves may degrade in contact with this chemical.

• Carefully check the glove for cracks or damage before reusing it, dispose of gloves where the penetration time is exceeded. • The penetration time depends on temperature, glove material, thickness and construction.
Penetration time is measured against EN 374 in laboratory conditions corresponding to permanent static contact and is not necessarily representative of the risk in the workplace. Contact the gloves' supplier for further information on the selection and resistance of gloves.

Eye protection:

Safety glasses. Do not wear contact lenses

Skin and body protection:

Wear suitable protective clothing. Safety foot-wear

Respiratory protection:

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended

Environmental exposure controls:

Avoid release to the environment. Assure that emissions are compliant with all applicable air pollution control regulations.

Other information:

Do not eat, drink or smoke during use. Handle in accordance with good industrial hygiene and safety procedures.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Colour	:	Colourless. Light yellow.
Odour	:	Hydrocarbon.
Odour threshold	:	No data available
pH	:	No data available
Relative evaporation rate (butylacetate=1)	:	No data available
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	45 - 340 °C
Flash point	:	< 35 °C (pensky/martens)
Auto-ignition temperature	:	> 400
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapour pressure	:	21 - 247 hPa (20.0°C)
Relative vapour density at 20 °C	:	No data available
Relative density	:	No data available
Density	:	820 - 920 kg/m³
Solubility	:	insoluble in water. Soluble in aromatic hydrocarbons. Soluble in most organic solvents.
Log Pow	:	No data available
Viscosity, kinematic	:	< 0.8 mm²/s (40°C)
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidising properties	:	No data available
Explosive limits	:	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Highly flammable liquid and vapour.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

In use may form flammable/explosive vapour-air mixture.

10.4. Conditions to avoid

No flames, no sparks. Eliminate all sources of ignition. High temperature. Heat.

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Additional information : Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness

Toluene (108-88-3)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rabbit	> 5000 mg/kg
LC50 inhalation rat	28.1 (28.1 - 49) mg/l/4h
LC50 inhalation rat (ppm)	> 26700 ppm/1h

Benzene (71-43-2)	
LD50 oral rat	930 (930 - 6400) mg/kg
LD50 dermal rabbit	> 8272 mg/kg
LC50 inhalation rat	34.4 mg/l/4h

Xylene (mixture of isomers) (1330-20-7)	
LD50 oral rat	4300 mg/kg
LD50 dermal rabbit	> 4200 mg/kg
LC50 inhalation rat	21.7 mg/l/4h

Ethylbenzene (100-41-4)	
LD50 oral rat	3500 mg/kg
LD50 dermal rabbit	15354 mg/kg
LC50 inhalation rat	17.2 mg/l/4h

Styrene (100-42-5)	
LD50 oral rat	2650 mg/kg
LD50 dermal rat	> 26.4 mg/kg
LC50 inhalation rat	11.8 mg/l/4h as a vapor
LC50 inhalation rat (ppm)	2770 ppmv/4h

Naphthalene (91-20-3)	
LD50 oral rat	490 mg/kg
LD50 dermal rabbit	> 20 g/kg
LC50 inhalation rat	> 340 mg/m³ (Exposure time: 1 h)

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Not classified

Additional information : May cause eye irritation

Respiratory or skin sensitisation : Not classified

Additional information : Based on available data, the classification criteria are not met

Germ cell mutagenicity : May cause genetic defects.

Carcinogenicity : May cause cancer.

Reproductive toxicity : Suspected of damaging the unborn child.

STOT-single exposure : May cause drowsiness or dizziness.

STOT-repeated exposure : May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard : May be fatal if swallowed and enters airways.

Additional information : In case of accidental swallowing, due to its low viscosity, the product may be aspired into the lung and induce a chemical pneumonitis developing over a few hours

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING (68516-20-1)	
Viscosity, kinematic	< 0.8 mm²/s (40°C)

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Toxic to aquatic life with long lasting effects. Do not allow product to spread into the environment.

Ecology - air : Product evaporates when in contact with the air.

Ecology - water : the product spreads out on the surface of the water, a small fraction of the constituents may be dissolved.

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING (68516-20-1)	
LC50 fish 1	1.1 - 4.4 mg/l
EC50 Daphnia 1	1.2 - 2.7 mg/l

Toluene (108-88-3)	
LC50 fish 1	15.22 - 19.05 mg/l (Pimephales promelas)
LC50 fish 2	12.6 mg/l (Pimephales promelas)
EC50 Daphnia 1	5.46 - 9.83 mg/l (Daphnia magna)
EC50 Daphnia 2	11.5 mg/l (Daphnia magna)
EC50 other aquatic organisms 1	> 433 mg/l (Pseudokirchneriella subcapitata)
EC50 other aquatic organisms 2	12.5 mg/l (Pseudokirchneriella subcapitata)

Benzene (71-43-2)	
LC50 fish 1	10.7 - 14.7 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
LC50 fish 2	5.3 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
EC50 Daphnia 1	8.76 - 15.6 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 Daphnia 2	10 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 other aquatic organisms 1	29 mg/l (Exposure time: 72 h - Species: Pseudokirchneriella subcapitata)
NOEC chronic fish	0.8 mg/l

Xylene (mixture of isomers) (1330-20-7)	
LC50 fish 1	13.4 mg/l (Pimephales promelas)
LC50 fish 2	2.661 - 4.093 mg/l (Oncorhynchus mykiss)
EC50 Daphnia 1	3.82 mg/l (water flea)
EC50 Daphnia 2	0.6 mg/l (Gammarus lacustris)

Ethylbenzene (100-41-4)	
LC50 fish 1	11.0 - 18.0 mg/l (Oncorhynchus mykiss)
LC50 fish 2	4.2 mg/l (Oncorhynchus mykiss)
EC50 Daphnia 1	1.8 - 2.4 mg/l (Daphnia)
EC50 other aquatic organisms 1	4.6 mg/l (Pseudokirchneriella subcapitata)
EC50 other aquatic organisms 2	> 438 mg/l (Pseudokirchneriella subcapitata)
NOEC (chronic)	1 mg/l (Daphnia)

Styrene (100-42-5)	
LC50 fish 1	3.24 - 4.99 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
LC50 fish 2	19.03 - 33.53 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
EC50 Daphnia 1	3.3 - 7.4 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 other aquatic organisms 1	1.4 mg/l (Exposure time: 72 h - Species: Pseudokirchneriella subcapitata)
EC50 other aquatic organisms 2	0.72 mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata)
NOEC (acute)	44 mg/kg (Exposure time: 14 Days - Species: Eisenia foetida [soil dry weight])

Naphthalene (91-20-3)	
LC50 fish 1	5.74 - 6.44 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
LC50 fish 2	1.6 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
EC50 Daphnia 1	2.16 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 Daphnia 2	1.96 mg/l (Exposure time: 48 h - Species: Daphnia magna [Flow through])
EC50 other aquatic organisms 1	0.4 mg/l (Exposure time: 72 h - Species: Skeletonema costatum)

12.2. Persistence and degradability

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING (68516-20-1)	
Persistence and degradability	Inherently biodegradable.

12.3. Bioaccumulative potential

Toluene (108-88-3)	
Log Pow	2.65

Benzene (71-43-2)	
BCF fish 1	3.5 - 4.4
Log Pow	1.83

Xylene (mixture of isomers) (1330-20-7)	
BCF fish 1	0.6 - 15
Log Pow	2.77 - 3.15

Ethylbenzene (100-41-4)	
BCF fish 1	15
Log Pow	3.118

Styrene (100-42-5)	
BCF fish 1	13.5
Log Pow	2.95

Naphthalene (91-20-3)	
BCF fish 1	30 - 430
Log Pow	3.3 (at 20 °C)

12.4. Mobility in soil

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING (68516-20-1)	
Ecology - soil	Avoid sub-soil penetration. it may pass through the soil and is likely to contaminate ground water.

12.5. Results of PBT and vPvB assessment

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING (68516-20-1)	
Results of PBT assessment	Not classified

12.6. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Hazardous waste. Dispose of in accordance with relevant local regulations. Use only registered transporters. Do not discharge the product into the environment. Empty containers should be taken for recycling, recovery or waste in accordance with local regulation.

Additional information : Handle empty containers with care because residual vapours are flammable.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	ADN	RID
14.1. UN Number				
3295	3295	3295	3295	3295
14.2. UN proper shipping name				
HYDROCARBONS, LIQUID, N.O.S.	HYDROCARBONS, LIQUID, N.O.S.	Hydrocarbons, liquid, n.o.s.	HYDROCARBONS, LIQUID, N.O.S.	HYDROCARBONS, LIQUID, N.O.S.
Transport document description				
UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS	UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS	UN 3295 Hydrocarbons, liquid, n.o.s., 3, II, ENVIRONMENTALLY HAZARDOUS	UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, ENVIRONMENTALLY HAZARDOUS	UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, ENVIRONMENTALLY HAZARDOUS
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing Group				
II	II	II	II	II
14.5. Environmental hazards				
Dangerous for the	Dangerous for the	Dangerous for the	Dangerous for the	Dangerous for the

ADR	IMDG	IATA	ADN	RID
environment : Yes	environment : Yes Marine Pollutant : Yes	environment : Yes	environment : Yes	environment : Yes
No supplementary information available				

14.6. Special precautions for user

- Overland transport

Classification code (ADR)	:	F1
Special provisions (ADR)	:	640D
Limited quantities (ADR)	:	1l
Excepted quantities (ADR)	:	E2
Packing instructions (ADR)	:	P001, IBC02, R001
Mixed packing provisions (ADR)	:	MP19
Portable tank and bulk container instructions (ADR)	:	T7
Portable tank and bulk container special provisions (ADR)	:	TP1, TP8, TP28
Tank code (ADR)	:	LGBF
Vehicle for tank carriage	:	FL
Transport category (ADR)	:	2
Special provisions for carriage - Operation (ADR)	:	S2, S20
Hazard identification number (Kemler No.)	:	33
Orange plates	:	
Tunnel restriction code (ADR)	:	D/E
EAC code	:	3YE

- Transport by sea (IMDG)

Limited quantities (IMDG)	:	1 L
Excepted quantities (IMDG)	:	E2
Packing instructions (IMDG)	:	P001
IBC packing instructions (IMDG)	:	IBC02
Tank instructions (IMDG)	:	T7
Tank special provisions (IMDG)	:	TP1, TP8, TP28
EmS-No. (Fire)	:	F-E
EmS-No. (Spillage)	:	S-D
Stowage category (IMDG)	:	B

- Air transport (IATA)

PCA Excepted quantities (IATA)	:	E2
PCA Limited quantities (IATA)	:	Y341
PCA limited quantity max net quantity (IATA)	:	1L
PCA packing instructions (IATA)	:	353
PCA max net quantity (IATA)	:	5L
CAO packing instructions (IATA)	:	364
CAO max net quantity (IATA)	:	60L
Special provisions (IATA)	:	A3, A224
ERG code (IATA)	:	3H

- Inland waterway transport

Classification code (ADN)	:	F1
Special provisions (ADN)	:	64D
Limited quantities (ADN)	:	1 L
Excepted quantities (ADN)	:	E2
Carriage permitted (ADN)	:	T
Equipment required (ADN)	:	PP, EX, A

Ventilation (ADN)	:	VE01
Number of blue cones/lights (ADN)	:	1

- Rail transport

Classification code (RID)	:	F1
Special provisions (RID)	:	640D
Limited quantities (RID)	:	1L
Excepted quantities (RID)	:	E2
Packing instructions (RID)	:	P001, IBC02, R001
Mixed packing provisions (RID)	:	MP19
Portable tank and bulk container instructions (RID)	:	T7
Portable tank and bulk container special provisions (RID)	:	TP1, TP8, TP28
Tank codes for RID tanks (RID)	:	LGBF
Transport category (RID)	:	2
Colis express (express parcels) (RID)	:	CE7
Hazard identification number (RID)	:	33

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

IBC code : No information available.

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006:

3. Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008	Toluene - Benzene - Styrene - Xylene (mixture of isomers) - Ethylbenzene
3(a) Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F	Toluene - Benzene - Styrene - Xylene (mixture of isomers) - Ethylbenzene
3(b) Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10	Toluene - Benzene - Styrene - Xylene (mixture of isomers) - Ethylbenzene
3(c) Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1	Toluene - Styrene - Xylene (mixture of isomers) - Ethylbenzene
5. Benzene	Benzene
28. Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as Carcinogen category 1A or 1B (Table 3.1) or Carcinogen category 1 or 2 (Table 3.2) and listed as follows: Carcinogen category 1A (Table 3.1)/Carcinogen category 1 (Table 3.2) listed in Appendix 1 Carcinogen category 1B (Table 3.1)/Carcinogen category 2 (Table 3.2) listed in Appendix 2	Benzene
29. Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as Germ cell Mutagen category 1A or 1B (Table 3.1) or Mutagen category 1 or 2 (Table 3.2) and listed as follows: Mutagen category 1A (Table 3.1)/Mutagen category 1 (Table 3.2) listed in Appendix 3 Mutagen category 1B (Table 3.1)/Mutagen category 2 (Table 3.2) listed in Appendix 4	Benzene
40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.	Toluene - Benzene - Styrene - Xylene (mixture of isomers) - Ethylbenzene
48. Toluene	Toluene

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING is not on the REACH Candidate List

HYDROTREATED GASOLINE (COUPE C8-C9 CUT) - CARLING is not on the REACH Annex XIV List

15.1.2. National regulations

Complies the United States TSCA (Toxic Substances Control Act) inventory
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Canadian DSL (Domestic Substances List)
Listed on the China Inventory of Existing Chemical Substances (IECSC)

15.2. Chemical safety assessment

A chemical safety assessment has been carried out

SECTION 16: Other information

Training advice : Training staff on good practice. Manipulations are to be done only by qualified and authorised persons.

Other information : Use good personal hygiene practices.

Full text of H- and EUH-statements:

Acute Tox. 4 (Dermal)	Acute toxicity (dermal), Category 4
Acute Tox. 4 (Inhalation)	Acute toxicity (inhal.), Category 4
Acute Tox. 4 (Inhalation:vapour)	Acute toxicity (inhalation:vapour) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment — Chronic Hazard, Category 1
Aquatic Chronic 2	Hazardous to the aquatic environment — Chronic Hazard, Category 2
Aquatic Chronic 3	Hazardous to the aquatic environment — Chronic Hazard, Category 3
Asp. Tox. 1	Aspiration hazard, Category 1
Carc. 1A	Carcinogenicity, Category 1A
Carc. 1B	Carcinogenicity, Category 1B
Carc. 2	Carcinogenicity, Category 2
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 2	Flammable liquids, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
Muta. 1B	Germ cell mutagenicity, Category 1B
Repr. 2	Reproductive toxicity, Category 2
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 1	Specific target organ toxicity — Repeated exposure, Category 1
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
H225	Highly flammable liquid and vapour
H226	Flammable liquid and vapour
H302	Harmful if swallowed
H304	May be fatal if swallowed and enters airways
H312	Harmful in contact with skin
H315	Causes skin irritation
H319	Causes serious eye irritation
H332	Harmful if inhaled
H335	May cause respiratory irritation
H336	May cause drowsiness or dizziness
H340	May cause genetic defects
H350	May cause cancer
H351	Suspected of causing cancer
H361d	Suspected of damaging the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects
H411	Toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects

SDS EU (REACH Annex II)

This information applies to the PRODUCT AS SUCH and conforming to specifications of TOTAL.
In case of formulations or mixtures, it is necessary to ascertain that a new danger will not appear.
The information contained is based on our knowledge of the product, at the date of publishing and it is given quite sincerely. However the revision of some data is in progress.
Users are advised of possible additional hazards when the product is used in applications for which it was not intended. This sheet shall only be used and reproduced for prevention and security purposes.
The references to legislative, regulatory and codes of practice documents cannot be considered as exhaustive.
It is the responsibility of the person receiving the product to refer to the totality of the official documents concerning the use, the possession and the handling of the product.
It is also the responsibility of the handlers of the product to pass on to any subsequent persons who will come into contact with the product. (usage, storage, cleaning of containers, other processes) the totality of the information contained within this safety data sheet and necessary for safety at work, the protection of health and the protection of environment.

Exposure Scenarios for High Benzene Naphtha

Annex: Exposure Scenarios for High Benzene Naphtha

Contents

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1. Exposure scenario 1: Manufacture of High benzene naphthas - Industrial

1.1. Exposure scenario

Section 1	Exposure Scenario Title
Title	**Manufacture of high benzene naphthas**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15
	Environmental Release Categories: ERC1, ERC4
Processes, tasks, activities covered	Manufacture of the substance or use as an intermediate or process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	Worker exposure was estimated using ECETOC TRAv2.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure is 0.5 - 10 kPa [OC4].
Concentration of substance in product	
Amounts used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes Benzene content >25% unless otherwise specified. Assumes a good basic standard of occupational hygiene is implemented [G1].

Contributing Scenarios	Risk Management Measures Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organizational measures, 4. Personal protection. Phrases between brackets are good practice advice only.
General measures (carcinogens) [G18]	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. [G20].
General exposures (closed systems) [CS15]. Outdoor [OC9].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]; Outdoor [OC9].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]Avoid carrying out activities involving exposure for more than 4 hours [OC 28].
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	Handle substance within a closed system [E47]. Transfer via enclosed lines [E52].Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11], or [G9], Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 1 hour [OC 27].
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	Transfer via enclosed lines [E52].Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11], or [G9], Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28].
Process sampling [CS2].	Sample via a closed loop or other system to avoid exposure [E8] Provide a good standard of general or controlled ventilation (not less than 3 to 5air changes per hour) [E11]; Provide extract ventilation to points where emissions occur [E54]. Avoid carrying out activities involving exposure for more than 1 hour [OC 27].
Laboratory activities [CS36].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]; Handle within a fume cupboard or implement suitable

	equivalent methods to minimise exposure. [E12].
Bulk transfers [CS14]. (open systems) [CS108]With potential for aerosol generation [CS138].	Ensure material transfers are under containment or extract ventilation [E66] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or [G9]; Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28].
Bulk transfers [CS14]. (closed systems) [CS107];	Handle substance within a closed system [E47].Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].Ensure operation is undertaken outdoors [E69]. Clear spills immediately [C&H13]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22], or Wear a respirator conforming to EN140 with Type A filter or better. [PPE22], and Avoid carrying out operations involving exposure for more thasn one hour [OC27]Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Storage [CS67] With occasional controlled exposure [CS137]; Outdoor [OC9].	Sample via a closed loop or other system to avoid exposure [E8], Store substance within a clsoed system [E84] orProvide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Avoid carrying out activities involving exposure for more than 4 hours [OC28]

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a]. Not readily biodegradable.	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tons/year)	5.0E05
Fraction of Regional tonnage used locally	1
Annual site tonnage (tons/year)	5.0E05
Maximum daily site tonnage (kg/day)	1.7E06
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	40
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure	
Emissions were based on those in SPERC fact sheet (ESVOC SpERC 1.1.v1) but have been amended taking into account the requirement that the local air concentration for benzene cannot exceed 5 ug/m3 as specified by EU directive 2000/69/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 November, 2000	
Release fraction to air from process (initial release prior to RMM)	1.0E-05
Release fraction to wastewater from process (initial release prior to RMM)	5.0E-06
Release fraction to soil from process (initial release prior to RMM)	1.0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). [TCR1j]. If discharging to domestic sewage treatment plant, no on-site wastewater treatment required [TCR9]. Prevent discharge of undissolved substance to or recover from wastewater [TCR14].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%). Treatment may be onsite or via a municipal sewage treatment plant.	0
Organization measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.0
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	1.8E06
Assumed domestic sewage treatment plant flow (m^3/d)	10000
Conditions and measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated. [ETW 4].	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated. [EWR 2].	

Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

3.2. Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2]. Nothing about environment risk characterization
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Check that RMMs and OCs are as described or of equivalent efficiency.
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4]

2. Exposure scenario 2: Distribution of High benzene naphthas - Industrial

2.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Distribution of high benzene naphthas**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
	Environmental Release Categories: ERC1 - 7
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	Worker exposure was estimated using ECETOC TRAv2.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure is 0.5 - 10 kPa [OC4].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting worker exposure	
Contributing Scenarios	**Risk Management Measures** Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organizational measures, 4. Personal protection. Phrases between brackets are good practice advice only.
General measures (carcinogens) [G18]	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. [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15] With sample collection [CS56]. With occasional controlled exposure [CS137]	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]; Ensure operation is undertaken outdoors [E69]or [G9]; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8] Ensure operation is undertaken outdoors [E69].
General exposures (open systems) [CS16]. Batch process [CS55] With sample collection [CS56].	Sample via a closed loop or other system to avoid exposure [E8] Ensure operation is undertaken outdoors [E69]or [G9]; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Process sampling [CS2].	Handle substance within a predominantly closed system provided with extract ventilation [E49]. Sample via a closed loop or other system to avoid exposure [E8]Provide a good standard of general or controlled ventilation (no less than 3 to 5 air changes per hour) [E11].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12].
Bulk transfers [CS14] (closed systems) [CS107]	Ensure material transfers are under containment or extract ventilation [E66] Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28].
Bulk transfers [CS14] (open systems) [CS108]	Ensure material transfers are under containment or extract ventilation [E66] Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28].
Drum and small package filling [CS6].	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].Clear spills immediately [C&H13]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]Retain drain downs in sealed

	storage pending disposal or for subsequent recycle [ENVT4].
Storage [CS67]With occasional controlled exposure [CS137]	Transfer via enclosed lines [E52].Ensure operation is undertaken outdoors [E69]; Store substance in a closed system [E84]

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a]. Not readily biodegradable.	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tons/year)	5.0E05
Fraction of Regional tonnage used locally	2.0E-03
Annual site tonnage (tons/year)	1.0E03
Maximum daily site tonnage (kg/day)	1.0E04
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	100
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Emissions were based on those in SPERC fact sheet (ESVOC SpERC 1.1b.v1) but have been amended taking into account the requirement that the local air concentration for benzene cannot exceed 5 ug/m3 as specified by EU directive 2000/69/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 November, 2000	
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 conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). [TCR1j]. If discharging to domestic sewage treatment plant, no on-site wastewater treatment required [TCR9]. Prevent discharge of undissolved substance to or recover from wastewater [TCR14].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%) Treatment may be onsite or via a municipal sewage treatment plant.	0

Organization measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.0
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	1.7E05
Assumed domestic sewage treatment plant flow (m^3/d)	2000
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. [ETW 3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [EWR 1]	

Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2]. Nothing about environment risk characterization
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Check that RMMs and OCs are as described or of equivalent efficiency.
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4]

3. Exposure scenario 3: Intermediate use of High benzene naphthas - Industrial

Use as an intermediate for the worker is covered by Exposure Scenario 1.

3.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Intermediate use of High Benzene Napthas streams (benzene); CAS RN 71-43-2**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15
	Environmental Release Categories: ERC6a
Processes, tasks, activities covered	Use as a isolated intermediate not under stricitly controlled conditions
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	Worker exposure was estimated using ECETOC TRAv2.
Section 2.1	**Control of worker exposure**
See 9.1 Exposure scenario 1	

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a]. Not readily biodegradable.	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tons/year)	1.5E05
Fraction of Regional tonnage used locally	0.1
Annual site tonnage (tons/year)	1.5E04
Maximum daily site tonnage (kg/day)	5.0E04
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Emissions were based on those in SPERC fact sheet (ESVOC SpERC 6.1a.v1) but have been amended taking into account the requirement that the local air concentration for benzene cannot exceed 5 ug/m3 as specified by EU directive 2000/69/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 November, 2000	

Release fraction to air from process (initial release prior to RMM)	5.0E-05
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-03
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). [TCR1j]. If discharging to domestic sewage treatment plant, no on-site wastewater treatment required [TCR9]. Prevent discharge of undissolved substance to or recover from wastewater [TCR14].	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%) Treatment may be onsite or via a municipal sewage treatment plant.	0
Organization measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.0
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	1.8E05
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of the substance is generated. [ETW 5]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [EWR 3]	

Section 3	**Exposure Estimation**
3.1. Health	See exposure scenario 1 manufacture
3.2. Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2]. Nothing about environment risk characterization
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Not applicable

4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4]

4. Exposure scenario 4: Formulation of High benzene naphthas - Industrial

4.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Formulation & (re)packaging of substances and mixtures of high benzene naphthas**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15
	Environmental Release Categories: ERC2
Processes, tasks, activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	Worker exposure was estimated using ECETOC TRAv2.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure is 0.5 - 10 kPa [OC4].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes Benzene content >25% unless otherwise specified. Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organizational measures, 4. Personal protection. Phrases between brackets are good practice advice only.

General measures (carcinogens) [G18]	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. [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or [G9]; Ensure operation is undertaken outdoors [E69].
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or [G9]; Ensure operation is undertaken outdoors [E69].
General exposures (open systems) [CS16]. Batch process [CS55] With sample collection [CS56] With potential for aerosol generation [CS138].	Sample via a closed loop or other system to avoid exposure [E8] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or [G9]; Ensure operation is undertaken outdoors [E69].
Batch processes at elevated temperatures [CS136].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out activities involving exposure for more than 1 hour [OC27].
Process sampling [CS2].	Sample via a closed loop or other system to avoid exposure [E8] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or [G9]; Ensure operation is undertaken outdoors [E69].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12].
Bulk transfers [CS14].	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out activities involving exposure for more than 4 hours [OC28]
Mixing operations (open systems) [CS30]. With potential for aerosol generation [CS138].	Provide extract ventilation to points where emissions occur [E54] Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour)

	[E40].Avoid carrying out activities involving exposure for more than 4 hours [OC28]
Manual [CS34] Transfer from/pouring from containers [CS22].	Ensure material transfers are under containment or extract ventilation [E66] Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Drum/batch transfers [CS8].	Ensure material transfers are under containment or extract ventilation [E66] Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Production or preparation or articles by tabletting, compression, extrusion or pelletisation [CS100]	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60] Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Avoid carrying out activities involving exposure for more than 4 hours [OC28]
Drum and small package filling [CS6].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60] Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].Clear spills immediately [C&H13]. Wear suitable gloves tested to EN374 [PPE15] Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]; Wear suitable coveralls to prevent exposure to the skin [PPE27].Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Storage [CS67]With occasional controlled exposure [CS137]	Ensure operation is undertaken outdoors [E69] Ensure material transfers are under containment or extract ventilation [E66] Store substance within a closed system [E84].Wear suitable gloves tested to EN374 [PPE15].

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a]. Not readily biodegradable.	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tons/year)	3.5E05
Fraction of Regional tonnage used locally	8.6E-02
Annual site tonnage (tons/year)	3.0E04
Maximum daily site tonnage (kg/day)	3.0E04
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300

Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Emissions were based on those in SPERC fact sheet (ESVOC SpERC 2.2.v1) but have been amended taking into account the requirement that the local air concentration for benzene cannot exceed 5 ug/m3 as specified by EU directive 2000/69/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 November, 2000	
Release fraction to air from process (initial release prior to RMM)	1.0E-06
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-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). [TCR1j].	
If discharging to domestic sewage treatment plant, no on-site wastewater treatment required [TCR9]. Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements): [OOC11]	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%) Treatment may be onsite or via a municipal sewage treatment plant.	85.3
Organization measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.0
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	2.4E05
Assumed domestic sewage treatment plant flow (m^3/d)	2000
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. [ETW 3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [EWR 1]	

Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the

	resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2]. Nothing about environment risk characterization
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Check that RMMs and OCs are as described or of equivalent efficiency.
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4]

5. Exposure scenario 5: Use of high benzene naphthas Category in fuels - Industrial

5.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in Fuels of high benzene naphthas**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16
	Environmental Release Categories: ERC7
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	Worker exposure was estimated using ECETOC TRAv2.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure is 0.5 - 10 kPa [OC4].
Concentration of substance in product	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Amounts used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes Benzene content >25% unless otherwise specified. Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organizational measures, 4. Personal protection. Phrases between brackets are good practice advice only.

General measures (carcinogens) [G18]	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. [G20].
Bulk transfers [CS14].	Handle substance within a predominantly closed system provided with extract ventilation [E49].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Drum/batch transfers [CS8].	Use drum pumps [E53].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Avoid carrying out activities involving exposure for more than 1 hour [OC27].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With occasional controlled exposure [CS137]	Handle substance within a predominantly closed system provided with extract ventilation [E49].Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
General exposures (closed systems) [CS15]. Batch process [CS55].	Handle substance within a predominantly closed system provided with extract ventilation [E49].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
General exposures (open systems) [CS16] (closed systems) [CS107]	Handle substance within a predominantly closed system provided with extract ventilation [E49].
General exposures (open systems) [CS16] (closed systems) [CS107] Batch process [CS55].	Handle substance within a predominantly closed system provided with extract ventilation [E49].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].

Equipment maintenance [CS5].	Drain down system prior to equipment break-in or maintenance [E65].Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Clear spills immediately [C&H13]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Vessel and container cleaning [CS103]	Drain down and flush system prior to equipment break-in or maintenance [E55].Provide extract ventilation to points where emissions occur [E54]. Clear spills immediately [C&H13]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Storage [CS67]	Store substance within a closed system [E84].
Storage [CS67]With occasional controlled exposure [CS137]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. Store substance within a closed system [E84]. Ensure material transfers are under containment or extract ventilation [E66].
Disposal of wastes [CS28].	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out activities involving exposure for more than 15 minutes [OC26].

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a]. Not readily biodegradable.	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tons/year)	2.5E05
Fraction of Regional tonnage used locally	0.1
Annual site tonnage (tons/year)	2.5E04
Maximum daily site tonnage (kg/day)	8.3E04
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Emissions were based on those in SPERC fact sheet (ESVOC SpERC 7.12a.v1) but have been amended taking into account the requirement that the local air concentration for benzene cannot exceed 5 ug/m3 as specified by EU directive 2000/69/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 November, 2000	

Release fraction to air from process (initial release prior to RMM)	5.0E-04
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)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). [TCR1k]. If discharging to domestic sewage treatment plant, no on-site wastewater treatment required [TCR9]. Prevent discharge of undissolved substance to or recover from wastewater [TCR14].	
Treat air emission to provide a typical removal efficiency of (%)	95.0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%) Treatment may be onsite or via a municipal sewage treatment plant.	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.0
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	1.3E05
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of the substance is generated.[ETW 5]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated.[ERW 3]	

Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4	**Guidance to check compliance with the Exposure Scenario**

4.1. Health	Check that RMMs and OCs are as described or of equivalent efficiency.
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4]

6. Exposure scenario 6: Use of High benzene naphthas as a fuel - Professional

6.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in Fuels of high benzene naphthas**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16
	Environmental Release Categories: ERC 9A, 9B
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	Worker exposure was estimated using ECETOC TRAv2.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure is 0.5 - 10 kPa [OC4].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting worker exposure	Assumes use at not > 20□C above ambient [G15]; Assumes Benzene content >25% unless otherwise specified. Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organizational measures, 4. Personal protection. Phrases between brackets are good practice advice only.

General measures (carcinogens) [G18]	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. [G20].
Bulk transfers [CS14].	Ensure material transfers are under containment or extract ventilation [E66] Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Clear transfer lines prior to de-coupling [E39].
Drum/batch transfers [CS8].	Use drum pumps or carefully pour from container [E64].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Ensure material transfers are under containment or extract ventilation [E66].
Dipping, immersion and pouring [CS4].	Use drum pumps or carefully pour from container [E64].Ensure material transfers are under containment or extract ventilation [E66] Ensure operation is undertaken outdoors [E69], or [G9] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]..Avoid carrying out activities involving exposure for more than 1 hour [OC27].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With occasional controlled exposure [CS137]	Handle substance within a predominantly closed system provided with extract ventilation [E49].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Avoid carrying out activities involving exposure for more than 4 hours [OC28]
General exposures (open systems) [CS16] (closed systems) [CS107] Batch process [CS55].	Handle substance within a predominantly closed system provided with extract ventilation [E49].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
General exposures (open systems) [CS16] (closed systems) [CS107]	Handle substance within a predominantly closed system provided with extract ventilation [E49].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Clear spills immediately [C&H13]. Wear

	a respirator conforming to EN140 with Type A filter or better. [PPE22]Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Vessel and container cleaning [CS103]	Drain down system prior to equipment break-in or maintenance [E65].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Clear spills immediately [C&H13]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Storage [CS67]	Store substance within a closed system [E84].

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a]. Not readily biodegradable.	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tons/year)	1.0E05
Fraction of Regional tonnage used locally	5.0E-04
Annual site tonnage (tons/year)	5.0E01
Maximum daily site tonnage (kg/day)	1.4E02
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Emissions were based on those in SPERC fact sheet (ESVOC SpERC 9.12b.v1) but have been amended taking into account the requirement that the local air concentration for benzene cannot exceed 5 ug/m3 as specified by EU directive 2000/69/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 November, 2000	
Release fraction to air from process (initial release prior to RMM)	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM)	1.0E-05
Release fraction to soil from process (initial release prior to RMM)	1.0E-05
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). [TCR1k]	
Soil emission controls are not applicable as there is no direct release to soil. [TCR 4]	
Negligible air emissions as process operates in a contained system.	

Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%) Treatment may be onsite or via a municipal sewage treatment plant.	0
Organization measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.0
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	3.3E03
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of the substance is generated.[ETW 5]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated.[ERW 3]	

Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2]. Nothing about environment risk characterization
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Check that RMMs and OCs are as described or of equivalent efficiency.
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4]