

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

#### 1.1. Product identifier

Chemical type	: Substance
Substance name	: Naphtha (petroleum), sweetened
Trade name	: Rubber Solvent
EC index no	: 649-350-00-1
EC no	: 265-089-2
CAS No.	: 64741-87-3
REACH registration No.	: 01-2119486791-26-0013
Product code	: 68C, SDS # PbR0120
Synonyms	: None known.

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

##### 1.2.1. Relevant identified uses

Use of the substance/preparation	: Manufacture of substances Intermediate Formulation [mixing] of preparations and/or re-packaging Coatings Cleaning agent Manufacture of rubber products. Fuels
----------------------------------	---

##### 1.2.2. Uses advised against

No additional information available

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

Only representative:  
Petrobras Europe Ltd.  
4th Floor, 20 North Audley Street  
London W1K 6WL, United Kingdom  
Fax number: +44(0) 20 7355 8750  
E-mail: reach@petrobras.com.br

Manufacturer:  
Petróleo Brasileiro S. A.  
Avenida Chile, 65.  
20035-900 Rio de Janeiro - Brazil  
E-mail: sac@petrobras.com.br

#### 1.4. Emergency telephone number

Emergency number	: For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident Call CHEMTREC Day or Night Within USA and Canada: 1-800-424-9300 Outside USA and Canada (collect calls accepted): 1-703-527-3887
------------------	--

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

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

Flam. Liq. 2	H225
Asp. Tox. 1	H304
Skin Irrit. 2	H315
STOT SE 3	H336
Repr. 2	H361
Aquatic Chronic 2	H411

Full text of H-phrases: see section 16.

##### Classification according to Directive 67/548/EEC or 1999/45/EC

F; R11  
N; R51/53  
Xi; R38  
Xn; R65  
R62  
R67

Full text of R-phrases: see section 16.

##### Adverse physicochemical, human health and environmental effects

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

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

### 2.2. Label elements

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

Hazard pictograms (CLP) :



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  
H361 - Suspected of damaging fertility or the unborn child  
H411 - Toxic to aquatic life with long lasting effects

Precautionary statements (CLP) :

P201 - Obtain special instructions before use  
P210 - Keep away from heat, open flames, sparks. - No smoking.  
P280 - Wear eye protection, protective clothing, protective gloves.  
P301+P310 - If swallowed, immediately call a doctor.  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed  
P501 - Dispose of contents/container to Comply with applicable local, national and international regulation.

### 2.3. Other hazards

This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.

other hazards which do not result in classification

: Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Name	Product identifier	%	Classification according to Directive 67/548/EEC
Naphtha (petroleum), sweetened (Main constituent)	(CAS No.) 64741-87-3 (EC no) 265-089-2 (EC index no) 649-350-00-1	100	F; R11 R67 Xn; R65 Xi; R38 Repr.Cat.3; R62 N; R51/53
n-Hexane (Constituent)	(CAS No.) 110-54-3 (EC no) 203-777-6 (EC index no) 601-037-00-0	< 15	F; R11 Repr.Cat.3; R62 Xn; R65-48/20 Xi; R38 R67 N; R51-53
Toluene (Constituent)	(CAS No.) 108-88-3 (EC no) 203-625-9 (EC index no) 601-021-00-3	< 3	F; R11 Xn; R48/20-65 Xi; R38 R67 Repr.Cat.3; R63
Benzene (Constituent)	(CAS No.) 71-43-2 (EC no) 200-753-7 (EC index no) 601-020-00-8	< 0.1	F; R11 Xn; R65 Xi; R36/38 Carc.Cat.1; R45 Muta.Cat.2; R46 T; R48/23/24/25
Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Naphtha (petroleum), sweetened (Main constituent)	(CAS No.) 64741-87-3 (EC no) 265-089-2 (EC index no) 649-350-00-1	100	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Asp. Tox. 1, H304 Repr. 2, H361 STOT SE 3, H336 Aquatic Chronic 2, H411
n-Hexane (Constituent)	(CAS No.) 110-54-3 (EC no) 203-777-6 (EC index no) 601-037-00-0	< 15	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361f STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 2, H411 STOT RE 2, H373

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Toluene (Constituent)	(CAS No.) 108-88-3 (EC no) 203-625-9 (EC index no) 601-021-00-3	< 3	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361d STOT SE 3, H336 Asp. Tox. 1, H304 STOT RE 2, H373
Benzene (Constituent)	(CAS No.) 71-43-2 (EC no) 200-753-7 (EC index no) 601-020-00-8	< 0.1	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

Full text of R-, H- and EUH-phrases: see section 16.

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. In case of breathing difficulties administer oxygen. If medical advice is needed, have product container or label at hand.
- First-aid measures after skin contact : After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water and soap. Rinse thoroughly with plenty of water for at least 20 minutes and take medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show this label if possible).
- First-aid measures after eye contact : Rinse immediately and plentifully with water, also under the eyelids, for at least 20 minutes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- First-aid measures after ingestion : Do not induce vomiting. If accidentally swallowed rinse the mouth with plenty of water (only if the person is conscious) and obtain immediate medical attention. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

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

- Symptoms/injuries : Inhalation causes narcotic effects/intoxication. May cause drowsiness or dizziness. Nausea. Headache.
- Symptoms/injuries after inhalation : High concentration of vapours may induce: headache, nausea, dizziness. May cause irritation to the respiratory tract and to other mucous membranes.
- Symptoms/injuries after skin contact : Slightly irritating to skin. Prolonged/repetitive skin contact may cause skin defatting or dermatitis.
- Symptoms/injuries after eye contact : Slightly irritating to eyes. In case of repeated or prolonged exposure : Conjunctivitis.
- Symptoms/injuries after ingestion : Nausea. Risk of aspiration pneumonia.

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

CNS depression.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

- Suitable extinguishing media: : carbon dioxide (CO<sub>2</sub>), dry chemical powder, foam. Water spray.
- 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

- Fire hazard : Flammable liquid. Keep away from sources of ignition - No smoking. Concentrated vapours are heavier than air. Vapours may form explosive mixtures with air.
- Explosion hazard : Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode.
- Reactivity : On combustion, forms. Carbon dioxide (CO<sub>2</sub>). Carbon monoxide. Nitrogen oxides (NO<sub>x</sub>).

### 5.3. Advice for firefighters

- Firefighting instructions : Cool tanks/drums with water spray/remove them into safety.
- Protective equipment for firefighters : Refer to section 8. In case of fire: Wear self-contained breathing apparatus.

## SECTION 6: Accidental release measures

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

- General measures : Eliminate all ignition sources if safe to do so. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Remove product from area of fire. Relevant water authorities should be notified of any large spillage to water course or drain.

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

### 6.1.1. For non-emergency personnel

Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. Refer to section 8.  
Emergency procedures : Stop leak if safe to do so. Remove all sources of ignition.

### 6.1.2. For emergency responders

Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. In case of fire: Wear self-contained breathing apparatus. Refer to section 8.  
Emergency procedures : Evacuate unnecessary personnel. Remove all sources of ignition. Stop leak if safe to do so. Eliminate leaks immediately.

### 6.2. Environmental precautions

Avoid release to the environment. Contaminated fire-fighting water must be collected separately. Prevent spreading over great surfaces (e.g. by damming or installing oil booms).

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

For containment : Stop leak if safe to do so.  
Methods for cleaning up : Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents). Do not absorb with saw-dust or any other combustible absorbent material.  
Other information : Relevant water authorities should be notified of any large spillage to water course or drain. Do not allow to enter into soil/subsoil. Eliminate all ignition sources if safe to do so. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

### 6.4. Reference to other sections

Refer to sections 8 and 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Handle in accordance with good industrial hygiene and safety procedures. Use only in well-ventilated areas. Ensure the grounding of containers, apparatus, pumps and suction equipment. Use only non-sparking tools. Keep away from sources of ignition - No smoking.

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

Technical measures: : Floors should be impenetrable, resistant to liquids and easy to clean. The floor should be leak tight, jointless and not absorbent. Provide for retaining containers, eg. floor pan without outflow.  
Incompatible materials : Oxidizing agents, strong.  
Storage area : Keep away from open flames, hot surfaces and sources of ignition. Ensure the grounding of containers, apparatus, pumps and suction equipment. Store in dry, cool, well-ventilated area.

### 7.3. Specific end use(s)

No additional information available

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Rubber Solvent (64741-87-3)		
EU	Notation	National occupational / biological exposure limits: none known
n-Hexane (110-54-3)		
EU	IOELV TWA (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>
EU	IOELV TWA (ppm)	20 ppm
Austria	MAK (mg/m <sup>3</sup> )	180 mg/m <sup>3</sup>
Austria	MAK (ppm)	50 ppm
Austria	MAK Short time value (mg/m <sup>3</sup> )	720 mg/m <sup>3</sup>
Austria	MAK Short time value (ppm)	200 ppm
Belgium	Limit value (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	20 ppm
France	VME (mg/m <sup>3</sup> )	170 mg/m <sup>3</sup>
France	VME (ppm)	50 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	180 mg/m <sup>3</sup>
Germany	TRGS 900 Occupational exposure limit value (ppm)	50 ppm
Germany	TRGS 903 (BGW)	5 mg/l
Germany	Remark (TRGS 903)	2,5-Hexandion + 4,5-Dihydroxy-2-hexanon (Urin; Expositionsende bzw. Schichtende)
Spain	VLA-ED (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>
Spain	VLA-ED (ppm)	20 ppm
The Netherlands	MAC TGG 8H (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>
The Netherlands	MAC TGG 15MIN (mg/m <sup>3</sup> )	144 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

<b>n-Hexane (110-54-3)</b>		
United Kingdom	WEL TWA (ppm)	20 ppm
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	70 mg/m <sup>3</sup>
Czech Republic	Expoziční limity (PEL) (ppm)	19.88 ppm
Czech Republic	Expoziční limity (NPK-P) (mg/m <sup>3</sup> )	200 mg/m <sup>3</sup>
Czech Republic	Expoziční limity (NPK-P) (ppm)	56.8 ppm
Czech Republic	Remark (CZ)	D, P
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	90 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (ppm)	25 ppm
Denmark	Grænseværdie (kortvarig) (mg/m <sup>3</sup> )	180 mg/m <sup>3</sup>
Denmark	Grænseværdie (kortvarig) (ppm)	50 ppm
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	20 ppm
Finland	Huomautus (FI)	iho
Hungary	AK-érték	180 mg/m <sup>3</sup>
Hungary	CK-érték	720 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	70 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (ppm)	20 ppm
Ireland	Notes (IE)	IOELV
Lithuania	IPRV (mg/m <sup>3</sup> )	90 mg/m <sup>3</sup>
Lithuania	IPRV (ppm)	25 ppm
Lithuania	TPRV (mg/m <sup>3</sup> )	180 mg/m <sup>3</sup>
Lithuania	TPRV (ppm)	50 ppm
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (ppm)	20 ppm
Norway	Merknader (NO)	R
Canada (Quebec)	VEMP (mg/m <sup>3</sup> )	176 mg/m <sup>3</sup>
Canada (Quebec)	VEMP (ppm)	50 ppm
Australia	TWA (mg/m <sup>3</sup> )	72 mg/m <sup>3</sup>
Australia	TWA (ppm)	20 ppm
<b>Toluene (108-88-3)</b>		
EU	IOELV TWA (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
EU	IOELV TWA (ppm)	50 ppm
EU	IOELV STEL (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
EU	IOELV STEL (ppm)	100 ppm
EU	Notation	Skin
Austria	MAK (mg/m <sup>3</sup> )	190 mg/m <sup>3</sup>
Austria	MAK (ppm)	50 ppm
Austria	MAK Short time value (mg/m <sup>3</sup> )	380 mg/m <sup>3</sup>
Austria	MAK Short time value (ppm)	100 ppm
Belgium	Limit value (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	50 ppm
Belgium	Short time value (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Belgium	Short time value (ppm)	100 ppm
Belgium	Remark*	D
France	VLE (mg/m <sup>3</sup> )	550 mg/m <sup>3</sup>
France	VLE (ppm)	150 ppm
France	VME (mg/m <sup>3</sup> )	375 mg/m <sup>3</sup>
France	VME (ppm)	100 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	190 mg/m <sup>3</sup>
Germany	TRGS 900 Occupational exposure limit value (ppm)	50 ppm

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

<b>Toluene (108-88-3)</b>		
Germany	TRGS 903 (BGW)	3 mg/l o-Kresol (Urin; bei Langzeitexposition/Expositionsende bzw. Schichtende) 1 mg/l Toluol (Blut; Expositionsende bzw. Schichtende)
Italy - Portugal - USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	188 mg/m <sup>3</sup>
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	50 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	375 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (ppm)	100 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m <sup>3</sup> )	560 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (STEL) (ppm)	150 ppm
USA OSHA	OSHA PEL (TWA) (ppm)	200 ppm
USA OSHA	OSHA PEL (STEL) (ppm)	300 ppm
USA OSHA	OSHA PEL (Ceiling) (ppm)	500 ppm
Spain	VLA-ED (mg/m <sup>3</sup> )	191 mg/m <sup>3</sup>
Spain	VLA-ED (ppm)	50 ppm
Spain	VLA-EC (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
Spain	VLA-EC (ppm)	100 ppm
Switzerland	VLE (mg/m <sup>3</sup> )	760 mg/m <sup>3</sup>
Switzerland	VLE (ppm)	200 ppm
Switzerland	VME (mg/m <sup>3</sup> )	190 mg/m <sup>3</sup>
Switzerland	VME (ppm)	50 ppm
Switzerland	Remark (CH)	max. 4x15 min/8h
The Netherlands	MAC TGG 8H (mg/m <sup>3</sup> )	150 mg/m <sup>3</sup>
The Netherlands	MAC TGG 15MIN (mg/m <sup>3</sup> )	384 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	191 mg/m <sup>3</sup>
United Kingdom	WEL TWA (ppm)	50 ppm
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	574 mg/m <sup>3</sup>
United Kingdom	WEL STEL (ppm)	150 ppm
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	200 mg/m <sup>3</sup>
Czech Republic	Expoziční limity (PEL) (ppm)	53.2 ppm
Czech Republic	Expoziční limity (NPK-P) (mg/m <sup>3</sup> )	500 mg/m <sup>3</sup>
Czech Republic	Expoziční limity (NPK-P) (ppm)	133 ppm
Czech Republic	Remark (CZ)	D
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	94 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (ppm)	25 ppm
Denmark	Grænseværdie (kortvarig) (mg/m <sup>3</sup> )	188 mg/m <sup>3</sup>
Denmark	Grænseværdie (kortvarig) (ppm)	50 ppm
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	190 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	50 ppm
Finland	HTP-arvo (15 min)	380 mg/m <sup>3</sup>
Finland	HTP-arvo (15 min) (ppm)	100 ppm
Finland	Huomautus (FI)	iho
Hungary	AK-érték	190 mg/m <sup>3</sup>
Hungary	CK-érték	760 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	188 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (ppm)	50 ppm
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	560 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (ppm)	100 ppm
Ireland	Notes (IE)	Sk, IOELV
Lithuania	IPRV (mg/m <sup>3</sup> )	200 mg/m <sup>3</sup>
Lithuania	IPRV (ppm)	50 ppm

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

<b>Toluene (108-88-3)</b>		
Lithuania	TPRV (mg/m <sup>3</sup> )	400 mg/m <sup>3</sup>
Lithuania	TPRV (ppm)	100 ppm
Lithuania	Remark (LT)	O
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	94 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (ppm)	25 ppm
Norway	Merknader (NO)	H
Poland	NDS (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>
Poland	NDSch (mg/m <sup>3</sup> )	350 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	192 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (ppm)	50 ppm
Slovakia	Upozornenie (SK)	K
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	200 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (ppm)	50 ppm
Sweden	kortidsvärde (KTV) (mg/m <sup>3</sup> )	400 mg/m <sup>3</sup>
Sweden	kortidsvärde (KTV) (ppm)	100 ppm
Canada (Quebec)	VEMP (mg/m <sup>3</sup> )	188 mg/m <sup>3</sup>
Canada (Quebec)	VEMP (ppm)	50 ppm
Australia	TWA (mg/m <sup>3</sup> )	191 mg/m <sup>3</sup>
Australia	TWA (ppm)	50 ppm
Australia	STEL (mg/m <sup>3</sup> )	574 mg/m <sup>3</sup>

<b>Benzene (71-43-2)</b>		
EU	IOELV TWA (mg/m <sup>3</sup> )	3.25 mg/m <sup>3</sup>
EU	IOELV TWA (ppm)	1 ppm
EU	Notation	Skin
Austria	MAK (mg/m <sup>3</sup> )	3.2 mg/m <sup>3</sup>
Austria	MAK (ppm)	1 ppm
Austria	MAK Short time value (mg/m <sup>3</sup> )	12.8 mg/m <sup>3</sup>
Austria	MAK Short time value (ppm)	4 ppm
Belgium	Limit value (mg/m <sup>3</sup> )	3.25 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	1 ppm
Belgium	Remark*	C, D
France	VME (mg/m <sup>3</sup> )	3.25 mg/m <sup>3</sup>
France	VME (ppm)	1 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	0.5 ppm
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	2.5 ppm
USA NIOSH	NIOSH REL (TWA) (ppm)	0.1 ppm
USA NIOSH	NIOSH REL (STEL) (ppm)	1 ppm
USA OSHA	OSHA PEL (TWA) (ppm)	1 ppm
USA OSHA	OSHA PEL (STEL) (ppm)	5 ppm
Spain	VLA-ED (mg/m <sup>3</sup> )	3.25 mg/m <sup>3</sup>
Spain	VLA-ED (ppm)	1 ppm
Switzerland	VME (mg/m <sup>3</sup> )	1.6 mg/m <sup>3</sup>
Switzerland	VME (ppm)	0.5 ppm
The Netherlands	MAC TGG 8H (mg/m <sup>3</sup> )	3.25 mg/m <sup>3</sup>
United Kingdom	WEL TWA (ppm)	1 ppm
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Czech Republic	Expoziční limity (PEL) (ppm)	0.939 ppm
Czech Republic	Expoziční limity (NPK-P) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Czech Republic	Expoziční limity (NPK-P) (ppm)	3.13 ppm
Czech Republic	Remark (CZ)	D, P
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	1.6 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (ppm)	0.5 ppm

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

<b>Benzene (71-43-2)</b>		
Denmark	Grænseværdie (kortvarig) (mg/m3)	3.2 mg/m <sup>3</sup>
Denmark	Grænseværdie (kortvarig) (ppm)	1.0 ppm
Finland	HTP-arvo (8h) (mg/m3)	3.25 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	1 ppm
Finland	Huomautus (FI)	iho, Kaikki työt
Hungary	CK-érték	3 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m3)	3 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (ppm)	1 ppm
Ireland	Notes (IE)	Sk, C1
Lithuania	IPRV (mg/m3)	3.25 mg/m <sup>3</sup>
Lithuania	IPRV (ppm)	1 ppm
Lithuania	TPRV (mg/m3)	19 mg/m <sup>3</sup>
Lithuania	TPRV (ppm)	6 ppm
Lithuania	Remark (LT)	K O; IPRV 3,25mg/m3 (1 ppm) galios nuo 2003 06 27 (pagal direktyvos 97/42 EC 2 str. 1 dalyje nurodytą datą).
Norway	Gjennomsnittsverdier (AN) (mg/m3)	3 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (ppm)	1 ppm
Norway	Merknader (NO)	K
Poland	NDS (mg/m3)	1.6 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (mg/m3)	1.5 mg/m <sup>3</sup> 0.5 mg/m <sup>3</sup> H, C
Sweden	nivågränsvärde (NVG) (ppm)	0.5 ppm 1.5 ppm H, C
Sweden	kortidsvärde (KTV) (mg/m3)	9 mg/m <sup>3</sup> 3 mg/m <sup>3</sup> H, C
Sweden	kortidsvärde (KTV) (ppm)	3 ppm 9 ppm H, C
Canada (Quebec)	VECD (mg/m <sup>3</sup> )	15.5 mg/m <sup>3</sup>
Canada (Quebec)	VECD (ppm)	5 ppm
Canada (Quebec)	VEMP (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Canada (Quebec)	VEMP (ppm)	1 ppm
<b>Rubber Solvent (64741-87-3)</b>		
DNEL/DMEL (Workers)		
Acute - systemic effects, inhalation	1100 mg/m <sup>3</sup>	
Long-term - systemic effects, inhalation	840 mg/m <sup>3</sup> /day	
DNEL/DMEL (General population)		
Acute - systemic effects, inhalation	640 mg/m <sup>3</sup>	
Long-term - systemic effects, inhalation	180 mg/m <sup>3</sup> /day	

### 8.2. Exposure controls

Appropriate engineering controls

: Provide adequate ventilation.

Personal protective equipment

: Insufficient ventilation: wear respiratory protection. Gloves. Protective clothing.



Hand protection

: Wear protective gloves. PVC (Polyvinyl chloride).

Eye protection

: if necessary: tightly fitting safety goggles.

Skin and body protection

: Wear suitable protective clothing or Rubber apron.

Respiratory protection

: Work in well ventilated zones or use proper respiratory protection. In case of fire: Wear self-contained breathing apparatus.

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: clear.
Colour	: colourless.
Odour	: Mild.
Odour threshold	: No data available
pH	: No data available
Melting point	: < -20 °C
Solidification point	: No data available
Boiling point	: (53.5-117.2) °C
Flash point	: < -11 °C (Closed cup)
Relat. evapor. rate comp. to butylacetate	: 3
Flammability (solid, gas)	: No data available
Explosive limits	: 1-6 vol %
Vapour pressure	: 220 mmHg @ 37.8°C
Relative vapour density at 20 °C	: No data available
Relative density	: 0.709-0.72 g/cm <sup>3</sup> @ 20°C
Solubility	: Soluble in organic solvents. Water: not significant
Log Pow	: No data available
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, kinematic	: 0.57 cSt @ 25°C
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available

#### 9.2. Other information

Other properties : No data available.

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

On combustion, forms. Carbon dioxide (CO<sub>2</sub>). Carbon monoxide. Nitrogen oxides (NO<sub>x</sub>).

#### 10.2. Chemical stability

Stable at normal conditions.

#### 10.3. Possibility of hazardous reactions

No data available.

#### 10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

#### 10.5. Incompatible materials

Oxidizing agents, strong.

#### 10.6. Hazardous decomposition products

No data available.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Not classified

Rubber Solvent (64741-87-3)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat (mg/l)	> 5.61 mg/l/4h

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Not classified  
Not irritating

Respiratory or skin sensitisation : Not classified  
Not sensitizing

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

Germ cell mutagenicity	: Not classified Negative
Carcinogenicity	: Not classified
Reproductive toxicity	: Suspected of damaging fertility or the unborn child.
Specific target organ toxicity (single exposure)	: May cause drowsiness or dizziness.
Specific target organ toxicity (repeated exposure)	: Not classified

Rubber Solvent (64741-87-3)	
NOAEL (dermal, rat/rabbit, 28 days)	3750 mg/kg bodyweight/day
NOAEL (inhalation, rat, vapour, days)	> 10 mg/l/6h/day

Aspiration hazard	: May be fatal if swallowed and enters airways.
Potential Adverse human health effects and symptoms	: Aspiration of this material may cause chemical pneumonia. Prolonged/repetitive skin contact may cause skin defatting or dermatitis. Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.

### SECTION 12: Ecological information

#### 12.1. Toxicity

Ecology - general	: Slightly volatile.
-------------------	----------------------

Rubber Solvent (64741-87-3)	
LC50 fishes	> 8.2 mg/l 96 hours
EC50 Daphnia	> 4.5 mg/l 48 hours
NOEC (chronic)	2.6 mg/l 21 days- daphnia
ErC50 (algae)	> 3.1 mg/l 72 hours

#### 12.2. Persistence and degradability

Rubber Solvent (64741-87-3)	
Persistence and degradability	No data available.

#### 12.3. Bioaccumulative potential

Rubber Solvent (64741-87-3)	
Bioaccumulative potential	No data available.

#### 12.4. Mobility in soil

Rubber Solvent (64741-87-3)	
Ecology - soil	If product enters soil, it will be mobile and may contaminate groundwater.

#### 12.5. Results of PBT and vPvB assessment

Rubber Solvent (64741-87-3)	
This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.	

#### 12.6. Other adverse effects

Other adverse effects	: No data available.
-----------------------	----------------------

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste treatment methods	: Dispose of this material and its container to hazardous or special waste collection point. Consult the local waste disposal expert about waste disposal. Disposal must be done according to official regulations.
Waste disposal recommendations	: Do not empty into drains or the aquatic environment.

### SECTION 14: Transport information

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

#### 14.1. UN number

UN-No.	: 1993
--------	--------

#### 14.2. UN proper shipping name

Proper shipping name	: FLAMMABLE LIQUID, N.O.S.
Transport document description	: UN 1993 FLAMMABLE LIQUID, N.O.S., 3, II, (D/E)

#### 14.3. Transport hazard class(es)

Class (UN)	: 3
------------	-----

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

Hazard labels (UN) : 3



### 14.4. Packing group

Packing group (UN) : II

### 14.5. Environmental hazards

Other information : No supplementary information available.

### 14.6. Special precautions for user

#### 14.6.1. Overland transport

Hazard identification number (Kemler No.) : 33

Classification code : F1

Orange plates :



Tunnel restriction code : D/E

Limited quantities (ADR) : LQ04

Excepted quantities (ADR) : E2

#### 14.6.2. Transport by sea

Class : 3 - Flammable liquids

#### 14.6.3. Air transport

Class : 3 - Flammable liquids

### 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IBC code : No data available.

## SECTION 15: Regulatory information

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

#### 15.1.1. EU-Regulations

Other regulations, restrictions and prohibition regulations : Compliance with following regulations: Regulation (EC) 1907/2006 as amended. Regulation (EC) 1272/2008 as amended. Directive 67/548/EEC as amended. Directive 1999/45/EC as amended.

#### 15.1.2. National regulations

No additional information available

Hazard symbols :



F - Highly flammable

Xn - Harmful

N - Dangerous for the environment

Xi - Irritant

R-phrases :

R11 - Highly flammable.  
R38 - Irritating to skin.  
R51/53 - Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
R62 - Possible risk of impaired fertility.  
R65 - Harmful: may cause lung damage if swallowed.  
R67 - Vapours may cause drowsiness and dizziness.

Classified dangerous in accordance with Directives 67/548/EEC and 1999/45/EC

S-phrases :

S2 - Keep out of the reach of children.  
S23 - Do not breathe vapour.  
S23 - Do not breathe spray  
S23 - Do not breathe aerosol.  
S24 - Avoid contact with skin.  
S29 - Do not empty into drains.  
S43 - In case of fire, use powder extinguisher  
S43 - In case of fire, never use water  
S43 - In case of fire, use foam, dry powder or sand  
S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label)

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

where possible).  
S51 - Use only in well-ventilated areas.  
S53 - Avoid exposure - obtain special instructions before use.  
S61 - Avoid release to the environment. Refer to special instructions/safety data sheets.  
S62 - If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

### 15.2. Chemical safety assessment

Chemical safety assessment has been established in the attachment.

## SECTION 16: Other information

Sources of Key data : PETROBRAS. MSDS.  
Abbreviations and acronyms : ASTM - American Society for Testing and Materials . CLP - Classification, Labelling and Packaging. CSR - Chemical Safety Report. EC - European Community. EEC - European Economic Community. GHS - Globally Harmonised System. REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals. SDS - Safety Data Sheet.

Full text of R-, H- and EUH-phrases:

Aquatic Chronic 2	Hazardous to the aquatic environment - chronic hazard Category 2
Asp. Tox. 1	Aspiration hazard Category 1
Carc. 1A	Carcinogenicity Category 1A
Eye Irrit. 2	Serious Eye Damage/Irritation Category 2
Flam. Liq. 2	flammable liquids Category 2
Muta. 1B	flammable liquids Category 1 flammable liquids Category 3
Repr. 2	Reproductive toxicity Category 2
Repr. 2	Reproductive toxicity Category 2
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
H225	Highly flammable liquid and vapour
H304	May be fatal if swallowed and enters airways
H315	Causes skin irritation
H319	Causes serious eye irritation
H336	May cause drowsiness or dizziness
H340	May cause genetic defects
H350	May cause cancer
H361	Suspected of damaging fertility or the unborn child
H361d	Suspected of damaging the unborn child.
H361f	Suspected of damaging fertility.
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H411	Toxic to aquatic life with long lasting effects

# Rubber Solvent

## Safety Data Sheet

according to Regulation (EC) No. 453/2010

R11	Highly flammable.
R36/38	Irritating to eyes and skin.
R38	Irritating to skin.
R45	May cause cancer.
R46	May cause heritable genetic damage.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R48/23/24/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R51	Toxic to aquatic organisms.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R53	May cause long-term adverse effects in the aquatic environment.
R62	Possible risk of impaired fertility.
R63	Possible risk of harm to the unborn child.
R65	Harmful: may cause lung damage if swallowed.
R67	Vapours may cause drowsiness and dizziness.

*The information presented in this Safety Data Sheet is based on current knowledge and is believed to be complete and accurate. It describes the product for the purposes of health, safety and environment requirements only and shall, therefore, be used only as a guide. The data refers to a specific product and may not be valid for combined uses with other products. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. Petrobras shall not be responsible for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices.*

### **Exposure Scenarios for: Rubber Solvent**

Trade Name : Rubber Solvent  
 CAS Number : 64741-87-3  
 EC Number : 265-089-2  
 SDS Reference : PbR0120

### **Table of Contents:**

Summary of parameters used for assessing safe use: .....	1
Exposure Scenario (ES1a): Manufacture of substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	3
Exposure Scenario (ES2a): Use of substance as intermediate (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	7
Exposure Scenario (ES3a): Distribution of substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	11
Exposure Scenario (ES4a): Formulation & (re)packing of substances and mixtures (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	15
Exposure Scenario (ES5a): Uses in Coatings: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	19
Exposure Scenario (ES6): Uses in Coatings: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	23
Exposure Scenario (ES7a): Use in Cleaning Agents: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	27
Exposure Scenario (ES8): Use in Cleaning Agents: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	31
Exposure Scenario (ES9): Use in Cleaning Agents: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	35
Exposure Scenario (ES10a): Use as a fuel: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	38
Exposure Scenario (ES11a): Use as a fuel: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	42
Exposure Scenario (ES12a): Use as a fuel: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	46
Exposure Scenario (ES13a): Rubber production and processing: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)) .....	49

### **Summary of parameters used for assessing safe use:**

DNEL: Worker - inhalation (acute): 1100-1300 ppm/15 min  
 Worker - inhalation (long term): 840 ppm/8 h  
 Consumer - inhalation (acute): 640-1200 ppm/15 min  
 Consumer - inhalation (long term): 180 ppm/24 h

### **Acronyms:**

---

CSA	:	Chemical safety assessment
DNEL	:	Derived no effect level
DU	:	Downstream user
ERC	:	Environmental release category
ES	:	Exposure scenario
PC	:	Product category
PEC	:	Predicted environmental concentration
PNEC	:	Predicted no effect concentration
PPE	:	Personal protection equipment
PROC	:	Process category
RCR	:	Risk characterisation ratio
STP	:	Sewage treatment plant
SU	:	Sector of use
WWTP	:	Wastewater treatment plant

### Exposure Scenario (ES1a):

Manufacture of substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.1.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Manufacture of substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	<p>SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites</p> <p>SU8 : Manufacture of bulk, large scale chemicals (including petroleum products)</p> <p>SU9 : Manufacture of fine chemicals</p> <p>PROC1 : Use in closed process, no likelihood of exposure</p> <p>PROC2 : Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3 : Use in closed batch process (synthesis or formulation)</p> <p>PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC15 : Use as laboratory reagent</p> <p>ERC1 : Manufacture of substances</p> <p>ERC4 : Industrial use of processing aids in processes and products, not becoming part of articles</p>
Specific environmental release category	ESVOC SpERC 1.1.v1
<b>9.1.2. Operational conditions and risk management measures</b>	
<b>9.1.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	2,000,000 kg/day (maximum in worst case)
Annually at point sources	600,000 t/year (maximum in worst case)
Annually total	18,700,000 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	300
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before	0.05

RMMs	
Release fraction to waste water from process before RMMs	0.003
Release fraction to soil from process before RMMs	0.0001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). Onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of $\geq 99\%$
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 95.2\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 80.4\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	99.1%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	2,000,000
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	10,000
<b>Conditions and measures related to treatment of waste</b>	
During manufacturing no waste of the substance is generated.	
<b>9.1.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Assumes use not $> 20^\circ C$ above ambient temperature.	
Assumes a good basic standard of occupational hygiene is implemented.	
<b>Technical conditions and measures at process level (source) to prevent release</b>	
No other specific measures identified.	
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	
Provide extract ventilation points where emissions occur (PROC4)	

Handle in a fume cupboard or under extract ventilation (PROC15)						
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>						
<p>Avoid direct skin contact with product (all PROCs)  Identify potential areas for indirect skin contact (all PROCs)  Clean up contamination/spills as soon as they occur (all PROCs)  Wash off skin contamination immediately (all PROCs)  Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)</p>						
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>						
1. PPE: Wear gloves (Type EN374) if regular skin contact likely (recommended for skin irritants)						
<b>9.1.3. Exposure information and reference to its source</b>						
<b>9.1.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
<p>Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic.  The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.</p> <p>When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1.  PNECs have been derived using HC5statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.</p>						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.1.3.2. Prediction of workers exposure resulting from the conditions described above</b>						
Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.						
<b>Process category</b>	<b>Inhalatory worker exposure (ppm)</b>		<b>Dermal worker exposure (mg/kg/day)</b>			
<b>PROC 1</b>	0.01		0.34			
<b>PROC 2</b>	50		1.37			
<b>PROC 3</b>	100		0.34			
<b>PROC 4</b>	10 - 100		0.69 – 6.86			
<b>PROC 8a</b>	250		13.71			
<b>PROC 8b</b>	150		6.86			
<b>PROC 15</b>	5		0.03			
<p>Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented</p>						

**Risk characterization:**

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.191	n.a.	0.191
PROC 3	0.382	n.a.	0.382
PROC 4	0.038 – 0.382	n.a.	0.038 – 0.382
PROC 8a	0.955	n.a.	0.955
PROC 8b	0.573	n.a.	0.573
PROC 15	0.019	n.a.	0.019

**9.1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**9.1.5. Additional good practice advice beyond the REACH CSA**

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### **Exposure Scenario (ES2a):**

Use of substance as intermediate (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.2.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Use of substance as intermediate (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites SU8 : Manufacture of bulk, large scale chemicals (including petroleum products) SU9 : Manufacture of fine chemicals PROC1 : Use in closed process, no likelihood of exposure PROC2 : Use in closed, continuous process with occasional controlled exposure PROC3 : Use in closed batch process (synthesis or formulation) PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC15 : Use as laboratory reagent ERC6a : Industrial use resulting in manufacture of another substance (use of intermediates)
Specific environmental release category	ESVOC SpERC 6.1a.v1
<b>9.2.2. Operational conditions and risk management measures</b>	
<b>9.2.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	50,000 kg/day (maximum in worst case)
Annually at point sources	15,000 t/year (maximum in worst case)
Annually total	2,210,000 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	300
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before	0.025

RMMs	
Release fraction to waste water from process before RMMs	0.003
Release fraction to soil from process before RMMs	0.001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Risk from environmental exposure is driven by freshwater sediment. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of 80%
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 92.9\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	78,000
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	2,000
<b>Conditions and measures related to treatment of waste</b>	
This substance is consumed during use and no waste of the substance is generated.	
<b>9.2.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Operation is carried out at elevated temperature ( $>20^\circ C$ above ambient temperature).	
Assumes a good basic standard of occupational hygiene is implemented.	
<b>Technical conditions and measures at process level (source) to prevent release</b>	
No other specific measures identified.	
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	

Provide extract ventilation points where emissions occur (PROC4)  
Handle in a fume cupboard or under extract ventilation (PROC15)

### Organisational measures to prevent /limit releases, dispersion and exposure

Avoid direct skin contact with product (all PROCs)  
Identify potential areas for indirect skin contact (all PROCs)  
Clean up contamination/spills as soon as they occur (all PROCs)  
Wash off skin contamination immediately (all PROCs)  
Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)

### Conditions and measures related to personal protection, hygiene and health evaluation

1. PPE: Wear gloves (Type EN374) if regular skin contact likely (recommended for skin irritants)

### 9.2.3. Exposure information and reference to its source

#### 9.2.3.1. Prediction of environmental exposure resulting from the conditions described above

Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic  
The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1.

PNECs have been derived using HC5 statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg dw)	In local marine water (mg/l)	In sediment freshwater (mg/kg dw)	In sediment marine water (mg/kg dw)
PEC	0.066	0.0066	0.00143	0.00066	0.034	0.000066

#### 9.2.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ectoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.01	0.34
PROC 2	50	1.37
PROC 3	100	0.34
PROC 4	10 - 100	0.69 - 6.86
PROC 8a	250	13.71
PROC 8b	150	6.86
PROC 15	5	0.03

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

### **Risk characterization:**

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
<b>PROC 1</b>	0	n.a.	0
<b>PROC 2</b>	0.191	n.a.	0.191
<b>PROC 3</b>	0.382	n.a.	0.382
<b>PROC 4</b>	0.038 – 0.382	n.a.	0.038 – 0.382
<b>PROC 8a</b>	0.955	n.a.	0.955
<b>PROC 8b</b>	0.573	n.a.	0.573
<b>PROC 15</b>	0.019	n.a.	0.019

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

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

### **9.2.5. Additional good practice advice beyond the REACH CSA**

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### Exposure Scenario (ES3a):

Distribution of substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.3.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Distribution of substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	<p>SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites</p> <p>PROC1 : Use in closed process, no likelihood of exposure</p> <p>PROC2 : Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3 : Use in closed batch process (synthesis or formulation)</p> <p>PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9 : Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC15 : Use as laboratory reagent</p> <p>ERC1 : Manufacture of substances</p> <p>ERC2 : Formulation of preparations</p> <p>ERC3 : Formulation in materials</p> <p>ERC4 : Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>ERC5 : Industrial use resulting in inclusion into or onto a matrix</p> <p>ERC6a : Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>ERC6b : Industrial use of reactive processing aids</p> <p>ERC6c : Industrial use of monomers for manufacture of thermo-plastics</p> <p>ERC6d : Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers</p> <p>ERC7 : Industrial use of substances in closed systems</p>
Specific environmental release category	ESVOC SpERC 1.1b.v1
<b>9.3.2. Operational conditions and risk management measures</b>	
<b>9.3.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	

Daily at point sources	120,000 kg/day (maximum in worst case)
Annually at point sources	37,500 t/year (maximum in worst case)
Annually total	18,700,000 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	300
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before RMMs	0.001
Release fraction to waste water from process before RMMs	0.00001
Release fraction to soil from process before RMMs	0.00001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of 90%
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 12\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	1,100,000
Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d)	2,000
<b>Conditions and measures related to treatment of waste</b>	
External treatment, disposal, recovery and recycling of waste should comply with applicable local and/or national regulations.	
<b>9.3.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures	8 hours/day (all PROCs)

control of risk															
<b>Human factors not influenced by risk management</b>															
Not applicable															
<b>Other given operational conditions affecting workers exposure</b>															
Assumes use not > 20°C above ambient temperature, unless stated differently.															
Assumes a good basic standard of occupational hygiene is implemented.															
<b>Technical conditions and measures at process level (source) to prevent release</b>															
Fill container/cans at dedicated fill points supplied with local extract ventilation (PROC 9)															
<b>Technical conditions and measures to control dispersion from source towards the worker</b>															
Provide extract ventilation points where emissions occur (PROC4) Handle in a fume cupboard or under extract ventilation (PROC15)															
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>															
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs) Clean up contamination/spills as soon as they occur (all PROCs) Wash off skin contamination immediately (all PROCs) Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)															
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>															
1. PPE: Wear gloves (Type EN374) if regular skin contact likely (recommended for skin irritants)															
<b>9.3.3. Exposure information and reference to its source</b>															
<b>9.3.3.1. Prediction of environmental exposure resulting from the conditions described above</b>															
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.															
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.															
<table border="1"> <thead> <tr> <th>Environmental exposure</th> <th>In STP/ untreated wastewater (mg/l)</th> <th>In local freshwater (mg/l)</th> <th>In local soil (mg/kg dw)</th> <th>In local marine water (mg/l)</th> <th>In sediment freshwater (mg/kg dw)</th> <th>In sediment marine water (mg/kg dw)</th> </tr> </thead> <tbody> <tr> <td>PEC</td> <td>0.066</td> <td>0.0066</td> <td>0.00143</td> <td>0.00066</td> <td>0.034</td> <td>0.000066</td> </tr> </tbody> </table>		Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg dw)	In local marine water (mg/l)	In sediment freshwater (mg/kg dw)	In sediment marine water (mg/kg dw)	PEC	0.066	0.0066	0.00143	0.00066	0.034	0.000066
Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg dw)	In local marine water (mg/l)	In sediment freshwater (mg/kg dw)	In sediment marine water (mg/kg dw)									
PEC	0.066	0.0066	0.00143	0.00066	0.034	0.000066									
<b>9.3.3.2. Prediction of workers exposure resulting from the conditions described above</b>															
Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.															

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.01	0.34
PROC 2	50	1.37
PROC 3	100	0.34
PROC 4	10	0.69
PROC 8a	250	13.71
PROC 8b	150	6.86
PROC 9	20	0.69
PROC 15	5	0.03

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

### Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.191	n.a.	0.191
PROC 3	0.382	n.a.	0.382
PROC 4	0.038	n.a.	0.038
PROC 8a	0.955	n.a.	0.955
PROC 8b	0.573	n.a.	0.573
PROC 9	0.076	n.a.	0.076
PROC 15	0.019	n.a.	0.019

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

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

### 9.3.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### Exposure Scenario (ES4a):

Formulation & (re)packing of substances and mixtures (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.4.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Formulation &amp; (re)packing of substances and mixtures (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites SU10 : Formulation [mixing] of preparations and/or re-packaging (excluding alloys) PROC1 : Use in closed process, no likelihood of exposure PROC2 : Use in closed, continuous process with occasional controlled exposure PROC3 : Use in closed batch process (synthesis or formulation) PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 : Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 : Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14 : Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15 : Use as laboratory reagent ERC2 : Formulation of preparations
Specific environmental release category	ESVOC SpERC 2.2.v1
<b>9.4.2. Operational conditions and risk management measures</b>	
<b>9.4.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	100,000 kg/day (maximum in worst case)
Annually at point sources	30,000 t/year (maximum in worst case)
Annually total	16,500,000 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	300

<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before RMMs	0.025
Release fraction to waste water from process before RMMs	0.002
Release fraction to soil from process before RMMs	0.0001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of 56.5%
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥94.7%  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ 0%
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage (M <sub>safe</sub> ) (kg/d)	100,000
Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d)	2,000
<b>Conditions and measures related to treatment of waste</b>	
External treatment, disposal, recovery and recycling of waste should comply with applicable local and/or national regulations.	
<b>9.4.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Assumes use not > 20°C above ambient temperature, unless stated differently.	

Assumes a good basic standard of occupational hygiene is implemented.						
<b>Technical conditions and measures at process level (source) to prevent release</b>						
Ensure material transfers are under containment or extract ventilation (PROC 8a & 8b) Fill containers/cans at dedicated dill points supplied with local extract ventilation (PROC 8b)						
<b>Technical conditions and measures to control dispersion from source towards the worker</b>						
Provide extract ventilation points where emissions occur (PROC 4 & 5) Handle in a fume cupboard or under extract ventilation (PROC15)						
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>						
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs) Clean up contamination/spills as soon as they occur (all PROCs) Wash off skin contamination immediately (all PROCs) Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)						
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>						
1. PPE: Wear gloves (Type EN374) if regular skin contact likely (recommended for skin irritants)						
<b>9.4.3. Exposure information and reference to its source</b>						
<b>9.4.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic. The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed exposures the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.4.3.2. Prediction of workers exposure resulting from the conditions described above</b>						
Workers exposure estimation is calculated with Ectoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.						

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.01	0.34
PROC 2	50	1.37
PROC 3	100	0.34
PROC 4	10	0.69
PROC 5	25	0.07
PROC 8a	25 – 250	0.14
PROC 8b	4.50	0.69
PROC 9	20	0.69
PROC 14	Not available	Not available
PROC 15	5	0.03

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

### Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.191	n.a.	0.191
PROC 3	0.382	n.a.	0.382
PROC 4	0.038	n.a.	0.038
PROC 5	0.095	n.a.	0.095
PROC 8a	0.095 – 0.955	n.a.	0.095 – 0.0955
PROC 8b	0.017	n.a.	0.017
PROC 9	0.076	n.a.	0.076
PROC 14	Not available	Not available	Not available
PROC 15	0.019	n.a.	0.019

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

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

### 9.4.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### Exposure Scenario (ES5a):

Uses in Coatings: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.5.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Uses in Coatings: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites PROC1 : Use in closed process, no likelihood of exposure PROC2 : Use in closed, continuous process with occasional controlled exposure PROC3 : Use in closed batch process (synthesis or formulation) PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 : Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC7 : Industrial spraying PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 : Roller application or brushing PROC13 : Treatment of articles by dipping and pouring PROC15 : Use as laboratory reagent ERC4 : Industrial use of processing aids in processes and products, not becoming part of articles
Specific environmental release category	ESVOC SpERC 4.3a.v1
<b>9.5.2. Operational conditions and risk management measures</b>	
<b>9.5.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	21,000 kg/day (maximum in worst case)
Annually at point sources	6,200 t/year (maximum in worst case)
Annually total	6,200 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	300
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	

Release fraction to air from process before RMMs	0.98
Release fraction to waste water from process before RMMs	0.007
Release fraction to soil from process before RMMs	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of 94.1%
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 92.6\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	21,000
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	2,000
<b>Conditions and measures related to treatment of waste</b>	
External treatment, disposal, recovery and recycling of waste should comply with applicable local and/or national regulations.	
<b>9.5.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Assumes use not $> 20^\circ C$ above ambient temperature, unless stated differently.	
Assumes a good basic standard of occupational hygiene is implemented.	
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings	

(PROC 7 & 10) Ensure material transfers are under containment or extract ventilation (PROC 8b) Use ventilation to extract vapours from freshly coated articles/objects (PROC 13)						
<b>Technical conditions and measures to control dispersion from source towards the worker</b>						
Provide extract ventilation points where emissions occur (PROC 2 & 5) Handle in a fume cupboard or under extract ventilation (PROC15)						
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>						
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs) Clean up contamination/spills as soon as they occur (all PROCs) Wash off skin contamination immediately (all PROCs) Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)						
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>						
1. PPE: Wear gloves (Type EN374) if regular skin contact likely (recommended for skin irritants)						
<b>9.5.3. Exposure information and reference to its source</b>						
<b>9.5.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.5.3.2. Prediction of workers exposure resulting from the conditions described above</b>						
Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.						

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.01	0.34
PROC 2	5	0.14
PROC 3	100	0.34
PROC 4	100	6.86
PROC 5	25	0.07
PROC 7	25 – 50	2.14
PROC 8a	250	0.14
PROC 8b	4.50	0.49
PROC 10	25	1.37
PROC 13	25	0.69
PROC 15	5	0.03

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

### Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.019	n.a.	0.019
PROC 3	0.382	n.a.	0.382
PROC 4	0.382	n.a.	0.382
PROC 5	0.095	n.a.	0.095
PROC 7	0.095 – 0.191	n.a.	0.095 – 0.191
PROC 8a	0.955	n.a.	0.955
PROC 8b	0.017	n.a.	0.017
PROC 10	0.095	n.a.	0.095
PROC 13	0.095	n.a.	0.095
PROC 15	0.019	n.a.	0.019

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

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

### 9.5.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

## **Exposure Scenario (ES6):**

Uses in Coatings: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.6.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Uses in Coatings: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen) PROC1 : Use in closed process, no likelihood of exposure PROC2 : Use in closed, continuous process with occasional controlled exposure PROC3 : Use in closed batch process (synthesis or formulation) PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 : Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 : Roller application or brushing PROC11 : Non industrial spraying PROC13 : Treatment of articles by dipping and pouring PROC15 : Use as laboratory reagent PROC19 : Hand-mixing with intimate contact and only PPE available ERC8a : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive outdoor use of processing aids in open systems
Specific environmental release category	ESVOC SpERC 8.3b.v1
<b>9.6.2. Operational conditions and risk management measures</b>	
<b>9.6.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	21,000 kg/day (maximum in worst case)
Annually at point sources	6,200 t/year (maximum in worst case)
Annually total	6,200 t/year total market

<b>Frequency and duration of use/exposure</b>	
Emission days per year	300
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before RMMs	0.98
Release fraction to waste water from process before RMMs	0.007
Release fraction to soil from process before RMMs	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of 94.1%
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 92.6\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	21,000
Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d)	2,000
<b>Conditions and measures related to treatment of waste</b>	
External treatment, disposal, recovery and recycling of waste should comply with applicable local and/or national regulations.	
<b>9.6.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	

<b>Other given operational conditions affecting workers exposure</b>						
Assumes use not > 20°C above ambient temperature, unless stated differently.						
Assumes a good basic standard of occupational hygiene is implemented.						
<b>Technical conditions and measures at process level (source) to prevent release</b>						
Ensure material transfers are under containment or extract ventilation (PROC 2, 8a & 8b) Use drum pumps or carefully pour from container (PROC 2) Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (PROC 13)						
<b>Technical conditions and measures to control dispersion from source towards the worker</b>						
Provide extract ventilation points where emissions occur (PROC 5 & 10) Provide enhanced mechanical ventilation by mechanical means (PROC 10 & 19) Carry out in vented booth (PROC 11) Handle in a fume cupboard or under extract ventilation (PROC15)						
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>						
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs) Clean up contamination/spills as soon as they occur (all PROCs) Wash off skin contamination immediately (all PROCs) Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)						
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>						
1. PPE: Wear a respirator conforming to EN140 with Type A filter or better (PROC 11 & 19 - if technical measures not practicable) 2. PPE: Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to leave to substantial aerosol release, e.g. spraying.						
<b>9.6.3. Exposure information and reference to its source</b>						
<b>9.6.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.6.3.2. Prediction of workers exposure resulting from the conditions described above</b>						
Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.						

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.10	0.34
PROC 2	10 – 50	0.14 – 1.37
PROC 3	100	0.34
PROC 4	50 – 250	0.69 – 6.86
PROC 5	100	0.07 – 13.71
PROC 8a	100	0.14
PROC 8b	25	0.69
PROC 10	150 – 210	27.43
PROC 11	100 - 200	107.14
PROC 13	50 – 250	0.69 – 13.71
PROC 15	10	0.03
PROC 19	50 – 150	141.43

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

### **Risk characterization:**

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.038 – 0.191	n.a.	0.038 – 0.191
PROC 3	0.382	n.a.	0.382
PROC 4	0.191 – 0.955	n.a.	0.191 – 0.955
PROC 5	0.382	n.a.	0.382
PROC 8a	0.382	n.a.	0.382
PROC 8b	0.095	n.a.	0.095
PROC 10	0.573 – 0.802	n.a.	0.573 – 0.802
PROC 11	0.382 – 0.764	n.a.	0.382 – 0.764
PROC 13	0.191 – 0.955	n.a.	0.191 – 0.955
PROC 15	0.038	n.a.	0.038
PROC 19	0.191 – 0.573	n.a.	0.191 – 0.573

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

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

### **9.6.5. Additional good practice advice beyond the REACH CSA**

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### **Exposure Scenario (ES7a):**

Use in Cleaning Agents: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.7.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Use in Cleaning Agents: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites PROC1 : Use in closed process, no likelihood of exposure PROC2 : Use in closed, continuous process with occasional controlled exposure PROC3 : Use in closed batch process (synthesis or formulation) PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises PROC7 : Industrial spraying PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 : Roller application or brushing PROC13 : Treatment of articles by dipping and pouring ERC4 : Industrial use of processing aids in processes and products, not becoming part of articles
Specific environmental release category	ESVOC SpERC 4.4a.v1
<b>9.7.2. Operational conditions and risk management measures</b>	
<b>9.7.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	5,000 kg/day (maximum in worst case)
Annually at point sources	100 t/year (maximum in worst case)
Annually total	512 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	300
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before RMMs	1.0

Release fraction to waste water from process before RMMs	0.00003
Release fraction to soil from process before RMMs	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of 70%
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 4.4\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	29,000
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	2,000
<b>Conditions and measures related to treatment of waste</b>	
External treatment, disposal, recovery and recycling of waste should comply with applicable local and/or national regulations.	
<b>9.7.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Assumes use not $> 20^\circ C$ above ambient temperature, unless stated differently.	
Assumes a good basic standard of occupational hygiene is implemented.	
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (PROC 4 & 7) Ensure material transfers are under containment or extract ventilation (PROC 8b)	

<b>Technical conditions and measures to control dispersion from source towards the worker</b>						
Provide enhanced general ventilation by mechanical means (PROC 10)						
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>						
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs) Clean up contamination/spills as soon as they occur (all PROCs) Wash off skin contamination immediately (all PROCs) Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)						
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>						
1. PPE: Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.						
<b>9.7.3. Exposure information and reference to its source</b>						
<b>9.7.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5 statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.7.3.2. Prediction of workers exposure resulting from the conditions described above</b>						
Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.						
<b>Process category</b>	<b>Inhalatory worker exposure (ppm)</b>		<b>Dermal worker exposure (mg/kg/day)</b>			
<b>PROC 1</b>	0.01		0.34			
<b>PROC 2</b>	50		1.37			
<b>PROC 3</b>	100		0.34			
<b>PROC 4</b>	10 - 100		0.69 - 6.86			
<b>PROC 7</b>	25		2.14			
<b>PROC 8a</b>	250		0.14			
<b>PROC 8b</b>	4.50		0.69			
<b>PROC 10</b>	25		1.37			
<b>PROC 13</b>	25		0.69			

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

**Risk characterization:**

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.191	n.a.	0.191
PROC 3	0.382	n.a.	0.382
PROC 4	0.038 - 0.382	n.a.	0.038 - 0.382
PROC 7	0.095	n.a.	0.095
PROC 8a	0.955	n.a.	0.955
PROC 8b	0.017	n.a.	0.017
PROC 10	0.095	n.a.	0.095
PROC 13	0.095	n.a.	0.095

**9.7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

The workers exposure and environmental emissions have been evaluated using Ecectoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**9.7.5. Additional good practice advice beyond the REACH CSA**

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### **Exposure Scenario (ES8):**

Use in Cleaning Agents: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.8.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Use in Cleaning Agents: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	<p>SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen)</p> <p>PROC1 : Use in closed process, no likelihood of exposure</p> <p>PROC2 : Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3 : Use in closed batch process (synthesis or formulation)</p> <p>PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC10 : Roller application or brushing</p> <p>PROC11 : Non industrial spraying</p> <p>PROC13 : Treatment of articles by dipping and pouring</p> <p>ERC8a : Wide dispersive indoor use of processing aids in open systems</p> <p>ERC8d : Wide dispersive outdoor use of processing aids in open systems</p>
Specific environmental release category	ESVOC SpERC 8.4b.v1
<b>9.8.2. Operational conditions and risk management measures</b>	
<b>9.8.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	0.49 kg/day (maximum in worst case)
Annually at point sources	0.18 t/year (maximum in worst case)
Annually total	360 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	365
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	

Release fraction to air from process before RMMs	0.02
Release fraction to waste water from process before RMMs	0.000001
Release fraction to soil from process before RMMs	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of % N/A
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 3.3\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	4.6
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	2,000
<b>Conditions and measures related to treatment of waste</b>	
External treatment, disposal, recovery and recycling of waste should comply with applicable local and/or national regulations.	
<b>9.8.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Assumes use not $> 20^\circ C$ above ambient temperature, unless stated differently.	
Assumes a good basic standard of occupational hygiene is implemented.	
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Ensure material transfers are under containment or extract ventilation (PROC 3, 8a & 8b)	

Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (PROC 4 & 10)

### Technical conditions and measures to control dispersion from source towards the worker

Provide extract ventilation points where emissions occur (PROC 2)  
Provide enhanced mechanical ventilation by mechanical means (PROC 10 & 11)

### Organisational measures to prevent /limit releases, dispersion and exposure

Avoid direct skin contact with product (all PROCs)  
Identify potential areas for indirect skin contact (all PROCs)  
Clean up contamination/spills as soon as they occur (all PROCs)  
Wash off skin contamination immediately (all PROCs)  
Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)

### Conditions and measures related to personal protection, hygiene and health evaluation

1. PPE: Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to leave to substantial aerosol release, e.g. spraying.

### 9.8.3. Exposure information and reference to its source

#### 9.8.3.1. Prediction of environmental exposure resulting from the conditions described above

Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic.  
The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed exposures the resulting risk characterisation ratios are expected to be less than 1.

PNECs have been derived using HC5 statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg dw)	In local marine water (mg/l)	In sediment freshwater (mg/kg dw)	In sediment marine water (mg/kg dw)
PEC	0.066	0.0066	0.00143	0.00066	0.034	0.000066

#### 9.8.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ectoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.10	0.34
PROC 2	10	0.14
PROC 3	100	0.34
PROC 4	250	0.69
PROC 8a	100	0.14
PROC 8b	25	0.69
PROC 10	100	1.37
PROC 11	200	2.14
PROC 13	50	0.69

# Rubber Solvent

## Annex to the Safety Data Sheet

according to Regulation (EC) No. 453/2010  
 Revision date: September 8, 2011

Supersedes:

Version: 1.0

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

### Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.038	n.a.	0.038
PROC 3	0.382	n.a.	0.382
PROC 4	0.955	n.a.	0.955
PROC 8a	0.382	n.a.	0.382
PROC 8b	0.095	n.a.	0.095
PROC 10	0.382	n.a.	0.382
PROC 11	0.764	n.a.	0.764
PROC 13	0.191	n.a.	0.191

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

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

### 9.8.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### **Exposure Scenario (ES9):**

Use in Cleaning Agents: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.9.1. Use in Cleaning Agents: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC3 : Air care products PC4 : Anti-Freeze and de-icing products PC9a : Coatings, paints, thinners, removers PC24 : Lubricants, greases, release products PC35 : Washing and cleaning products (including solvent based products) PC38 : Welding and soldering products (with flux coatings or flux cores.), flux products ERC8a : Wide dispersive indoor use of processing aids in open systems ERC8d : Wide dispersive indoor use of reactive substances in open systems
Specific environmental release category	ESVOC SpERC 8.4c.v1
<b>9.9.2. Operational conditions and risk management measures</b>	
<b>9.9.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 50%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Annually at point sources	0.43 t/year (maximum in worst case)
Regional tonnage	854 t/year
Fraction of regional tonnage used locally	0.0005
<b>Frequency and duration of use/exposure</b>	
Emission days per year	365
<b>Environment factors not influenced by risk management</b>	
Local Freshwater dilution factor	10
Local marine water dilution factor	100
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from wide dispersive use (regional only)	0.95
Release fraction to wastewater from wide dispersive use	0.025
Release fraction to soil from wide dispersive use (regional only)	0.025
<b>Conditions and measures related to municipal sewage treatment plant</b>	

# Rubber Solvent

## Annex to the Safety Data Sheet

according to Regulation (EC) No. 453/2010  
Revision date: September 8, 2011

Supersedes:

Version: 1.0

Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation)						
Estimated substance removal from wastewater via domestic sewage treatment		95.5%				
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)		11				
Assumed domestic sewage treatment plant flow ( $m^3/d$ )		2,000				
<b>Conditions and measures related to external treatment of waste for disposal</b>						
External treatment and disposal of waste should comply with applicable local and/or national regulations						
<b>Conditions and measures related to external recovery of waste</b>						
External recovery and recycling of waste should comply with applicable local and/or national regulations.						
<b>9.9.2.2. Control of consumer exposure</b>						
<b>Substance content in the product</b>		Up to 50%				
<b>Amounts of product used / applied per event</b>		Up to 2760 g				
<b>Frequency and duration of use/exposure</b>		Covers use frequency up to 4 times per day				
		Duration of exposure: up to 8 hours per event				
<b>Consumer related measures</b>		<p>Covers concentrations 1 – 50%;</p> <p>Covers use 1- 365 days/year;</p> <p>Covers use up to 4 times/on day of use;</p> <p>Covers skin contact area 35.70 – 857.50 <math>cm^2</math> for each use event;</p> <p>Covers use amounts 0.1 - 2760 g;</p> <p>Covers use in room size of 20<math>m^3</math>;</p> <p>For each use event, covers exposure up to 0.02 - 8.00hr/event;</p> <p>RMM: No specific RMMs identified beyond those OCs stated</p>				
<b>Other Operational Conditions affecting exposure</b>		Assumes use at ambient temperatures; assumes use in a 20 $m^3$ room; assumes use with typical ventilation.				
<b>9.9.3. Exposure information and reference to its source</b>						
<b>9.9.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic. The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed exposures the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
PEC	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.9.3.2. Prediction of consumer exposure resulting from the conditions described above</b>						

# Rubber Solvent

## Annex to the Safety Data Sheet

according to Regulation (EC) No. 453/2010  
 Revision date: September 8, 2011

Supersedes:

Version: 1.0

The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD.

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented.

Ranges for exposure estimates and RCR are listed below. For more information contact the supplier or refer to the CSR. For DNEL values, please refer to Page 2.

Consumers exposure	Dermal (mg/kg/day)	Oral (mg/kg/day)	Inhalation (mg/kg for 24hr day)	All routes systematic (mg/kg/day)
Exposure estimates	0 – 128.60	0 – 68	0 – 11416.70	0 – 11488

### Risk characterization:

Process category	RCR (dermal)	RCR (oral)	RCR (inhalation)	RCR (all routes)
All PROCs	Not available	Not available	Not available	Not available

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

### 9.9.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### **Exposure Scenario (ES10a):**

Use as a fuel: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.10.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Use as a fuel: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	<p>SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites</p> <p>PROC1 : Use in closed process, no likelihood of exposure</p> <p>PROC2 : Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3 : Use in closed batch process (synthesis or formulation)</p> <p>PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC16 : Using material as fuel sources, limited exposure to unburned product to be expected</p> <p>ERC7 : Industrial use of substances in closed systems</p>
Specific environmental release category	ESVOC SpERC 7.12a.v1
<b>9.10.2. Operational conditions and risk management measures</b>	
<b>9.10.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	4,600,000 kg/day (maximum in worst case)
Annually at point sources	1,400,000 t/year (maximum in worst case)
Annually total	1,400,000 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	300
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before RMMs	0.0025
Release fraction to waste water from process before RMMs	0.00001
Release fraction to soil from process before RMMs	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	

Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of 99.4%
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 76.9\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	4,600,000
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	2,000
<b>Conditions and measures related to treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.	
<b>Conditions and measures related to recovery of waste</b>	
This substance is consumed during use and no waste of the substance is generated.	
<b>9.10.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Assumes use not $> 20^\circ C$ above ambient temperature, unless stated differently.	
Assumes a good basic standard of occupational hygiene is implemented.	
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Ensure material transfers are under containment or extract ventilation (PROC 8b)	
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	
No specific measures identified.	
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>	
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs)	

Clean up contamination/spills as soon as they occur (all PROCs)  
Wash off skin contamination immediately (all PROCs)  
Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)

**Conditions and measures related to personal protection, hygiene and health evaluation**

1. PPE: Wear gloves (Type EN374) if regular skin contact likely (recommended for skin irritants)

**9.10.3. Exposure information and reference to its source**

**9.10.3.1. Prediction of environmental exposure resulting from the conditions described above**

Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic.  
The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1.  
PNECs have been derived using HC5 statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.

Environmental exposure	In STP/ untreated wastewater (mg/l)	In local freshwater (mg/l)	In local soil (mg/kg dw)	In local marine water (mg/l)	In sediment freshwater (mg/kg dw)	In sediment marine water (mg/kg dw)
PEC	0.066	0.0066	0.00143	0.00066	0.034	0.000066

**9.10.3.2. Prediction of workers exposure resulting from the conditions described above**

Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.01	0.34
PROC 2	50	1.37
PROC 3	100	0.34
PROC 8a	250	13.71
PROC 8b	90 - 150	6.86
PROC 16	25	0.34

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

**Risk characterization:**

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.191	n.a.	0.191
PROC 3	0.382	n.a.	0.382
PROC 8a	0.955	n.a.	0.955
PROC 8b	0.344 – 0.573	n.a.	0.344 – 0.573
PROC 16	0.095	n.a.	0.095

**9.10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**9.10.5. Additional good practice advice beyond the REACH CSA**

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### Exposure Scenario (ES11a):

Use as a fuel: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.11.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Use as a fuel: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	<p>SU22 : Professional uses: Public domain (administration, education, entertainment, services, craftsmen)</p> <p>PROC1 : Use in closed process, no likelihood of exposure</p> <p>PROC2 : Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3 : Use in closed batch process (synthesis or formulation)</p> <p>PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC16 : Using material as fuel sources, limited exposure to unburned product to be expected</p> <p>ERC9a : Wide dispersive indoor use of substances in closed systems</p> <p>ERC9b : Wide dispersive outdoor use of substances in closed systems</p>
Specific environmental release category	ESVOC SpERC 9.12b.v1
<b>9.11.2. Operational conditions and risk management measures</b>	
<b>9.11.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	160 kg/day (maximum in worst case)
Annually at point sources	590 t/year (maximum in worst case)
Annually total	1,190,000 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	365
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before RMMs	0.01
Release fraction to waste water from	0.00001

# Rubber Solvent

## Annex to the Safety Data Sheet

according to Regulation (EC) No. 453/2010  
Revision date: September 8, 2011

Supersedes:

Version: 1.0

process before RMMs	
Release fraction to soil from process before RMMs	0.00001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of % N/A
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 3.4\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	15,000
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	2,000
<b>Conditions and measures related to treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regular exposure assessment.	
<b>Conditions and measures related to recovery of waste</b>	
This substance is consumed during use and no waste of the substance is generated.	
<b>9.11.2.2. Control of worker exposure</b>	
<b>Frequency and duration of use/exposure</b>	
Frequency of use for which the ES ensures control of risk	days/year: not restricted
Duration of use for which the ES ensures control of risk	8 hours/day (all PROCs)
<b>Human factors not influenced by risk management</b>	
Not applicable	
<b>Other given operational conditions affecting workers exposure</b>	
Assumes use not $> 20^\circ\text{C}$ above ambient temperature, unless stated differently.	
Assumes a good basic standard of occupational hygiene is implemented.	
<b>Technical conditions and measures at process level (source) to prevent release</b>	
No other specific measures identified.	

<b>Technical conditions and measures to control dispersion from source towards the worker</b>						
Drain down system prior to equipment break-in or maintenance (PROC 8a)						
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>						
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs) Clean up contamination/spills as soon as they occur (all PROCs) Wash off skin contamination immediately (all PROCs) Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)						
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>						
1. PPE: Wear gloves (Type EN374) if regular skin contact likely (recommended for skin irritants)						
<b>9.11.3. Exposure information and reference to its source</b>						
<b>9.11.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic. The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5 statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.11.3.2. Prediction of workers exposure resulting from the conditions described above</b>						
Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.						
<b>Process category</b>	<b>Inhalatory worker exposure (ppm)</b>		<b>Dermal worker exposure (mg/kg/day)</b>			
<b>PROC 1</b>	0.10		0.34			
<b>PROC 2</b>	50		1.37			
<b>PROC 3</b>	100		0.34			
<b>PROC 8a</b>	100		0.14			
<b>PROC 8b</b>	250		6.86			
<b>PROC 16</b>	50		0.34			
Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented						

**Risk characterization:**

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.191	n.a.	0.191
PROC 3	0.382	n.a.	0.382
PROC 8a	0.382	n.a.	0.382
PROC 8b	0.955	n.a.	0.955
PROC 16	0.191	n.a.	0.191

**9.11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**9.11.5. Additional good practice advice beyond the REACH CSA**

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### **Exposure Scenario (ES12a):**

Use as a fuel: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.12.1. Use as a fuel: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	SU21 : Consumer uses: Private households (= general public = consumers) PC13 : Fuels ERC9a : Wide dispersive indoor use of substances in closed systems ERC9b : Wide dispersive outdoor use of substances in closed systems
Specific environmental release category	ESVOC SpERC 9.12c.v1
<b>9.12.2. Operational conditions and risk management measures</b>	
<b>9.12.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	
Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Annually at point sources	7,000 t/year (maximum in worst case)
Regional tonnage	13,900,000 t/year
Fraction of regional tonnage used locally	0.0005
<b>Frequency and duration of use/exposure</b>	
Emission days per year	365
<b>Environment factors not influenced by risk management</b>	
Local Freshwater dilution factor	10
Local marine water dilution factor	100
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from wide dispersive use (regional only)	0.01
Release fraction to wastewater from wide dispersive use	0.00001
Release fraction to soil from wide dispersive use (regional only)	0.00001
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation)	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	180,000
Assumed domestic sewage treatment plant flow ( $m^3/d$ )	2,000

<b>Conditions and measures related to external treatment of waste for disposal</b>						
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.						
<b>Conditions and measures related to external recovery of waste</b>						
This substance is consumed during use and no waste of the substance is generated.						
<b>9.12.2.2. Control of consumer exposure</b>						
<b>Substance content in the product</b>	Up to 100%					
<b>Amounts of product used / applied per event</b>	Up to 37,500 g					
<b>Frequency and duration of use/exposure</b>	Covers use frequency up to 0.143 times per day					
	Duration of exposure: up to 2 hours per event					
<b>Consumer related measures</b>	<p>Covers concentrations up to 100%;  Covers use 1- 365 days/year;  Covers use up to 1 time/on day of use;  Covers skin contact area 210 – 420 cm<sup>2</sup> for each use event;  Covers use amounts 750 - 37,500 g;  Covers use in room size of 20m<sup>3</sup>;  For each use event, covers exposure up to 0.03 - 2.00hr/event;</p> <p>RMM: No specific RMMs identified beyond those OCs stated</p>					
<b>Other Operational Conditions affecting exposure</b>	Assumes use at ambient temperatures; assumes use in a 20m <sup>3</sup> room; assumes use with typical ventilation.					
<b>9.12.3. Exposure information and reference to its source</b>						
<b>9.12.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic. The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066
<b>9.12.3.2. Prediction of consumer exposure resulting from the conditions described above</b>						
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD. Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented.						
Ranges for exposure estimates and RCR are listed below. For more information contact the supplier or refer to the CSR. For DNEL values, please refer to Page 2.						

# Rubber Solvent

## Annex to the Safety Data Sheet

according to Regulation (EC) No. 453/2010  
 Revision date: September 8, 2011

Supersedes:

Version: 1.0

Consumers exposure	Dermal (mg/kg/day)	Oral (mg/kg/day)	Inhalation (mg/kg for 24hr day)	All routes systematic (mg/kg/day)
Exposure estimates	71.50	0	11416.70	11488

### Risk characterization:

Process category	RCR (dermal)	RCR (oral)	RCR (inhalation)	RCR (all routes)
All PROCs	Not available	Not available	Not available	Not available

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

### 9.12.5. Additional good practice advice beyond the REACH CSA

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.

### **Exposure Scenario (ES13a):**

Rubber production and processing: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))

<b>9.13.1. Exposure scenario addressing uses carried out by workers</b>	
<b>Rubber production and processing: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))</b>	
Use descriptors related to the life cycle stage	<p>SU3 : Industrial uses: Uses of substances as such or in preparations at industrial sites</p> <p>SU10 : Formulation [mixing] of preparations and/or re-packaging (excluding alloys)</p> <p>SU11 : Manufacture of rubber products</p> <p>PROC1 : Use in closed process, no likelihood of exposure</p> <p>PROC2 : Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3 : Use in closed batch process (synthesis or formulation)</p> <p>PROC4 : Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5 : Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC6 : Calendering operations</p> <p>PROC7 : Industrial spraying</p> <p>PROC8a : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9 : Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC13 : Treatment of articles by dipping and pouring</p> <p>PROC14 : Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC15 : Use as laboratory reagent</p> <p>PROC21 : Low energy manipulation of substances bound in materials and/or articles</p> <p>ERC1 : Manufacture of substances</p> <p>ERC4 : Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>ERC6d : Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers</p>
Specific environmental release category	ESVOC SpERC 4.19.v1
<b>9.13.2. Operational conditions and risk management measures</b>	
<b>9.13.2.1. Control of environmental exposure</b>	
<b>Product characteristic</b>	

# Rubber Solvent

## Annex to the Safety Data Sheet

according to Regulation (EC) No. 453/2010  
Revision date: September 8, 2011

Supersedes:

Version: 1.0

Physical state	Liquid
Concentration of substance in product	Up to 100%
Vapour pressure of substance	>10 kPa at STP
<b>Amounts used</b>	
Daily at point sources	4,700 kg/day (maximum in worst case)
Annually at point sources	94 t/year (maximum in worst case)
Annually total	94 t/year total market
<b>Frequency and duration of use/exposure</b>	
Emission days per year	20
<b>Environment factors not influenced by risk management</b>	
Flow rate of receiving surface water	18,000 m <sup>3</sup> /day (default)
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process before RMMs	0.003
Release fraction to waste water from process before RMMs	0.01
Release fraction to soil from process before RMMs	0.0001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Prevent discharge of undissolved substance to or recover from wastewater. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Apply technical measures aiming at reducing releases to air (containment by preference or catalytic or thermal gas oxidation)	Treat air emissions to provide a typical removal efficiency of % N/A
Apply technical measures aiming at reduction and cleaning of waste water (WWTP /local STP (e.g. biological treatment))	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq 23.9\%$  If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$
<b>Organizational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment	95.5%
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs	95.5%
Maximum allowable site tonnage ( $M_{safe}$ ) (kg/d)	42,000
Assumed domestic sewage treatment plant flow (m <sup>3</sup> /d)	2,000
<b>Conditions and measures related to treatment of waste</b>	
<b>Conditions and measures related to recovery of waste</b>	
External treatment, disposal, recovery and recycling of waste should comply with applicable local and/or national	

regulations.						
<b>9.13.2.2. Control of worker exposure</b>						
<b>Frequency and duration of use/exposure</b>						
Frequency of use for which the ES ensures control of risk			days/year: not restricted			
Duration of use for which the ES ensures control of risk			8 hours/day (all PROCs)			
<b>Human factors not influenced by risk management</b>						
Not applicable						
<b>Other given operational conditions affecting workers exposure</b>						
Operation is carried out at elevated temperature (>20 °C above ambient temperature).						
Assumes a good basic standard of occupational hygiene is implemented.						
<b>Technical conditions and measures at process level (source) to prevent release</b>						
Ensure material transfers are under containment or extract ventilation (PROC 8b) Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (PROC 2, 4, 5, 6, 10 & 13)						
<b>Technical conditions and measures to control dispersion from source towards the worker</b>						
Provide extract ventilation points where emissions occur (PROC 7 & 14) Provide a good standard of general ventilation. Natural ventilation is from doors, windows, etc. Controlled ventilation means air is supplied or removed by a powered fan. Carry out in vented booth (PROC 9) Handle in a fume cupboard or under extract ventilation (PROC 15)						
<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>						
Avoid direct skin contact with product (all PROCs) Identify potential areas for indirect skin contact (all PROCs) Clean up contamination/spills as soon as they occur (all PROCs) Wash off skin contamination immediately (all PROCs) Provide basic employee training to prevent/minimise exposures and to report and skin effects that may develop (all PROCs)						
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>						
1. PPE: Other skin protection measures such as impervious suits and face shield may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.						
<b>9.13.3. Exposure information and reference to its source</b>						
<b>9.13.3.1. Prediction of environmental exposure resulting from the conditions described above</b>						
Substance is a complex hydrocarbon UVCB. Predominantly hydrophobic. The Hydrocarbon Block Method with the Petrorisk model is used for environmental risk assessment.						
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed the resulting risk characterisation ratios are expected to be less than 1. PNECs have been derived using HC5 statistical extrapolation method and the target lipid model using representative structures. For more detailed information contact supplier - see Product Library tab in Petrorisk spreadsheet.						
<b>Environmental exposure</b>	<b>In STP/ untreated wastewater (mg/l)</b>	<b>In local freshwater (mg/l)</b>	<b>In local soil (mg/kg dw)</b>	<b>In local marine water (mg/l)</b>	<b>In sediment freshwater (mg/kg dw)</b>	<b>In sediment marine water (mg/kg dw)</b>
<b>PEC</b>	0.066	0.0066	0.00143	0.00066	0.034	0.000066

### 9.13.3.2. Prediction of workers exposure resulting from the conditions described above

Workers exposure estimation is calculated with Ecetoc TRA model. Where applicable, predicted exposures and RCR values are reported as ranges. For DNEL values, please refer to Page 2.

Process category	Inhalatory worker exposure (ppm)	Dermal worker exposure (mg/kg/day)
PROC 1	0.01	0.34
PROC 2	5 - 50	0.14 – 1.37
PROC 3	100	0.34
PROC 4	10	0.69
PROC 5	25	0.07
PROC 6	2.50 - 25	1.37
PROC 7	25	2.14
PROC 8a	250	0.14
PROC 8b	4.50	0.69
PROC 9	20	0.69
PROC 13	25	0.69
PROC 14	25	0.34
PROC 15	5	0.03
PROC 21	0	2.83

Predicted exposures are not expected to exceed the applicable exposure limits (DNEL as provided above) when the operational conditions/risk management measures described above are implemented

#### Risk characterization:

Process category	RCR (inhalation)	RCR (dermal)	RCR (all routes)
PROC 1	0	n.a.	0
PROC 2	0.019 – 0.191	n.a.	0.019 – 0.191
PROC 3	0.382	n.a.	0.382
PROC 4	0.038	n.a.	0.038
PROC 5	0.095	n.a.	0.095
PROC 6	0.010 – 0.095	n.a.	0.010 – 0.095
PROC 7	0.095	n.a.	0.095
PROC 8a	0.955	n.a.	0.955
PROC 8b	0.017	n.a.	0.017
PROC 9	0.076	n.a.	0.076
PROC 13	0.095	n.a.	0.095
PROC 14	0.095	n.a.	0.095
PROC 15	0.019	n.a.	0.019
PROC 21	0	n.a.	0

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

# Rubber Solvent

## Annex to the Safety Data Sheet

according to Regulation (EC) No. 453/2010  
Revision date: September 8, 2011

Supersedes:

Version: 1.0

The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool and Hydrocarbon Block Method with the Petrorisk model respectively.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

### **9.13.5. Additional good practice advice beyond the REACH CSA**

Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.