



## SAFETY DATA SHEET

### AMMONIA SOLUTION 10 - <25%

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

##### 1.1. Product identifier

Product name	AMMONIA SOLUTION 10 - <25%
Product number	22958
Synonyms; trade names	AMMONIUM HYDROXIDE SOLUTION, AMMONIA 14% SOL, AMMONIA CP 24.5 %, AMMONIA 24.5 % SOL, AMMONIA SOLUTION 20%, AMMONIUM SOLUTION 10%, AMMONIA SOLUTION 12.5%, AMMONIA 18 % SOL, AMMONIA 19% SOLUTION, AMMONIA 911, AMMONIA 925, AMMONIA 15 % SOL
REACH registration number	01-2119488876-14-XXXX
CAS number	1336-21-6
EU index number	007-001-01-2
EC number	215-647-6

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

Identified uses Industrial application For further information, see attached Exposure Scenario.

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

Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com
----------	---

##### 1.4. Emergency telephone number

Emergency telephone	SGS - +32 (0)3 575 55 55 (24h)
Sds No.	22958

#### SECTION 2: Hazards identification

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

###### Classification (EC 1272/2008)

Physical hazards	Not Classified
Health hazards	Skin Corr. 1B - H314 Eye Dam. 1 - H318 STOT SE 3 - H335
Environmental hazards	Not Classified

##### 2.2. Label elements

EC number	215-647-6
-----------	-----------

## AMMONIA SOLUTION 10 - <25%

### Hazard pictograms



<b>Signal word</b>	Danger
<b>Hazard statements</b>	H314 Causes severe skin burns and eye damage. H335 May cause respiratory irritation.
<b>Precautionary statements</b>	P261 Avoid breathing vapour/ spray. P271 Use only outdoors or in a well-ventilated area. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P501 Dispose of contents/ container in accordance with national regulations.

### 2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

<b>Product name</b>	AMMONIA SOLUTION 10 - <25%
<b>REACH registration number</b>	01-2119488876-14-XXXX
<b>EU index number</b>	007-001-01-2
<b>CAS number</b>	1336-21-6
<b>EC number</b>	215-647-6
<b>Composition comments</b>	The data shown are in accordance with the latest EC Directives.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

<b>Inhalation</b>	Move affected person to fresh air at once. Get medical attention.
<b>Ingestion</b>	Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Rinse mouth - Let fasting Do not induce vomiting. Get medical attention.
<b>Skin contact</b>	Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention immediately.
<b>Eye contact</b>	Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention immediately. Continue to rinse.

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

<b>Inhalation</b>	Coughing, chest tightness, feeling of chest pressure.
<b>Ingestion</b>	May cause chemical burns in mouth and throat.
<b>Skin contact</b>	May cause serious chemical burns to the skin.
<b>Eye contact</b>	Severe irritation, burning and tearing.

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

## AMMONIA SOLUTION 10 - <25%

**Notes for the doctor** No specific recommendations. If in doubt, get medical attention promptly.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

**Suitable extinguishing media** Use fire-extinguishing media suitable for the surrounding fire.

**Unsuitable extinguishing media** Do not use water jet as an extinguisher, as this will spread the fire.

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

**Specific hazards** Oxides of the following substances: Nitrogen.

**Hazardous combustion products** Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours.

#### 5.3. Advice for firefighters

**Special protective equipment for firefighters** Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

### SECTION 6: Accidental release measures

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

**Personal precautions** Follow precautions for safe handling described in this safety data sheet Avoid inhalation of spray mist and contact with skin and eyes. Provide adequate ventilation.

#### 6.2. Environmental precautions

**Environmental precautions** Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

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

**Methods for cleaning up** Absorb spillage with inert, damp, non-combustible material. Flush contaminated area with plenty of water. Collect and place in suitable waste disposal containers and seal securely. For waste disposal, see Section 13.

#### 6.4. Reference to other sections

**Reference to other sections** Wear protective clothing as described in Section 8 of this safety data sheet.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

**Usage precautions** Avoid spilling. Avoid contact with skin and eyes. Avoid inhalation of vapours and spray/mists. Provide adequate ventilation.

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

**Storage precautions** Keep container tightly closed. Keep only in the original container.

**Storage class** Corrosive storage.

#### 7.3. Specific end use(s)

**Specific end use(s)** The identified uses for this product are detailed in Section 1.2.

### SECTION 8: Exposure controls/Personal protection

#### 8.1. Control parameters

##### Occupational exposure limits

## AMMONIA SOLUTION 10 - <25%

Long-term exposure limit (8-hour TWA): WEL 25 ppm 18 mg/m<sup>3</sup>

Short-term exposure limit (15-minute): WEL 35 ppm 25 mg/m<sup>3</sup>

WEL = Workplace Exposure Limit.

### Ingredient comments

WEL = Workplace Exposure Limits

### DNEL

Industry - Oral; Short term systemic effects: 6.8 mg/kg/day

Industry - Inhalation; Short term systemic effects: 47.6 mg/m<sup>3</sup>

Industry - Inhalation; Short term local effects: 36 mg/m<sup>3</sup>

Industry - Dermal; Long term systemic effects: 68 mg/kg/day

Industry - Inhalation; Long term local effects: 14 mg/m<sup>3</sup>

Consumer - Dermal; Short term local effects: 7.2 mg/m<sup>3</sup>

Consumer - Dermal; Short term systemic effects: 23.8 mg/m<sup>3</sup>

Consumer - Dermal; Long term local effects: 2.8 mg/m<sup>3</sup>

Consumer - Oral; Long term systemic effects: 6.8 mg/kg/day

### PNEC

- Fresh water; 0.0011 mg/l

- marine water; 0.0011 mg/l

- Intermittent release; 0.089 mg/l

### 8.2. Exposure controls

#### Protective equipment



#### Appropriate engineering controls

Provide adequate ventilation. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits.

#### Eye/face protection

Eyewear complying with an approved standard should be worn if a risk assessment indicates eye contact is possible. The following protection should be worn: Chemical splash goggles. Personal protective equipment for eye and face protection should comply with European Standard EN166.

#### Hand protection

The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. Nitrile rubber (0.38 - 0.425mm, Breakthrough time 4 - 8h), Butyl rubber (0.3 - 0.5mm, Breakthrough time >8h), Viton (0.7mm, Breakthrough time >8h). To protect hands from chemicals, gloves should comply with European Standard EN374.

#### Other skin and body protection

Wear rubber apron. Wear rubber footwear.

#### Hygiene measures

Good personal hygiene procedures should be implemented. Eye wash facilities and emergency shower must be available when handling this product.

#### Respiratory protection

If ventilation is inadequate, suitable respiratory protection must be worn. Wear a respirator fitted with the following cartridge: Gas filter, type K. EN 136/140/141/145/143/149

### SECTION 9: Physical and chemical properties

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

##### Appearance

Clear liquid.

##### Colour

Colourless to pale yellow.

##### Odour

Pungent.

##### Odour threshold

No information available.

## AMMONIA SOLUTION 10 - <25%

<b>pH</b>	No information available.
<b>Melting point</b>	-55 - --35°C
<b>Initial boiling point and range</b>	38 - 40°C
<b>Flash point</b>	No information available.
<b>Evaporation rate</b>	No information available.
<b>Evaporation factor</b>	No information available.
<b>Flammability (solid, gas)</b>	No information available.
<b>Upper/lower flammability or explosive limits</b>	Upper flammable/explosive limit: 27 % Lower flammable/explosive limit: 16 %
<b>Other flammability</b>	No information available.
<b>Vapour pressure</b>	No information available.
<b>Vapour density</b>	No information available.
<b>Relative density</b>	0.880 - 0.957
<b>Bulk density</b>	No information available.
<b>Solubility(ies)</b>	Soluble in water.
<b>Partition coefficient</b>	log Pow: 0.23
<b>Auto-ignition temperature</b>	650°C
<b>Decomposition Temperature</b>	No information available.
<b>Viscosity</b>	No information available.
<b>Explosive properties</b>	No information available.
<b>Explosive under the influence of a flame</b>	No information available.
<b>Oxidising properties</b>	No information available.
<b><u>9.2. Other information</u></b>	
<b>Other information</b>	Not determined.
<b>Refractive index</b>	No information available.
<b>Particle size</b>	No information available.
<b>Molecular weight</b>	No information available.
<b>Volatility</b>	No information available.
<b>Saturation concentration</b>	No information available.
<b>Critical temperature</b>	No information available.
<b>Volatile organic compound</b>	No information available.

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

**Reactivity**                      There are no known reactivity hazards associated with this product.

#### 10.2. Chemical stability

## AMMONIA SOLUTION 10 - <25%

**Stability** Stable at normal ambient temperatures and when used as recommended.

### 10.3. Possibility of hazardous reactions

**Possibility of hazardous reactions** The following materials may react violently with the product: Strong acids. Strong alkalis. Reducing agents.

### 10.4. Conditions to avoid

**Conditions to avoid** Avoid excessive heat for prolonged periods of time.

### 10.5. Incompatible materials

**Materials to avoid** Strong acids. Copper. Zinc.

### 10.6. Hazardous decomposition products

**Hazardous decomposition products** Ammonia or amines. Oxides of the following substances: Nitrogen.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

#### Skin corrosion/irritation

**Skin corrosion/irritation** Causes severe burns.

#### Serious eye damage/irritation

**Serious eye damage/irritation** Causes serious eye damage.

#### Respiratory sensitisation

**Respiratory sensitisation** No information available.

#### Skin sensitisation

**Skin sensitisation** No information available.

#### Germ cell mutagenicity

**Genotoxicity - in vitro** No information available.

#### Carcinogenicity

**Carcinogenicity** No information available.

#### Reproductive toxicity

**Reproductive toxicity - fertility** Fertility - NOAEL 408 mg/kg/day, ,

**Reproductive toxicity - development** Developmental toxicity: - NOAEL: 100 mg/kg/day, ,

#### Specific target organ toxicity - single exposure

**STOT - single exposure** May cause respiratory irritation.

#### Specific target organ toxicity - repeated exposure

**STOT - repeated exposure** No information available.

#### Aspiration hazard

**Aspiration hazard** No information available.

#### **Inhalation**

Vapours may irritate throat/respiratory system. A single exposure may cause the following adverse effects: Coughing. Difficulty in breathing.

#### **Ingestion**

Ingestion may cause severe irritation of the mouth, the oesophagus and the gastrointestinal tract.

## AMMONIA SOLUTION 10 - <25%

<b>Skin contact</b>	Corrosive. Prolonged contact causes serious tissue damage.
<b>Eye contact</b>	Causes severe burns. This product is strongly corrosive. Immediate first aid is imperative.

### SECTION 12: Ecological information

**Ecotoxicity** The product components are not classified as environmentally hazardous. However, large or frequent spills may have hazardous effects on the environment.

#### 12.1. Toxicity

**Toxicity** Not considered toxic to fish.

#### 12.2. Persistence and degradability

**Persistence and degradability** The product is biodegradable.

#### 12.3. Bioaccumulative potential

**Bioaccumulative potential** The product is not bioaccumulating.

**Partition coefficient** log Pow: 0.23

#### 12.4. Mobility in soil

**Mobility** The product is soluble in water.

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

**Results of PBT and vPvB assessment** This substance is not classified as PBT or vPvB according to current EU criteria.

#### 12.6. Other adverse effects

**Other adverse effects** Not determined.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

**General information** Waste should be treated as controlled waste. Do not puncture or incinerate, even when empty.

**Disposal methods** Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

### SECTION 14: Transport information

**General** Wear protective clothing as described in Section 8 of this safety data sheet.

#### 14.1. UN number

**UN No. (ADR/RID)** 2672

**UN No. (IMDG)** 2672

**UN No. (ICAO)** 2672

**UN No. (ADN)** 2672

#### 14.2. UN proper shipping name

**Proper shipping name (ADR/RID)** AMMONIA SOLUTION

**Proper shipping name (IMDG)** AMMONIA SOLUTION

**Proper shipping name (ICAO)** AMMONIA SOLUTION

**AMMONIA SOLUTION 10 - <25%**

Proper shipping name (ADN) AMMONIA SOLUTION

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

ADR/RID class	8
ADR/RID classification code	C5
ADR/RID label	8
IMDG class	8
ICAO class/division	8
ADN class	8

**Transport labels****14.4. Packing group**

ADR/RID packing group	III
IMDG packing group	III
ICAO packing group	III
ADN packing group	III

**14.5. Environmental hazards**

Environmentally hazardous substance/marine pollutant  
No.

**14.6. Special precautions for user**

EmS	F-A, S-B
ADR transport category	3
Emergency Action Code	2R
Hazard Identification Number (ADR/RID)	80
Tunnel restriction code	(E)

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

**SECTION 15: Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

EU legislation	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended). Commission Regulation (EU) No 2015/830 of 28 May 2015.
----------------	--

## AMMONIA SOLUTION 10 - <25%

### Restrictions (Annex XVII Regulation 1907/2006)

This product is/contains a substance that is included in REGULATION (EC) No 1907/2006 (REACH) ANNEX XVII - RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, MIXTURES AND ARTICLES. Entry number: 3

### 15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

## SECTION 16: Other information

### Abbreviations and acronyms used in the safety data sheet

ATE: Acute Toxicity Estimate.  
 ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.  
 ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.  
 CAS: Chemical Abstracts Service.  
 DNEL: Derived No Effect Level.  
 IATA: International Air Transport Association.  
 IMDG: International Maritime Dangerous Goods.  
 Kow: Octanol-water partition coefficient.  
 LC<sub>50</sub>: Lethal Concentration to 50 % of a test population.  
 LD<sub>50</sub>: Lethal Dose to 50% of a test population (Median Lethal Dose).  
 PBT: Persistent, Bioaccumulative and Toxic substance.  
 PNEC: Predicted No Effect Concentration.  
 REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.  
 RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.  
 vPvB: Very Persistent and Very Bioaccumulative.  
 IARC: International Agency for Research on Cancer.  
 MARPOL 73/78: International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978.  
 cATpE: Converted Acute Toxicity Point Estimate.  
 BCF: Bioconcentration Factor.  
 BOD: Biochemical Oxygen Demand.  
 EC<sub>50</sub>: 50% of maximal Effective Concentration.  
 LOAEC: Lowest Observed Adverse Effect Concentration.  
 LOAEL: Lowest Observed Adverse Effect Level.  
 NOAEC: No Observed Adverse Effect Concentration.  
 NOAEL: No Observed Adverse Effect Level.  
 NOEC: No Observed Effect Concentration.  
 LOEC: Lowest Observed Effect Concentration.  
 DMEL: Derived Minimal Effect Level.  
 EL50: Exposure Limit 50  
 hPa: Hectopascal  
 LL50: Lethal Loading fifty  
 OECD: Organisation for Economic Co-operation and Development  
 POW: Octanol-water partition coefficient  
 SCBA: self-contained breathing apparatus  
 STP: Sewage Treatment Plant  
 VOC: Volatile Organic Compounds

### Classification abbreviations and acronyms

Acute Tox. = Acute toxicity  
 Aquatic Acute = Hazardous to the aquatic environment (acute)  
 Aquatic Chronic = Hazardous to the aquatic environment (chronic)

**AMMONIA SOLUTION 10 - <25%**

<b>Key literature references and sources for data</b>	Supplier's information.
<b>Classification procedures according to Regulation (EC) 1272/2008</b>	Skin Corr. 1B - H314: Calculation method. Eye Dam. 1 - H318: Calculation method. STOT SE 3 - H335: Calculation method.
<b>Revision comments</b>	NOTE: Lines within the margin indicate significant changes from the previous revision.
<b>Revision date</b>	26/01/2022
<b>Version number</b>	4.002
<b>Supersedes date</b>	26/01/2018
<b>SDS number</b>	22958
<b>SDS status</b>	Approved.
<b>Hazard statements in full</b>	H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage. H335 May cause respiratory irritation.
<b>Signature</b>	Jitendra Panchal

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty, guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.



## Exposure scenario Industrial distribution and formulation

### Identification

<b>Product name</b>	Ammonia
<b>REACH registration number</b>	01-2119488876-14-XXXX
<b>CAS number</b>	1336-21-6
<b>EC number</b>	215-647-6
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Industrial distribution and formulation
<b>Process scope</b>	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
<b>Product category</b>	PC1 Adhesives, sealants. PC9a Coatings and paints, thinners, paint removers. PC12 Lawn and garden preparations (- fertilizers). PC16 Heat transfer fluids. PC18 Ink and toners. PC19 Intermediate. PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC21 Laboratory chemicals. PC26 Paper and board treatment products PC29 Pharmaceuticals PC30 Photochemicals. PC34 Textile dyes and impregnating products PC35 Washing and cleaning products PC37 Water treatment chemicals. PC39 Cosmetics, personal care. PC40 Extraction agents.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU10 Formulation [mixing] of preparations and/or re-packaging

### Environment

## Industrial distribution and formulation

**Environmental release category** ERC2 Formulation into mixture

### Worker

**Process category**

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

PROC5 Mixing or blending in batch processes

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

PROC15 Use as laboratory reagent.

## 2. Conditions of use affecting exposure (Industrial - Environment 1)

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure > 10 kPa at STP.

**Concentration details** Covers concentrations up to 100 %. Unless otherwise stated.

Readily biodegradable.

### Amounts used

Annual amount per site: 1000000 tonnes

### Frequency and duration of use

Emission days: 330 days/year

### Other given operational conditions affecting environmental exposure

**Emission factor - air** Release fraction to air from process (initial release prior to RMM): 2.5%

**Emission factor - water** Release fraction to wastewater from process (initial release prior to RMM): 2%

### Risk management measures

**Good practice** Prevent leaks and prevent soil/water pollution caused by leaks.

**Technical measures** Prevent environmental discharge consistent with regulatory requirements. Bund storage facilities to prevent soil and water pollution in the event of spillage.

**STP type** Municipal STP.

**STP details** Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 99.9%

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Exhaust air scrubber.

**Soil** Not applicable.

### Conditions and measures related to external treatment of waste for disposal

## Industrial distribution and formulation

**Waste treatment** All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Biological nitrogen elimination

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure > 10 kPa at STP.

**Concentration details** Covers concentrations up to 100 %. Unless otherwise stated.

#### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

#### Other given operational conditions affecting workers exposure

**Setting** Indoor.

**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure material transfers are under containment or extract ventilation.

#### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

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

**Organisational measures** Only allow access to authorised persons. Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Permit to work for maintenance work.

#### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
Handle substance within a predominantly closed system provided with extract ventilation.  
If above technical/organisational control measures are not feasible, then adopt following PPE:  
Use a full-face respirator, selected in accordance with EN 529.

### 3. Exposure estimation (Environment 1)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 0.0000497 mg/kg, PNEC 0.0011 mg/kg, RCR 0.045  
Marine water: Exposure 0.000012 mg/kg, PNEC 0.0011 mg/kg, RCR 0.011

### 4. Guidance to check compliance with the exposure scenario (Environment 1)

## Industrial distribution and formulation

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ECETOC TRA model.

**Exposure** Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.



## Exposure scenario Industrial use as an intermediate

### Identification

Product name	Ammonia
REACH registration number	01-2119488876-14-XXXX
CAS number	1336-21-6
EC number	215-647-6
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

Main title	Industrial use as an intermediate
Process scope	Use of substance as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container). Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.
Product category	PC19 Intermediate.
Main sector	SU3 Industrial uses
Sector of use	SU1 Agriculture, forestry, fishery SU5 Manufacture of textiles, leather, fur SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals SU12 Manufacture of plastics products, including compounding and conversion SU24 Scientific research and development

### Environment

Environmental release category	ERC6a Use of intermediate
--------------------------------	---------------------------

### Worker

## Industrial use as an intermediate

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC15 Use as laboratory reagent.</p>
-------------------------	--

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure > 10 kPa at STP.
<b>Concentration details</b>	Covers concentrations up to 100 %. Unless otherwise stated. Readily biodegradable.

#### Amounts used

Annual amount per site: 800000 tonnes

#### Frequency and duration of use

Emission days: 330 days/year

#### Other given operational conditions affecting environmental exposure

<b>Emission factor - air</b>	Release fraction to air from process (initial release prior to RMM): 5%
<b>Emission factor - water</b>	Release fraction to wastewater from process (initial release prior to RMM): 2%

#### Risk management measures

<b>Good practice</b>	Prevent leaks and prevent soil/water pollution caused by leaks.
<b>Technical measures</b>	Prevent environmental discharge consistent with regulatory requirements. Bund storage facilities to prevent soil and water pollution in the event of spillage.
<b>STP type</b>	Municipal STP.
<b>STP details</b>	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 90% Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

<b>Air</b>	Exhaust air scrubber.
<b>Soil</b>	Not applicable.

#### Conditions and measures related to external treatment of waste for disposal

<b>Waste treatment</b>	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Biological nitrogen elimination
------------------------	--

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Product characteristics

## Industrial use as an intermediate

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure > 10 kPa at STP.
<b>Concentration details</b>	Covers concentrations up to 100 %. Unless otherwise stated.

### Amounts used

Maximum daily site tonnage: 3000 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor/outdoor use.
<b>Ventilation rate</b>	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure material transfers are under containment or extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

<b>Technical protective measures</b>	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Provide extract ventilation to points where emissions occur. Local exhaust ventilation - efficiency of at least [%]: 90
--------------------------------------	--

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

<b>Organisational measures</b>	Automate activity where possible. Only allow access to authorised persons. Ensure operatives are trained to minimise exposures.
--------------------------------	---

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
 PROC5 Mixing or blending in batch processes  
 PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
 Wear a respirator providing a minimum efficiency of (%): 95  
 , or:  
 Avoid carrying out operation for more than 4 hours.  
 PROC15 Use as laboratory reagent.  
 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
 PROC4 Chemical production where opportunity for exposure arises  
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
 Wear a respirator providing a minimum efficiency of (%): 95

## 3. Exposure estimation (Environment 1)

<b>Assessment method</b>	Used EUSES model.
--------------------------	-------------------

## Industrial use as an intermediate

**Environmental exposure**      Fresh water: Exposure 0.0000837 mg/kg, PNEC 0.0011 mg/kg, RCR 0.076  
Marine water: Exposure 0.0000205 mg/kg, PNEC 0.0011 mg/kg, RCR 0.0186

### 4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

### 3. Exposure estimation (Health 1)

**Assessment method**      Used ECETOC TRA model.

**Exposure**      Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.



## Exposure scenario Industrial use

### Identification

<b>Product name</b>	Ammonia
<b>REACH registration number</b>	01-2119488876-14-XXXX
<b>CAS number</b>	1336-21-6
<b>EC number</b>	215-647-6
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Industrial use
<b>Process scope</b>	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.
<b>Product category</b>	PC1 Adhesives, sealants. PC9a Coatings and paints, thinners, paint removers. PC14 Metal surface treatment products PC15 Non-metal-surface treatment products. PC16 Heat transfer fluids. PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC26 Paper and board treatment products PC29 Pharmaceuticals PC30 Photochemicals. PC34 Textile dyes and impregnating products PC35 Washing and cleaning products PC37 Water treatment chemicals. PC39 Cosmetics, personal care. PC40 Extraction agents.
<b>Main sector</b>	SU3 Industrial uses

## Industrial use

### Sector of use

SU4 Manufacture of food products  
 SU5 Manufacture of textiles, leather, fur  
 SU6a Manufacture of wood and wood products  
 SU6b Manufacture of pulp, paper and paper products  
 SU8 Manufacture of bulk, large-scale chemicals (including petroleum products)  
 SU9 Manufacture of fine chemicals  
 SU11 Manufacture of rubber products  
 SU12 Manufacture of plastics products, including compounding and conversion  
 SU13 Manufacture of other non-metallic mineral products  
 SU15 Manufacture of fabricated metal products, except machinery and equipment  
 SU16 Manufacture of computer, electronic and optical products, electrical equipment  
 SU23 Electricity, steam, gas, water supply and sewage treatment

### Environment

#### Environmental release category

ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)  
 ERC5 Use at industrial site leading to inclusion into/onto article  
 ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)  
 ERC7 Use of functional fluid at industrial site

### Worker

#### Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
 PROC4 Chemical production where opportunity for exposure arises  
 PROC5 Mixing or blending in batch processes  
 PROC7 Industrial spraying  
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
 PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
 PROC10 Roller application or brushing  
 PROC13 Treatment of articles by dipping and pouring.  
 PROC19 Manual activities involving hand contact

## 2. Conditions of use affecting exposure (Industrial - Environment 1)

### Product characteristics

#### Physical state

Liquid

#### Vapour pressure

Vapour pressure > 10 kPa at STP.

#### Concentration details

Covers concentrations up to 100 %. Unless otherwise stated.  
 Readily biodegradable.

### Amounts used

Annual site tonnage: 25000 tonnes

### Frequency and duration of use

Emission days: 330 days/year

### Other given operational conditions affecting environmental exposure

## Industrial use

**Emission factor - air**

ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)  
Release fraction to air from process (initial release prior to RMM): 95%

ERC5 Use at industrial site leading to inclusion into/onto article  
Release fraction to air from process (initial release prior to RMM): 50%

ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)  
Release fraction to air from process (initial release prior to RMM): 0.1%

ERC7 Use of functional fluid at industrial site  
Release fraction to air from process (initial release prior to RMM): 5%

**Emission factor - water**

ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)  
Release fraction to wastewater from process (initial release prior to RMM): 100%

ERC5 Use at industrial site leading to inclusion into/onto article  
Release fraction to wastewater from process (initial release prior to RMM): 50%

ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)  
Release fraction to wastewater from process (initial release prior to RMM): 5%

ERC7 Use of functional fluid at industrial site  
Release fraction to wastewater from process (initial release prior to RMM): 5%

### Risk management measures

**Good practice** Prevent leaks and prevent soil/water pollution caused by leaks.

**Technical measures** Prevent environmental discharge consistent with regulatory requirements. Bund storage facilities to prevent soil and water pollution in the event of spillage.

**STP type** Municipal STP.

**STP details** Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 99%  
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

### Conditions and measures related to external treatment of waste for disposal

**Waste treatment** All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. Biological nitrogen elimination

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure > 10 kPa at STP.

**Concentration details** Covers concentrations up to 100 %. Unless otherwise stated.

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

**Setting** Indoor/outdoor use.

### Technical conditions and measures at process level (source) to prevent release

## Industrial use

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

Provide extract ventilation to points where emissions occur. Local exhaust ventilation - efficiency of at least [%]: 90

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

**Organisational measures** Automate activity where possible. Only allow access to authorised persons. Ensure operatives are trained to minimise exposures.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
 Handle substance within a predominantly closed system provided with extract ventilation.  
 If above technical/organisational control measures are not feasible, then adopt following PPE:  
 Use a full-face respirator, selected in accordance with EN 529.  
 PROC7 Industrial spraying  
 Wear a respirator providing a minimum efficiency of (%): 95  
 , or:  
 Avoid carrying out operation for more than 4 hours.  
 PROC19 Manual activities involving hand contact  
 Wear a respirator providing a minimum efficiency of (%): 95

### 3. Exposure estimation (Environment 1)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 0.0000558 mg/kg, PNEC 0.0011 mg/kg, RCR 0.0507  
 Marine water: Exposure 0.0000231 mg/kg, PNEC 0.0011 mg/kg, RCR 0.021

### 4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ECETOC TRA model.

**Exposure** Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.



## Exposure scenario Professional use

### Identification

<b>Product name</b>	Ammonia
<b>REACH registration number</b>	01-2119488876-14-XXXX
<b>CAS number</b>	1336-21-6
<b>EC number</b>	215-647-6
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Professional use
<b>Process scope</b>	Covers the use as a component of cleaning products, including pouring/unloading from drums or containers and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand). Covers the use as a component of cleaning products within closed or contained systems, including incidental exposures during transfer from storage, mixing/diluting in the preparatory phase and cleaning activities, related equipment cleaning and maintenance. Covers the use in coatings (paints, inks, adhesives, etc.), including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities. Covers the use of the substance for the treatment of water in open and closed systems. Covers the use of the substance in extraction processes at mining operations, including material transfers, winning and separation activities and substance recovery and disposal. Processing of formulated polymers within closed or contained systems, including incidental exposures during material transfers, additives handling (e.g. pigments, stabilisers, fillers, plasticisers etc.), moulding, curing and forming activities, material reworks, storage and associated maintenance. Use as an agrochemical excipient for application by manual or machine spraying, smokes and fogging, including equipment clean-downs and disposal. Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in closed industrial equipment, including incidental exposures during maintenance and related material transfers. Use of the substance within laboratory settings within enclosed or contained systems, including incidental exposures during material transfers and equipment cleaning.

## Professional use

**Product category**

PC9a Coatings and paints, thinners, paint removers.  
PC12 Lawn and garden preparations (- fertilizers).  
PC14 Metal surface treatment products  
PC15 Non-metal-surface treatment products.  
PC16 Heat transfer fluids.  
PC19 Intermediate.  
PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents  
PC21 Laboratory chemicals.  
PC29 Pharmaceuticals  
PC30 Photochemicals.  
PC34 Textile dyes and impregnating products  
PC35 Washing and cleaning products  
PC37 Water treatment chemicals.  
PC40 Extraction agents.

**Main sector**

SU22 Professional uses

**Sector of use**

SU1 Agriculture, forestry, fishery  
SU4 Manufacture of food products  
SU5 Manufacture of textiles, leather, fur  
SU6a Manufacture of wood and wood products  
SU6b Manufacture of pulp, paper and paper products  
SU8 Manufacture of bulk, large-scale chemicals (including petroleum products)  
SU9 Manufacture of fine chemicals  
SU10 Formulation [mixing] of preparations and/or re-packaging  
SU11 Manufacture of rubber products  
SU12 Manufacture of plastics products, including compounding and conversion  
SU15 Manufacture of fabricated metal products, except machinery and equipment  
SU16 Manufacture of computer, electronic and optical products, electrical equipment  
SU17 General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment  
SU24 Scientific research and development

**Environment****Environmental release category**

ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
ERC8e Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)  
ERC9a Widespread use of functional fluid (indoor)  
ERC9b Widespread use of functional fluid (outdoor)

**Worker**

## Professional use

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</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>PROC15 Use as laboratory reagent.</p> <p>PROC19 Manual activities involving hand contact</p> <p>PROC20 Use of functional fluids in small devices</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

No exposure assessment presented for the environment. Not applicable for wide dispersive uses.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure > 10 kPa at STP.
<b>Concentration details</b>	Covers concentrations up to 100 %. Unless otherwise stated.

#### Amounts used

Maximum daily site tonnage: 3000 tonnes

#### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

#### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor.
<b>Ventilation rate</b>	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure material transfers are under containment or extract ventilation.

#### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

## Professional use

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

**Organisational measures** Automate activity where possible. Only allow access to authorised persons. Ensure operatives are trained to minimise exposures.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
If above technical/organisational control measures are not feasible, then adopt following PPE:  
Use a full-face respirator, selected in accordance with EN 529.  
PROC11 Non industrial spraying  
PROC19 Manual activities involving hand contact  
Wear a respirator providing a minimum efficiency of (%): 95

### 3. Exposure estimation (Environment 1)

**Assessment method** Used EUSES model.  
The use is assessed to be safe.

### 4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ECETOC TRA model.

**Exposure** Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.



## Exposure scenario Consumer Use

### Identification

<b>Product name</b>	Ammonia
<b>REACH registration number</b>	01-2119488876-14-XXXX
<b>CAS number</b>	1336-21-6
<b>EC number</b>	215-647-6
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Consumer Use
<b>Process scope</b>	Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products. Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: for cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.
<b>Product category</b>	PC9a Coatings and paints, thinners, paint removers. PC16 Heat transfer fluids. PC35 Washing and cleaning products PC39 Cosmetics, personal care.
<b>Main sector</b>	SU21 Consumer uses
<b><u>Environment</u></b>	
<b>Environmental release category</b>	ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8e Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) ERC9a Widespread use of functional fluid (indoor) ERC9b Widespread use of functional fluid (outdoor)

### 2. Conditions of use affecting exposure (Non-industrial - Environment 1)

#### Control of environmental exposure (Non-industrial)

No exposure assessment presented for the environment. Not applicable for wide dispersive uses.

### 2. Conditions of use affecting exposure (Non-industrial - Health 1)

#### Product characteristics

## Consumer Use

<b>Physical state</b>	Liquid (aqueous)
<b>Concentration details</b>	PC39 Cosmetics, personal care. Maximum concentration after dilution for use: 4 % PC35 Washing and cleaning products Maximum concentration after dilution for use: 0.125 % PC9a Coatings and paints, thinners, paint removers. Maximum concentration after dilution for use: 0.05 %

### Frequency and duration of use

PC35 Washing and cleaning products  
Covers frequency up to 1 event per week, , .  
PC9a Coatings and paints, thinners, paint removers.  
PC39 Cosmetics, personal care.  
Covers frequency up to 1 event per month, , .  
PC16 Heat transfer fluids.  
Not applicable.  
(closed systems)

### Other given operational conditions affecting Non-industrial exposure

**Temperature** Assumes activities are at ambient temperature (unless stated differently).

### Other given operational conditions affecting Non-industrial exposure

**Consumer information** Use suitable eye protection and gloves.

### 3. Exposure estimation (Environment 1)

**Assessment method** Used EUSES model.  
The use is assessed to be safe.

### 4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ECETOC TRA model.

**Exposure** Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

**SAFETY DATA SHEET**

according to Regulation (EC) No. 1907/2006

Version 6.1  
Revision Date 29.10.2022  
Print Date 04.11.2023**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifiers**

Product name : Carbohydrazide

Product Number : C11006

Brand : Aldrich

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 497-18-7

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

Identified uses : Laboratory chemicals, Manufacture of substances

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

Company : Merck Life Science UK Limited  
New Road  
The Old Brickyard  
GILLINGHAM  
Dorset  
SP8 4XT  
UNITED KINGDOM

Telephone : +44 (0)1747 833-000

Fax : +44 (0)1747 833-313

E-mail address : TechnicalService@merckgroup.com

**1.4 Emergency telephone**

Emergency Phone # : +44 (0)870 8200418 (CHEMTREC)

**SECTION 2: Hazards identification****2.1 Classification of the substance or mixture**

**Classification according to Regulation (EC) No 1272/2008 as amended by GB-CLP Regulation, UK SI 2019/720, and UK SI 2020/1567**

Acute toxicity, Oral (Category 4), H302

Skin irritation (Category 2), H315

Skin sensitization (Category 1), H317

Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 2.2 Label elements

### Labelling according Regulation (EC) No 1272/2008 as amended by GB-CLP Regulation, UK SI 2019/720, and UK SI 2020/1567

Pictogram



Signal Word

Warning

Hazard statement(s)

H302

Harmful if swallowed.

H315

Causes skin irritation.

H317

May cause an allergic skin reaction.

H411

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273

Avoid release to the environment.

P280

Wear protective gloves.

P301 + P312 + P330

IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.

P302 + P352

IF ON SKIN: Wash with plenty of water.

Supplemental Hazard information (EU)

EUH044

Risk of explosion if heated under confinement.

### Reduced Labeling (<= 125 ml)

Pictogram



Signal Word

Warning

Hazard statement(s)

H317

May cause an allergic skin reaction.

Precautionary statement(s)

P280

Wear protective gloves.

P302 + P352

IF ON SKIN: Wash with plenty of water.

Supplemental Hazard information (EU)

EUH044

Risk of explosion if heated under confinement.

## 2.3 Other hazards

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

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Formula : CH<sub>6</sub>N<sub>4</sub>O  
Molecular weight : 90.08 g/mol  
CAS-No. : 497-18-7  
EC-No. : 207-837-2

Component	Classification	Concentration
<b>1,3-diaminourea</b>		
CAS-No.	497-18-7	Acute Tox. 4; Skin Irrit. 2; Skin Sens. 1; Aquatic
EC-No.	207-837-2	

	Chronic 2; H302, H315, H317, H411	
--	-----------------------------------	--

For the full text of the H-Statements mentioned in this Section, see Section 16.

---

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

#### General advice

Consult a physician. Show this material safety data sheet to the doctor in attendance.

#### If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

#### In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

#### In case of eye contact

Flush eyes with water as a precaution.

#### If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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

No data available

---

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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

Carbon oxides

Nitrogen oxides (NO<sub>x</sub>)

### 5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

### 5.4 Further information

No data available

---

## SECTION 6: Accidental release measures

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

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

For personal protection see section 8.

## 6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

## 6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

## 6.4 Reference to other sections

For disposal see section 13.

---

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

#### Advice on safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

#### Advice on protection against fire and explosion

Provide appropriate exhaust ventilation at places where dust is formed.

#### Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

For precautions see section 2.2.

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

#### Storage conditions

Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

#### Storage class

Storage class (TRGS 510): 11: Combustible Solids

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

---

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

### 8.2 Exposure controls

#### Personal protective equipment

##### Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

##### Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

### Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

### Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

### Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

---

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

a) Physical state	crystalline
b) Color	white
c) Odor	odorless
d) Melting point/freezing point	Melting point/range: 150 - 153 °C - lit.
e) Initial boiling point and boiling range	No data available
f) Flammability (solid, gas)	No data available
g) Upper/lower flammability or explosive limits	No data available
h) Flash point	No data available
i) Autoignition temperature	No data available
j) Decomposition temperature	No data available
k) pH	6.7 - 8.3
l) Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
m) Water solubility	soluble
n) Partition coefficient: n-octanol/water	No data available
o) Vapor pressure	16 hPa at 20 °C
p) Density	1.020 g/cm <sup>3</sup> at 20 °C
Relative density	No data available
q) Relative vapor density	No data available
r) Particle	No data available

characteristics

- s) Explosive properties No data available
- t) Oxidizing properties No data available

## 9.2 Other safety information

No data available

---

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

No data available

### 10.2 Chemical stability

Stable under recommended storage conditions.

### 10.3 Possibility of hazardous reactions

No data available

### 10.4 Conditions to avoid

No data available

### 10.5 Incompatible materials

Strong oxidizing agents, Strong acids, Copper, Zinc, Nickel, Lead, Brass

### 10.6 Hazardous decomposition products

In the event of fire: see section 5

---

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

LD50 Oral - Rat - female - 311 mg/kg  
Acute toxicity estimate Oral - 311 mg/kg  
(Calculation method)  
Inhalation: No data available  
Dermal: No data available

#### Skin corrosion/irritation

Remarks: No data available

#### Serious eye damage/eye irritation

No data available

#### Respiratory or skin sensitization

No data available

#### Germ cell mutagenicity

Result: negative  
Remarks: Histidine reversion (Ames)

#### Carcinogenicity

No data available

#### Reproductive toxicity

No data available

#### Specific target organ toxicity - single exposure

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

**11.2 Additional Information**

RTECS: FF2625000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

---

**SECTION 12: Ecological information**

**12.1 Toxicity**

Toxicity to fish LC50 - *Lepomis macrochirus* (Bluegill) - 190.0 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates LC50 - *Daphnia magna* (Water flea) - 96 mg/l - 48 h

Toxicity to algae EC50 - *Desmodesmus subspicatus* (green algae) - 9.5 mg/l - 72 h

**12.2 Persistence and degradability**

Biodegradability Result: - Not readily biodegradable.

**12.3 Bioaccumulative potential**

No data available

**12.4 Mobility in soil**

No data available

**12.5 Results of PBT and vPvB assessment**

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

**12.6 Endocrine disrupting properties**

No data available

**12.7 Other adverse effects**

Toxic to aquatic life with long lasting effects.

---

**SECTION 13: Disposal considerations**

**13.1 Waste treatment methods**

**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Waste material must be disposed of in accordance with the Directive on waste 2008/98/EC as well as other national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

**Contaminated packaging**

Dispose of as unused product.

---

## SECTION 14: Transport information

### 14.1 UN number

ADR/RID: 3077

IMDG: 3077

IATA: 3077

### 14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (1,3-diaminourea)

IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (1,3-diaminourea)

IATA: Environmentally hazardous substance, solid, n.o.s. (1,3-diaminourea)

### 14.3 Transport hazard class(es)

ADR/RID: 9

IMDG: 9

IATA: 9

### 14.4 Packaging group

ADR/RID: III

IMDG: III

IATA: III

### 14.5 Environmental hazards

ADR/RID: yes

IMDG Marine pollutant: yes

IATA: yes

### 14.6 Special precautions for user

#### Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids. Packages smaller than or equal to 5 kg / L , not dangerous goods of Class 9

---

## SECTION 15: Regulatory information

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

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

#### National legislation

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

### 15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

---

## SECTION 16: Other information

### Full text of H-Statements referred to under sections 2 and 3.

EUH044	Risk of explosion if heated under confinement.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H411	Toxic to aquatic life with long lasting effects.

## Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

## Further information

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See [www.sigma-aldrich.com](http://www.sigma-aldrich.com) and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact [mlsbranding@sial.com](mailto:mlsbranding@sial.com).



**petroineos** SAFETY DATA SHEET  
REFINING AND TRADING  
**For Gas Oil Class A2**

To Health, Safety and Environment  
 From PETROINEOS MANUFACTURING SCOTLAND LTD  
 Unique Reference No. Gas Oil Class A2 68334-30-5 EN  
 Date 21 Jan 2013 13:26

### 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE

#### 1.1 Product Identification

Substance Gas Oil Class A2  
 Commercial Product Name Gas Oil Class A2  
 Synonyms 10ppm Sulfur Gas Oil  
 CAS 68334-30-5 - 10 ppm Gas Oil 68334-30-4  
 ECHA Registration No. 01-2119484664-27-0135 - PETROINEOS MANUFACTURING SCOTLAND LTD

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

Specific Use(s) All advised uses are listed in page 1 of the Annex to this SDS  
 Exposure Scenario(s)  
 Uses Advised Against All other uses because their risks have not been assessed.  
 Chemical Safety Report

#### 1.3 Details of the supplier of the SDS

Company Petroineos Manufacturing Scotland Ltd  
 Bo'ness Road, Grangemouth  
 Stirlingshire FK3 9XH  
 UNITED KINGDOM  
 Telephone No. +44-1324-493384  
 Email msds.Olefins@ineos.com  
 Fax

#### 1.4 Emergency telephone number

Emergency telephone number +44 1235 239 670 (carechem24)  
 Anti-Poisoning Centre Number  
 Opening Hours Opening Hours: Available 24x7

Version No	1.0
Last Updated	21 Jan 2013
Supersedes	-

	<b>SAFETY DATA SHEET</b>	Page : 2 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### 2.1.1. Classification according to Regulation (EU) 1272/2008

CLP-Classification : The product is classified as hazardous in accordance with Regulation (EC) No. 1272/2008.

Flam. Liq. 3	H226
Acute Tox. 4 (Inhalation)	H332
Skin Irrit. 2	H315
Carc. 2	H351
STOT RE 2	H373
Asp. Tox. 1	H304
Aquatic Chronic 2	H411

Full text of H-phrases: see section 16

#### 2.1.2. Classification according to EU Directives 67/548/EC or 1999/45/EC

Classification : The product is classified as dangerous in accordance with Directive 67/548/EEC.

Carc.Cat.3; R40  
Xn; R20  
Xn; R65  
Xi; R38  
N; R51/53

Full text of R-phrases: see section 16

### 2.2. Label elements

#### 2.2.1. Labelling according to Regulation (EU) 1272/2008

CLP pictograms :



Signal word :

Hazard statements (CLP) :

Precautionary statements (CLP) :

- : Danger
- : H226 - Flammable liquid and vapour.
- : H304 - May be fatal if swallowed and enters airways.
- : H315 - Causes skin irritation.
- : H332 - Harmful if inhaled.
- : H351 - Suspected of causing cancer.
- : H373 - May cause damage to organs through prolonged or repeated exposure.
- : H411 - Toxic to aquatic life with long lasting effects.
- : P261 - Avoid breathing vapours.
- : P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection.
- : P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
- : P331 - Do NOT induce vomiting.
- : P501 - Dispose of contents/ container to an approved waste disposal plant.

#### 2.2.2. Labelling according to Directives (67/548 - 1999/45)

Not relevant

### 2.3. Other hazards

Other hazards which do not result in classification :

- : Results of PBT and vPvB assessment
- : Non-classified PBT substance
- : Non-classified vPvB substance

	<b>SAFETY DATA SHEET</b>	Page : 3 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### SECTION 3: Composition/information on ingredients

#### 3.1. Substances

Substance name	Product identifier	%	Classification according to Directive 67/548/EEC
Fuels, diesel	(CAS No.) 68334-30-5	100	Carc.Cat.3; R40 Xn; R20 Xn; R65 Xi; R38 N; R51/53
Substance name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Fuels, diesel	(CAS No.) 68334-30-5	100	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation:dust,mist), H332 Skin Irrit. 2, H315 Carc. 2, H351 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 2, H411

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

Inhalation	: Keep at rest. Move to fresh air. Consult a physician if necessary. If unconscious place in recovery position and seek medical advice. Oxygen or artificial respiration if needed.
Skin contact	: Remove contaminated clothing and shoes. After contact with skin, wash immediately with plenty of soap and water. If skin irritation persists, call a physician. In the event of a high pressure injection injury, worker should obtain immediate medical assistance.
Eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
Ingestion	: Do NOT induce vomiting. Rinse mouth. Drink plenty of water. Obtain medical attention.
Additional advice	: First aider needs to protect himself. See also section 8 . Treat symptomatically. Never give anything by mouth to an unconscious person or a person with cramps. Show this safety data sheet to the doctor in attendance. When symptoms persist or in all cases of doubt seek medical advice.

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

Inhalation	: Harmful if inhaled. May cause irritation of respiratory tract.
Skin contact	: Causes skin irritation.
Eye contact	: Contact with eyes may cause irritation.

	<b>SAFETY DATA SHEET</b>	Page : 4 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

Ingestion : May be fatal if swallowed and enters airways. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

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

No data available

**SECTION 5: Firefighting measures**

**5.1. Extinguishing media**

Suitable extinguishing media : Use dry chemical, CO<sub>2</sub>, water spray or alcohol resistant foam.

Extinguishing media which shall not be used for safety reasons : High volume water jet

**5.2. Special hazards arising from the substance or mixture**

Fire hazard : Flammable

Specific hazards : Vapours may form explosive mixture with air.  
Vapours are heavier than air and may spread along floors.  
The pressure in sealed containers can increase under the influence of heat.  
Possible decomposition products are: CO<sub>x</sub>, H<sub>2</sub>S, SO<sub>x</sub>.  
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

**5.3. Advice for firefighters**

Advice for firefighters : Special protective equipment for firefighters .  
In the event of fire, wear self-contained breathing apparatus.  
In the event of fire, cool tanks with water spray.  
Evacuate personnel to safe areas.  
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

**SECTION 6: Accidental release measures**

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

Advice for non-emergency personnel : Ensure adequate ventilation.  
Evacuate personnel to safe areas.  
Wear personal protective equipment.  
See also section 8  
Avoid contact with skin, eyes and clothing.  
Do not breathe vapours or spray mist.  
Vapours may form explosive mixture with air.  
Vapours are heavier than air and may spread along floors.  
Keep away from open flames, hot surfaces and sources of ignition.  
Ensure all equipment is electrically grounded before beginning transfer operations.  
Material can create slippery conditions.  
product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.

Advice for emergency responders : Only qualified personnel equipped with suitable protective equipment may intervene.  
See also section 8.

**6.2. Environmental precautions**

Environmental precautions : Prevent product from entering drains.  
Do not flush into surface water or sanitary sewer system.

	<b>SAFETY DATA SHEET</b>	Page : 5 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

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

Methods for cleaning up : Prevent further leakage or spillage if safe to do so.  
 Dam up.  
 Soak up with inert absorbent material.  
 Sweep up and shovel into suitable containers for disposal.  
 If liquid has been spilt in large quantities clean up promptly by scoop or vacuum.  
 After cleaning, flush away traces with water.  
 Dispose of in accordance with local regulations.

### **6.4. Reference to other sections**

See also section 8  
 See also section 13.

## **SECTION 7: Handling and storage**

### **7.1. Precautions for safe handling**

Handling : Provide adequate information, instruction and training for operators.  
 Ensure adequate ventilation.  
 Wear personal protective equipment.  
 See also section 8.  
 Avoid contact with skin, eyes and clothing.  
 Do not breathe vapours or spray mist.  
 Take precautionary measures against static discharges.  
 Ensure all equipment is electrically grounded before beginning transfer operations.  
 Keep away from open flames, hot surfaces and sources of ignition.  
 Take any precaution to avoid mixing with incompatible materials.  
 See also section 10.  
 Take care to avoid waste and spillage when weighing, loading and mixing the product.  
 Do not use compressed air for filling, discharging or handling.  
 Do not let product enter drains.  
 product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.  
 When using, do not eat, drink or smoke.  
 Wash hands before breaks and immediately after handling the product.  
 Remove and wash contaminated clothing before re-use.  
 Keep working clothes separately.  
 Keep away from food, drink and animal feedingstuffs.

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

Storage : Do not store near or with any of the incompatible materials listed in section 10.  
 Store in original container.  
 Keep tightly closed in a dry, cool and well-ventilated place.  
 Keep in a bunded area.  
 product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.  
 Keep away from direct sunlight.

Packaging material : Store in original container.  
 Mild steel  
 Stainless steel

### **7.3. Specific end use(s)**

see attached exposure scenario.

	<b>SAFETY DATA SHEET</b>	Page : 6 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Exposure limit(s) : No data available

Fuels, diesel (68334-30-5)		
Belgium	Limit value (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>
Italy - Portugal - USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>

CAS 68334-30-5 (68334-30-5)	
DNEL/DMEL (workers)	
Acute - systemic effects, inhalation	(15min) 4300 mg/m <sup>3</sup>
Long-term - systemic effects, dermal	(8h) 2,9 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	(8h) 68 mg/m <sup>3</sup>
DNEL/DMEL (general population)	
Acute - systemic effects, inhalation	(15min) 2600 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	20 mg/m <sup>3</sup>
Long-term - systemic effects, dermal	1,3 mg/kg bodyweight/day

### 8.2. Exposure controls

- Personal protective equipment : The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
- Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment.  
Respirator with a half face mask (EN 140)  
Respirator with a full face mask (EN 136)  
Recommended Filter type: A (EN 141) / ABEK (H2S) (EN141)  
Self-contained open-circuit compressed air breathing apparatus (EN 137)
- Hand protection : The selection of specific gloves for a specific application and time of use in a working area, should also take into account other factors on the working space, such as (but not limited to): other chemicals that are possibly used, physical requirements (protection against cutting/drilling, skill, thermal protection), and the instructions/specification of the supplier of gloves. Rubber gloves (EN 374) Nitrile rubber Break through time : >480min
- Eye protection : Goggles, Face-shield (EN 166).
- Skin and body protection : chemical-resistant overalls  
Protective helmets  
Antistatic boots
- Thermal hazard protection : Not required under normal use.  
Use dedicated equipment.
- Engineering measures : Ensure adequate ventilation.  
Use only in area provided with appropriate exhaust ventilation.  
Ensure that eyewash stations and safety showers are close to the workstation location.  
Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).  
Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.  
Organisational measures to prevent /limit releases, dispersion and exposure  
See also section 7

	<b>SAFETY DATA SHEET</b>	Page : 7 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

Environmental exposure controls : Do not flush into surface water or sanitary sewer system.  
Comply with applicable Community environmental protection legislation.

## SECTION 9: Physical and chemical properties

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

Appearance : liquid  
 Colour : no data available  
 Odour : characteristic  
 pH : NA: study scientifically unjustified  
 Melting point/range : -40 - 6 °C  
 Boiling point/boiling range : 141 - 500 °C  
 Flash point : 73,5 °C  
 Evaporation rate : no data available  
 Flammability (solid, gas) : NA: study scientifically unjustified, liquid  
 Vapour pressure : 0,4 kPa  
 Density : 800 - 910 kg/m<sup>3</sup>  
 Water solubility : NA: study scientifically unjustified  
 Partition coefficient: n-octanol/water : NA: study scientifically unjustified  
 Autoignition temperature : > 225 °C  
 Viscosity : 3,169 mm<sup>2</sup>/s @ 40°C  
 Explosive properties : NA: The study does not need to be conducted because there are no chemical groups associated with explosive properties present in the molecule.  
 Oxidizing properties : NA: The classification procedure needs not to be applied because there are no chemical groups present in the molecule which are associated with oxidising properties.

### 9.2. Other information

No data available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Reactivity : Flammable liquid  
See also section 10.5

### 10.2. Chemical stability

Stability : Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

Hazardous reactions : Vapours may form explosive mixtures with air.

### 10.4. Conditions to avoid

Conditions to avoid : Heat, flames and sparks.  
See also section 7  
Handling and storage

### 10.5. Incompatible materials

Incompatible materials : Incompatible with strong acids and oxidizing agents. Bases See also section 7 Handling and storage

### 10.6. Hazardous decomposition products

Hazardous decomposition products : Carbon oxides, H<sub>2</sub>S, SO<sub>x</sub>

	<b>SAFETY DATA SHEET</b>	Page : 8 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Harmful if inhaled.

<b>CAS 68334-30-5 (68334-30-5)</b>	
LD50/oral/rat	7600 mg/kg
LD50/dermal/rabbit	> 4300 mg/kg
LC50/inhalation/4h/rat	4,1 mg/l/4h

<b>Fuels, diesel (68334-30-5)</b>	
ATE (dust,mist)	1,50000 mg/l/4h

Skin corrosion/irritation : Causes skin irritation.  
pH: NA: study scientifically unjustified

Serious eye damage/irritation : Not classified (Based on available data, the classification criteria are not met.)  
pH: NA: study scientifically unjustified

Respiratory/skin sensitisation : Not classified (Based on available data, the classification criteria are not met.)

Germ cell mutagenicity : Not classified (Based on available data, the classification criteria are not met.)

Carcinogenicity : Suspected of causing cancer.  
Test Method : Dermal, mouse, males, life long, 3x wk, 24µL.

Reproductive toxicity : Not classified (Based on available data, the classification criteria are not met.)

Specific target organ toxicity (single exposure) : Not classified (Based on available data, the classification criteria are not met.)

Specific target organ toxicity (repeated exposure) : May cause damage to organs through prolonged or repeated exposure.  
Target Organs :  
blood  
liver  
thymus

<b>CAS 68334-30-5 (68334-30-5)</b>	
NOAEL (dermal,rat/rabbit,90 days)	30 mg/kg bodyweight/day
Additional information	NOAEC, mammalian, long term, inhalation, rat, systemic : 1710 mg/m <sup>3</sup> (90 days)

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

### Further information

Symptoms related to the physical, chemical and toxicological characteristics, See section 4.2.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecotoxicity effects : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

<b>CAS 68334-30-5 (68334-30-5)</b>
------------------------------------

	<b>SAFETY DATA SHEET</b>	Page : 9 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

<b>CAS 68334-30-5 (68334-30-5)</b>	
Additional information	EL50, aquatic invertebrates, acute, Fresh water, Daphnia magna (Big water flea): 68 mg/l (48 hours) IL50, aquatic algae, Pseudokirchneriella subcapitata: 22 mg/l (72 hours) LL50, fish, acute, Fresh water, Oncorhynchus mykiss (rainbow trout): 21 mg/l (96 hours) NOEL, aquatic invertebrates, long term, Fresh water, Daphnia magna (Big water flea): 0.21 mg/l (14 days) NOEL, fish, long term, Fresh water, Oncorhynchus mykiss (rainbow trout): 0.083 mg/l (QSAR)

### **12.2. Persistence and degradability**

Persistence and degradability : Not applicable.  
UVCB

### **12.3. Bioaccumulative potential**

Bioaccumulation : Not applicable.  
UVCB

Partition coefficient: n-octanol/water : NA: study scientifically unjustified

### **12.4. Mobility in soil**

Mobility : Not applicable  
UVCB

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

PBT/vPvB : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).  
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

### **12.6. Other adverse effects**

Further information : Do not flush into surface water or sanitary sewer system.

## **SECTION 13: Disposal considerations**

### **13.1. Waste treatment methods**

Waste from residues / unused products : Handle with care.  
See also section 7  
Handling and storage  
Where possible recycling is preferred to disposal or incineration.  
Collect and dispose of waste product at an authorised disposal facility.  
Dispose of in accordance with local regulations.

Contaminated packaging : Do not use pressure to empty drums.  
Do not burn, or use a cutting torch on, the empty drum.  
Do not puncture or incinerate.  
Empty containers should be transported/delivered using a registered waste carrier to local recyclers for disposal.  
Dispose of in accordance with local regulations.

Additional ecological information : Do not flush into surface water or sanitary sewer system.

Waste codes / waste designations according to EWC / AVV : Classified as hazardous waste according to European Union regulations.  
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.  
The following Waste Codes are only suggestions:  
130701 - fuel oil and diesel  
150110 - packaging containing residues of or contaminated by dangerous substances

	<b>SAFETY DATA SHEET</b>	Page : 10 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## SECTION 14: Transport information

### 14.1. UN number

UN-No. : 1202

### 14.2. UN proper shipping name

Proper shipping name : GAS OIL  
 Proper shipping name IATA/IMDG : GAS OIL

### 14.3. Transport hazard class(es)

#### 14.3.1. Overland transport

Class : 3 - Flammable liquid  
 Hazard identification number (Kemler No.) : 30  
 Classification code (ADR) : F1  
 ADR/RID-Labels : 3 - Flammable liquid



#### 14.3.2. Inland waterway transport (ADN)

ADN : Hazards :3+N2  
 Class (ADN) : 3

#### 14.3.3. Transport by sea

Class : 3 - Flammable liquids

#### 14.3.4. Air transport

Class : 3 - Flammable liquids

### 14.4. Packing group

Packing group : III

### 14.5. Environmental hazards

Environmental hazards : p



Other information : ADN :N2.

### 14.6. Special precautions for user

No data available

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

No data available

## SECTION 15: Regulatory information

	<b>SAFETY DATA SHEET</b>	Page : 11 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

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

### **15.1.1. EU-Regulations**

Restrictions on use :  
 3. Liquid substances or mixtures, which are regarded as dangerous according to the definitions in Council Directive 67/548/EEC and Directive 1999/45/EC. : CAS 68334-30-5

This product contains an ingredient according to the candidate list of Annex XIV of the REACH Regulation 1907/2006/EC. : Not applicable.

Authorisations : Not applicable

### **15.1.2. National regulations**

DE : WGK : 2  
 DE : German storage class (LGK) : LGK 3B  
 DE : TA-Luft : Organic Substances  
 DE : Technische Regeln für Gefahrstoffe (TRGS) : applicable  
 DE : Risk classification according to VbF : A III - Liquids with a flashpoint above 55°C up to 100°C  
 FR : Installations classées : 117X; 143X  
 NL : ABM : 6 - Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. (A)  
 NL : NeR (Nederlandse emissie Richtlijn) : Organic substances in vapour or gaseous form

## **15.2. Chemical safety assessment**

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

## **SECTION 16: Other information**

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

Acute Tox. 4 (Inhalation) : Acute toxicity (inhalation) Category 4  
 Acute Tox. 4 (Inhalation:dust,mist) : Acute toxicity Category 4  
 Aquatic Chronic 2 : Hazardous to the aquatic environment - chronic hazard category 2  
 Asp. Tox. 1 : Aspiration hazard Category 1  
 Carc. 2 : Carcinogenicity Category 2  
 Flam. Liq. 3 : Flammable liquids Category 3  
 Skin Irrit. 2 : skin corrosion/irritation Category 2  
 STOT RE 2 : Specific target organ toxicity (repeated exposure) Category 2  
 H226 : Flammable liquid and vapour.  
 H304 : May be fatal if swallowed and enters airways.  
 H315 : Causes skin irritation.  
 H332 : Harmful if inhaled.  
 H351 : Suspected of causing cancer.  
 H373 : May cause damage to organs through prolonged or repeated exposure.  
 H411 : Toxic to aquatic life with long lasting effects.  
 R20 : Harmful by inhalation.  
 R38 : Irritating to skin.  
 R40 : Limited evidence of a carcinogenic effect.  
 R51/53 : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
 R65 : Harmful: may cause lung damage if swallowed.  
 N : Dangerous for the environment  
 Xi : irritating  
 Xn : Harmful

Sources of key data used to compile : European Chemicals Bureau : ecb.jrc.it

	<b>SAFETY DATA SHEET</b>	Page : 12 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

the datasheet

CSR , SDS supplier

Abbreviations and acronyms

: ADN = Accord Européen relatif au Transport International des Marchandises Dangereuses par voie de Navigation du Rhin  
ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route  
CLP = Classification, Labelling and Packaging Regulation according to 1272/2008/EC  
IATA = International Air Transport Association  
IMDG = International Maritime Dangerous Goods Code  
LEL = Lower Explosive Limit/Lower Explosion Limit  
UEL = Upper Explosion Limit/Upper Explosive Limit  
REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals  
CSR = Chemical Safety Report  
DNEL = Derived No Effect Level  
EC50 = Median Effective Concentration  
N = Dangerous for the environment  
LC50 = Median lethal concentration  
LD50 = Median lethal dose  
NOEL = No-observed-effect level  
PBT = persistent, bioaccumulating and toxic (PBT).  
PNEC = Predicted No Effect Concentration  
STEL = Short term exposure limit  
TLV = Threshold limits  
TWA = time weighted average  
vPvB = very persistent and very bioaccumulating  
WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water Management Act)  
NA = not applicable  
UVCB = Substance of unknown or variable composition, complex reaction products or biological material (UVCB)

The contents and format of this SDS are in accordance with EEC Commission Directive 1999/45/EC, 67/548/EC, 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex II.

**DISCLAIMER OF LIABILITY** The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

	<b>SAFETY DATA SHEET</b>	Page : 13 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

<b>Annex : Identified uses</b>						
<b>Title</b>	<b>Sector of use</b>	<b>Product category</b>	<b>Process category</b>	<b>Article category</b>	<b>Environmental release</b>	<b>SPERC</b>
Manufacture of substance	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15		ERC1, ERC4	ESVOC SPERC 1.1.v1
Use as an intermediate	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15		ERC6a	ESVOC SPERC 6.1a.v1
Distribution of substance	SU3		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15, PROC9		ERC6a, ERC2, ERC1, ERC3, ERC4, ERC5, ERC6b, ERC6c, ERC6d, ERC7	ESVOC SPERC 1.1b.v1
Formulation & (re)packing of substances and mixtures	SU3, SU10		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15, PROC9, PROC5, PROC14		ERC2	ESVOC SPERC 2.2.v1
Uses in coatings Industrial use	SU3		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15, PROC5, PROC13, PROC7, PROC10		ERC4	ESVOC SPERC 4.3a.v1

	<b>SAFETY DATA SHEET</b>	Page : 14 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

<b>Annex : Identified uses</b>						
<b>Title</b>	<b>Sector of use</b>	<b>Product category</b>	<b>Process category</b>	<b>Article category</b>	<b>Environmental release</b>	<b>SPERC</b>
Uses in coatings Professional use	SU22		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15, PROC5, PROC13, PROC10, PROC11, PROC19		ERC8a, ERC8d	ESVOC SPERC 8.3b.v1
Use in Oil and Gas field drilling and production operations	SU3		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B		ERC4	
Use in Oil and Gas field drilling and production operations	SU22		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B		ERC8d	
lubricants	SU3		PROC1, PROC2, PROC3, PROC4, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17, PROC18		ERC4, ERC7	ESVOC SPERC 4.6a.v1
lubricants: Low environmental release	SU22		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20		ERC9a, ERC9b	ESVOC SPERC 9.6b.v1

	<b>SAFETY DATA SHEET</b>	Page : 15 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

<b>Annex : Identified uses</b>						
<b>Title</b>	<b>Sector of use</b>	<b>Product category</b>	<b>Process category</b>	<b>Article category</b>	<b>Environmental release</b>	<b>SPERC</b>
lubricants: High environmental release	SU22		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20		ERC8a, ERC8d	ESVOC SPERC 8.6c.v1
Metal working fluids / rolling oils	SU3		PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17		ERC4	ESVOC SPERC 4.7a.v1
Use as binders and release agents	SU3		PROC1, PROC2, PROC3, PROC4, PROC7, PROC8B, PROC10, PROC13, PROC6, PROC14		ERC4	ESVOC SPERC 4.10a.v1
Use as binders and release agents	SU22		PROC1, PROC2, PROC3, PROC4, PROC8B, PROC10, PROC6, PROC14, PROC8A, PROC11		ERC8a, ERC8d	ESVOC SPERC 8.10b.v1
Use as a fuel	SU3		PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16		ERC7	ESVOC SPERC 7.12a.v1

	<b>SAFETY DATA SHEET</b>	Page : 16 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

<b>Annex : Identified uses</b>						
<b>Title</b>	<b>Sector of use</b>	<b>Product category</b>	<b>Process category</b>	<b>Article category</b>	<b>Environmental release</b>	<b>SPERC</b>
Use as a fuel	SU22		PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16		ERC9a, ERC9b	ESVOC SPERC 9.12b.v1
Use as a fuel	SU21	PC13			ERC9a, ERC9b	ESVOC SPERC 9.12c.v1
Functional Fluids	SU3		PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9		ERC7	ESVOC SPERC 7.13a.v1
Road and construction applications	SU22		PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13		ERC8f, ERC8d	ESVOC SPERC 8.15.v1
Explosives manufacture & use	SU22		PROC8A, PROC8B, PROC1, PROC3, PROC5		ERC8e	
Rubber production and processing	SU3, SU10, SU11		PROC8A, PROC8B, PROC1, PROC3, PROC5, PROC2, PROC4, PROC6, PROC7, PROC9, PROC13, PROC14, PROC15, PROC21		ERC1, ERC4, ERC6d	ESVOC SPERC 4.19.v1

	<b>SAFETY DATA SHEET</b>	Page : 17 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 01

### Manufacture of substance

ES Ref.: 01
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15 SU3, SU8, SU9 ERC1, ERC4 ESVOC SPERC 1.1.v1
Processes, tasks activities covered	Manufacture of substance or use as process chemical or extracting agent within closed or contained systems. Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container). Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15)

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

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

#### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health
---	--

	<b>SAFETY DATA SHEET</b>	Page : 18 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
Bulk closed loading and unloading	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
Bulk open loading and unloading	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS36 - Laboratory activities	No other specific measures identified.	
CS85 - Bulk product storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC1, ERC4)

ERC1	Manufacture of substances
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	28000000
	Fraction of Regional tonnage used locally:	0,021
	Annual site tonnage (tons/year):	600000
Frequency and duration of use	Maximum daily site tonnage (kg/day):	2000000
	Continuous use/release.	
Environmental factors not influenced by risk management	Number of emission days per year	300
	Local freshwater dilution factor:	10
Other given operational conditions affecting environmental exposure	Local marine water dilution factor:	100
	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or	Risk from environmental exposure is driven by freshwater sediment.,Prevent discharge of	

	<b>SAFETY DATA SHEET</b>	Page : 19 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

limit discharges, air emissions and releases to soil	undissolved substance to or recover from onsite wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	90
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	90,3
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	3300000
	Assumed domestic sewage treatment plant flow (m3/d):	10000
Conditions and measures related to external treatment of waste for disposal	During manufacturing no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	During manufacturing no waste of the substance is generated.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cfec.org/en/reach-for-industries-libraries.html">http://cfec.org/en/reach-for-industries-libraries.html</a> ).,Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet.,If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.
------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 20 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 02

### Use as an intermediate

ES Ref.: 02
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15 SU3, SU8, SU9 ERC6a ESVOC SPERC 6.1a.v1
Processes, tasks activities covered	Use as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container). Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15)

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

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

#### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health
---	--

	<b>SAFETY DATA SHEET</b>	Page : 21 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
Bulk closed loading and unloading	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
Bulk open loading and unloading	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS36 - Laboratory activities	No other specific measures identified.	
CS85 - Bulk product storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC6a)

ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	350000
	Fraction of Regional tonnage used locally:	0,043
	Annual site tonnage (tons/year):	15000
	Maximum daily site tonnage (kg/day):	50000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,Prevent discharge of undissolved substance to or recover from onsite	

	<b>SAFETY DATA SHEET</b>	Page : 22 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	80
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	51,6
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	410000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	This substance is consumed during use and no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 23 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 03

### Distribution of substance

ES Ref.: 03
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC15 SU3 ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7 ESVOC SPERC 1.1b.v1
Processes, tasks activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC15)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective
---	--

	<b>SAFETY DATA SHEET</b>	Page : 24 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
Bulk closed loading and unloading	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
Bulk open loading and unloading	PPE15 - Wear suitable gloves tested to EN374.	
CS6 - Drum and small package filling	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS36 - Laboratory activities	No other specific measures identified.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7)

ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC3	Formulation in materials
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC6c	Industrial use of monomers for manufacture of thermo-plastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	28000000
	Fraction of Regional tonnage used locally:	0,002
	Annual site tonnage (tons/year):	56000
	Maximum daily site tonnage (kg/day):	190000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk	Local freshwater dilution factor:	10

	<b>SAFETY DATA SHEET</b>	Page : 25 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

management	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,000001
	Release fraction to soil from process (initial release prior to RMM):	0,00001

#### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,Prevent discharge of undissolved substance to or recover from onsite wastewater.,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	90
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	2900000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health
-------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 26 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	effects.,Risk Management Measures are based on qualitative risk characterisation.
--	---

**4.2. Environment**

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 27 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 04

### Formulation & (re)packing of substances and mixtures

ES Ref.: 04  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC9, PROC14, PROC15 SU3, SU10 ERC2 ESVOC SPERC 2.2.v1
Processes, tasks activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC9, PROC14, PROC15)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of
---	--

	<b>SAFETY DATA SHEET</b>	Page : 28 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
CS8 - Drum/batch transfers	E64 - Use drum pumps or carefully pour from container.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS30 - Mixing operations (open systems)	E54 - Provide extraction ventilation at points where emissions occur.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	PPE15 - Wear suitable gloves tested to EN374.	
CS6 - Drum and small package filling	PPE15 - Wear suitable gloves tested to EN374.	
CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC2)

ERC2	Formulation of preparations
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	28000000
	Fraction of Regional tonnage used locally:	0,0011
	Annual site tonnage (tons/year):	30000
	Maximum daily site tonnage (kg/day):	100000
Frequency and duration of use	Continuous use/release.	

	<b>SAFETY DATA SHEET</b>	Page : 29 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,00002
	Release fraction to soil from process (initial release prior to RMM):	0,0001

#### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,Prevent discharge of undissolved substance to or recover from onsite wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	0
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	59,9
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	680000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

	<b>SAFETY DATA SHEET</b>	Page : 30 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

**4.1. Health**

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

**4.2. Environment**

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 31 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 05

### Uses in coatings

ES Ref.: 05
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC10, PROC13, PROC15 SU3 ERC4 ESVOC SPERC 4.3a.v1
Processes, tasks activities covered	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC10, PROC13, PROC15)

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

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

#### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is
---	--

	<b>SAFETY DATA SHEET</b>	Page : 32 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS3 - Material transfers,CS8 - Drum/batch transfers,Transfer from/pouring from containers	PPE15 - Wear suitable gloves tested to EN374.	
CS96 - Preparation of material for application,CS30 - Mixing operations (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Film formation - force drying, stoving and other technologies	E47 - Handle substance within a closed system.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS95 - Film formation - air drying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE15 - Wear suitable gloves tested to EN374.	
CS97 - Spraying (automatic/robotic)	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,PPE15 - Wear suitable gloves tested to EN374.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS24 - Spraying/ fogging by manual application	PPE29 - Wear a respirator conforming to EN140 with Type A/P2 filter or better.,PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.,E119 - Ensure operatives are trained to minimise exposures.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS98 - Roller, spreader, flow application	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS4 - Dipping, immersion and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	No other specific measures identified.	

	<b>SAFETY DATA SHEET</b>	Page : 33 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	8100
	Fraction of Regional tonnage used locally:	1
	Annual site tonnage (tons/year):	8100
	Maximum daily site tonnage (kg/day):	27000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,98
	Release fraction to wastewater from process (initial release prior to RMM):	0,00007
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).,Prevent discharge of undissolved substance to or recover from onsite wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	90
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	58,2
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	140000
	Assumed domestic sewage treatment plant flow	2000

	<b>SAFETY DATA SHEET</b>	Page : 34 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(m3/d):	
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario

2.1 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:

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

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 35 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 06

### Uses in coatings

ES Ref.: 06
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC10, PROC11, PROC13, PROC15, PROC19 SU22 ERC8a, ERC8d ESVOC SPERC 8.3b.v1
Processes, tasks activities covered	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation) and equipment cleaning, maintenance and associated laboratory activities. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC10, PROC11, PROC13, PROC15, PROC19)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking
---	--

	<b>SAFETY DATA SHEET</b>	Page : 36 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS3 - Material transfers,CS8 - Drum/batch transfers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS96 - Preparation of material for application,CS29 - Mixing operations (closed systems)	No other specific measures identified.	
CS96 - Preparation of material for application,CS30 - Mixing operations (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS95 - Film formation - air drying	PPE15 - Wear suitable gloves tested to EN374.	
CS24 - Spraying/ fogging by manual application,OC8 - Indoor	E57 - Carry out in a vented booth or extracted enclosure.,PPE15 - Wear suitable gloves tested to EN374.,OC18 - Limit the substance content in the product to 25 %.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS24 - Spraying/ fogging by manual application,OC9 - Outdoor	PPE29 - Wear a respirator conforming to EN140 with Type A/P2 filter or better.,PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.,OC18 - Limit the substance content in the product to 25 %.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.,EI19 - Ensure operatives are trained to minimise exposures.	
CS98 - Roller, spreader, flow application	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.,OC18 - Limit the substance content in the product to 25 %.	
CS4 - Dipping, immersion and pouring	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	

	<b>SAFETY DATA SHEET</b>	Page : 37 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

CS72 - Hand application - fingerpaints, pastels, adhesives	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.,OC17 - Limit the substance content in the product to 5 %.	
CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	2300
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,2
	Maximum daily site tonnage (kg/day):	3,2
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,98
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release prior to RMM):	0,01

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on	50

	<b>SAFETY DATA SHEET</b>	Page : 38 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	release following total wastewater treatment removal (kg/d):	
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 39 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 07

### Use in Oil and Gas field drilling and production operations

ES Ref.: 07  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B SU3 ERC4
Processes, tasks activities covered	Oil field well drilling operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance. Industrial use
Assessment method	ECETOC TRA

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they

	<b>SAFETY DATA SHEET</b>	Page : 40 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	E52 - Transfer via enclosed lines.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS115 - Drilling mud (re-)formulation	No other specific measures identified.	
CS116 - Drill floor operations	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS117 - Operation of solids filtering equipment, Elevated temperature	E71 - Provide the operation with a properly sited receiving hood.	
CS120 - Cleaning of solids filtering equipment	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Cuttings treatment and disposal	E54 - Provide extraction ventilation at points where emissions occur.	
CS2 - Process sampling	No other specific measures identified.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS9 - Pouring from small containers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS39 - Equipment cleaning and maintenance	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles	
<b>Product characteristics</b>		
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic	
<b>Operational conditions</b>		
Amount used	Fraction of EU tonnage used in region:	1
	Regional use tonnage (tons/year):	7750
	Fraction of Regional tonnage used locally:	Not applicable
	Annual site tonnage (tons/year):	Not applicable
Frequency and duration of use	Maximum daily site tonnage (kg/day):	Not applicable
	Number of emission days per year	not applicable
Environmental factors not influenced by risk management	Local marine water dilution factor:	Not applicable
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	Not applicable
	Release fraction to wastewater from process (initial release prior to RMM):	Not applicable

	<b>SAFETY DATA SHEET</b>	Page : 41 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Risk management measures

Technical conditions and measures at process level to prevent release	Discharge to aquatic environment is restricted (see Section 4.2).	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	not applicable	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	Not applicable
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	Not applicable
Organizational measures to prevent/limit release from the site	Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	not applicable
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	not applicable
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	not applicable
	Assumed domestic sewage treatment plant flow (m3/d):	not applicable
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario

2.1 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:

2.2 Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment.,Qualitative approach used to conclude safe use.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Discharge to aquatic environment is restricted by law and industry prohibits release.
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 42 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 08

### Use in Oil and Gas field drilling and production operations

ES Ref.: 08  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B SU22 ERC8d
Processes, tasks activities covered	Oil field well drilling operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance. Professional use
Assessment method	ECETOC TRA

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they

	<b>SAFETY DATA SHEET</b>	Page : 43 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS115 - Drilling mud (re-)formulation	No other specific measures identified.	
CS116 - Drill floor operations	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS117 - Operation of solids filtering equipment, Elevated temperature	E71 - Provide the operation with a properly sited receiving hood.	
CS120 - Cleaning of solids filtering equipment	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Cuttings treatment and disposal	E54 - Provide extraction ventilation at points where emissions occur.	
CS2 - Process sampling	No other specific measures identified.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS9 - Pouring from small containers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS39 - Equipment cleaning and maintenance	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8d)

ERC8d	Wide dispersive outdoor use of processing aids in open systems
-------	--

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	1
	Regional use tonnage (tons/year):	7750
	Fraction of Regional tonnage used locally:	Not applicable
	Annual site tonnage (tons/year):	Not applicable
	Maximum daily site tonnage (kg/day):	Not applicable
Frequency and duration of use	Number of emission days per year	not applicable
Environmental factors not influenced by risk management	Local marine water dilution factor:	Not applicable
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	Not applicable
	Release fraction to wastewater from process (initial release prior to RMM):	Not applicable

	<b>SAFETY DATA SHEET</b>	Page : 44 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Risk management measures

Technical conditions and measures at process level to prevent release	Discharge to aquatic environment is restricted (see Section 4.2).	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	not applicable	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	Not applicable
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	Not applicable
Organizational measures to prevent/limit release from the site	Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	not applicable
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	not applicable
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	not applicable
	Assumed domestic sewage treatment plant flow (m3/d):	not applicable
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment.,Qualitative approach used to conclude safe use.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Discharge to aquatic environment is restricted by law and industry prohibits release.
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 45 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 09

### lubricants

ES Ref.: 09
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17, PROC18 SU3 ERC4, ERC7 ESVOC SPERC 4.6a.v1
Processes, tasks activities covered	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17, PROC18)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is
---	--

	<b>SAFETY DATA SHEET</b>	Page : 46 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	E54 - Provide extraction ventilation at points where emissions occur.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS75 - Initial factory fill of equipment	PPE15 - Wear suitable gloves tested to EN374.	
CS17 - Operation and lubrication of high energy open equipment	E54 - Provide extraction ventilation at points where emissions occur.,E68 - Restrict area of openings to equipment.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.	
CS77 - Maintenance (of larger plant items) and machine set up	E66 - Ensure material transfers are under containment or extract ventilation.,E67 - Provide extract ventilation to emission points when contact with warm (>50oC) product is likely.,PPE15 - Wear suitable gloves tested to EN374.	
CS18 - Maintenance of small items	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS19 - Remanufacture of reject articles	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

	<b>SAFETY DATA SHEET</b>	Page : 47 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 2.2 Contributing scenario controlling environmental exposure (ERC4, ERC7)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	27000
	Fraction of Regional tonnage used locally:	0,0036
	Annual site tonnage (tons/year):	100
	Maximum daily site tonnage (kg/day):	5000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	20
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,005
	Release fraction to wastewater from process (initial release prior to RMM):	0,000003
	Release fraction to soil from process (initial release prior to RMM):	0,001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	70
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	78000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

	<b>SAFETY DATA SHEET</b>	Page : 48 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 49 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 10

### lubricants: Low environmental release

ES Ref.: 10
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20 SU22 ERC9a, ERC9b ESVOC SPERC 9.6b.v1
Processes, tasks activities covered	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions
PROC20	Heat and pressure transfer fluids in dispersive, professional use but closed systems

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where
---	--

	<b>SAFETY DATA SHEET</b>	Page : 50 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
Operation of equipment containing engine oils and similar	No other specific measures identified.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.,E40 - Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS81 - Dedicated facility	E64 - Use drum pumps or carefully pour from container.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS82 - Non-dedicated facility	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS17 - Operation and lubrication of high energy open equipment,OC8 - Indoor	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS17 - Operation and lubrication of high energy open equipment,OC9 - Outdoor	E69 - Ensure operation is undertaken outdoors.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.,OC18 - Limit the substance content in the product to 25 %.,PPE15 - Wear suitable gloves tested to EN374.,EI19 - Ensure operatives are trained to minimise exposures.	
CS77 - Maintenance (of larger plant items) and machine set up	E66 - Ensure material transfers are under containment or extract ventilation.,E67 - Provide extract ventilation to emission points when contact with warm (>50oC) product is likely.,PPE15 - Wear suitable gloves tested to EN374.	
CS18 - Maintenance of small items	E81 - Drain or remove substance from equipment prior to break-in or maintenance.,Provide a good standard of general ventilation (not less than 3 to 5	

	<b>SAFETY DATA SHEET</b>	Page : 51 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS78 - Engine lubricant service	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS10 - Spraying,with local exhaust ventilation	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.,E119 - Ensure operatives are trained to minimise exposures.	
CS10 - Spraying,Without local exhaust ventilation	PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE18 - Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.,OC18 - Limit the substance content in the product to 25 %.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	3200
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,6
	Maximum daily site tonnage (kg/day):	4,4
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release prior to RMM):	0,01

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	

	<b>SAFETY DATA SHEET</b>	Page : 52 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	68
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 53 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 11

### lubricants: High environmental release

ES Ref.: 11
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20 SU22 ERC8a, ERC8d ESVOC SPERC 8.6c.v1
Processes, tasks activities covered	Covers the use of formulated lubricants within closed or contained systems including incidental exposures during material transfers, operation of engines and similar articles, equipment maintenance and disposal of waste oil. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions
PROC20	Heat and pressure transfer fluids in dispersive, professional use but closed systems

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where
---	--

	<b>SAFETY DATA SHEET</b>	Page : 54 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
Operation of equipment containing engine oils and similar	No other specific measures identified.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.,E40 - Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS81 - Dedicated facility	E64 - Use drum pumps or carefully pour from container.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS82 - Non-dedicated facility	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS17 - Operation and lubrication of high energy open equipment,OC8 - Indoor	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS17 - Operation and lubrication of high energy open equipment,OC9 - Outdoor	E69 - Ensure operation is undertaken outdoors.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.,OC18 - Limit the substance content in the product to 25 %.,PPE15 - Wear suitable gloves tested to EN374.,EI19 - Ensure operatives are trained to minimise exposures.	
CS77 - Maintenance (of larger plant items) and machine set up	E66 - Ensure material transfers are under containment or extract ventilation.,E67 - Provide extract ventilation to emission points when contact with warm (>50oC) product is likely.,PPE15 - Wear suitable gloves tested to EN374.	
CS18 - Maintenance of small items	E81 - Drain or remove substance from equipment prior to break-in or maintenance.,Provide a good standard of general ventilation (not less than 3 to 5	

	<b>SAFETY DATA SHEET</b>	Page : 55 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS78 - Engine lubricant service	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS10 - Spraying	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.,E119 - Ensure operatives are trained to minimise exposures.,G16 - If technical measures not practical.,PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE18 - Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.,OC18 - Limit the substance content in the product to 25 %.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	3200
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,6
	Maximum daily site tonnage (kg/day):	4,4
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,15
	Release fraction to wastewater from process (initial release prior to RMM):	0,05
	Release fraction to soil from process (initial release prior to RMM):	0,05

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	

	<b>SAFETY DATA SHEET</b>	Page : 56 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	68
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 57 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 12

### Metal working fluids / rolling oils

ES Ref.: 12  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17 SU3 ERC4 ESVOC SPERC 4.7a.v1
Processes, tasks activities covered	Covers the use in formulated MWFs (MWFs)/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking
---	--

	<b>SAFETY DATA SHEET</b>	Page : 58 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	E54 - Provide extraction ventilation at points where emissions occur.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
CS79 - Metal machining operations	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS80 - Automated metal rolling/forming	E49 - Handle substance within a predominantly closed system provided with extract ventilation.	
CS83 - Semi-automated metal rolling/forming	E54 - Provide extraction ventilation at points where emissions occur.	
CS39 - Equipment cleaning and maintenance	E55 - Drain down and flush system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

	<b>SAFETY DATA SHEET</b>	Page : 59 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	10000
	Fraction of Regional tonnage used locally:	0,0097
	Annual site tonnage (tons/year):	100
	Maximum daily site tonnage (kg/day):	5000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	20
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,02
	Release fraction to wastewater from process (initial release prior to RMM):	0,000003
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	70
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	78000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

### 3.1. Health

Information for contributing exposure scenario
--

	<b>SAFETY DATA SHEET</b>	Page : 60 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
-----	---

**3.2. Environment**

Information for contributing exposure scenario:

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

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

**4.1. Health**

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

**4.2. Environment**

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 61 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 13

### Use as binders and release agents

ES Ref.: 13
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8B, PROC10, PROC13, PROC14 SU3 ERC4 ESVOC SPERC 4.10a.v1
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application (including spraying and brushing) and handling of waste. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8B, PROC10, PROC13, PROC14)

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
PROC6	Calendering operations
PROC7	Industrial spraying
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
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of
---	---

	<b>SAFETY DATA SHEET</b>	Page : 62 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.	
CS8 - Drum/batch transfers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS29 - Mixing operations (closed systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS31 - Mold forming	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS32 - Casting operations,CS108 - (open systems)	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying,CS33 - Machine	E61 - Minimise exposure by extracted full enclosure for the operation or equipment.,PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying,CS34 - Manual	PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,E119 - Ensure operatives are trained to minimise exposures.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 63 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	14000
	Fraction of Regional tonnage used locally:	0,18
	Annual site tonnage (tons/year):	2500
	Maximum daily site tonnage (kg/day):	25000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	100
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	1
	Release fraction to wastewater from process (initial release prior to RMM):	0,0000003
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	80
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	170000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

	<b>SAFETY DATA SHEET</b>	Page : 64 / 163
	<b>CAS 68334-30-5</b>	Revision nr : 1
Issuing date : 27/09/2012		
Supersedes :		

#### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

##### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

##### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 65 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 14

### Use as binders and release agents

ES Ref.: 14
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC8A, PROC8B, PROC10, PROC11, PROC14 SU22 ERC8a, ERC8d ESVOC SPERC 8.10b.v1
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8A, PROC8B, PROC10, PROC11, PROC14)

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
PROC6	Calendering operations
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
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up
---	--

	<b>SAFETY DATA SHEET</b>	Page : 66 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS14 - Bulk transfers,CS107 - (closed systems)	No other specific measures identified.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS29 - Mixing operations (closed systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS31 - Mold forming	PPE15 - Wear suitable gloves tested to EN374.,E54 - Provide extraction ventilation at points where emissions occur.	
CS32 - Casting operations,with local exhaust ventilation	E54 - Provide extraction ventilation at points where emissions occur.,PPE15 - Wear suitable gloves tested to EN374.	
CS32 - Casting operations,Without local exhaust ventilation	PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,PPE29 - Wear a respirator conforming to EN140 with Type A/P2 filter or better.	
CS10 - Spraying,CS34 - Manual,with local exhaust ventilation	E57 - Carry out in a vented booth or extracted enclosure.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,EI19 - Ensure operatives are trained to minimise exposures.	
CS10 - Spraying,CS34 - Manual,Without local exhaust ventilation	PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,EI19 - Ensure operatives are trained to minimise exposures.	
CS34 - Manual,CS51 - Rolling, Brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

	<b>SAFETY DATA SHEET</b>	Page : 67 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	2900
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,5
	Maximum daily site tonnage (kg/day):	4
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,95
	Release fraction to wastewater from process (initial release prior to RMM):	0,025
	Release fraction to soil from process (initial release prior to RMM):	0,025

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	62
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

	<b>SAFETY DATA SHEET</b>	Page : 68 / 163
	<b>CAS 68334-30-5</b>	Revision nr : 1
Issuing date : 27/09/2012		
Supersedes :		

#### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

##### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

##### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 69 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 15

### Use as a fuel

ES Ref.: 15
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16 SU3 ERC7 ESVOC SPERC 7.12a.v1
Processes, tasks activities covered	Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16)

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)
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
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves

	<b>SAFETY DATA SHEET</b>	Page : 70 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
Use as a fuel,CS107 - (closed systems)	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	4500000
	Fraction of Regional tonnage used locally:	0,34
	Annual site tonnage (tons/year):	1500000
	Maximum daily site tonnage (kg/day):	5000000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,005
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	95
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	97,7
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	60,4
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	

	<b>SAFETY DATA SHEET</b>	Page : 71 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	97,7
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	5000000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls.,Combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario

2.1 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:

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

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 72 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 16

### Use as a fuel

ES Ref.: 16
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16 SU22 ERC9a, ERC9b ESVOC SPERC 9.12b.v1
Processes, tasks activities covered	Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16)

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)
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
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves

	<b>SAFETY DATA SHEET</b>	Page : 73 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers	E64 - Use drum pumps or carefully pour from container.,PPE15 - Wear suitable gloves tested to EN374.	
refuelling	PPE15 - Wear suitable gloves tested to EN374.	
Use as a fuel,CS107 - (closed systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,or,E69 - Ensure operation is undertaken outdoors.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	6700000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	3300
	Maximum daily site tonnage (kg/day):	9200
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,0001
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from process (initial release prior to RMM):	0,00001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant,	0

	<b>SAFETY DATA SHEET</b>	Page : 74 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	provide the required onsite wastewater removal efficiency of $\geq$ (%):	
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	140000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls.,Combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 75 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 17

### Use as a fuel

ES Ref.: 17
ES Type: consumer

Use descriptors	PC13 SU21 ERC9a, ERC9b ESVOC SPERC 9.12c.v1
Processes, tasks activities covered	Covers consumer uses in liquid fuels. Consumer use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario consumer end-use (PC13)

PC13	Fuels
------	-------

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	OC15 - Liquid, vapour pressure > 10 Pa

#### Operational conditions

Frequency and duration of use	unless stated differently.,Covers use up to (g)	37500
	Covers skin contact area up to (cm2)	420
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use up to	0,143Uses per day
	Covers exposure up to	2Hours/event
	PC13 - Fuels,Liquid: Automotive Refuelling	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 52. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 210 cm2. For each use event, covers use amounts up to: 37500 g. Covers outdoor use. Covers use in room size of 100 m3. Covers exposure up to 0,05. Hours/event
	PC13 - Fuels,Liquid Garden Equipment - Use	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 26. days/year. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 750 g. Covers outdoor use. Covers use in room size of 100 m3. Covers exposure up to 2,00. Hours/event
	PC13 - Fuels,Liquid: Garden Equipment - Refuelling	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 26. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 420 cm2. For each use event, covers use amounts up to: 750

	<b>SAFETY DATA SHEET</b>	Page : 76 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

		g. Covers use in a one car garage (34 m3) under typical ventilation. Covers use in room size of 34m3. Covers exposure up to 0,03. Hours/event
--	--	---

#### Risk management measures

Other risk management measures:

PC13 - Fuels,Liquid: Automotive Refuelling	No specific risk management measure identified beyond those operational conditions stated.	
PC13 - Fuels,Liquid Garden Equipment - Use	No specific risk management measure identified beyond those operational conditions stated.	
PC13 - Fuels,Liquid: Garden Equipment - Refuelling	No specific risk management measure identified beyond those operational conditions stated.	

#### 2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems

#### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

#### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	16000000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	8200
	Maximum daily site tonnage (kg/day):	23000
Frequency and duration of use	Continuous use/release.	
	Emission days (days/year):	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).	
	Release fraction to air from wide dispersive use (regional only):	0,0001
	Release fraction to wastewater from wide dispersive use:	0,00001
	Release fraction to soil from wide dispersive use (regional only):	0,00001

#### Risk management measures

Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	350000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls.,Combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario
--

	<b>SAFETY DATA SHEET</b>	Page : 77 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

2.1	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. Where exposure determinants differ to these source, then they are indicated.
-----	---

**3.2. Environment**

Information for contributing exposure scenario:

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

**4.1. Health**

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
-------------------	--

**4.2. Environment**

Guidance - Environment	Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 78 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 18

### Functional Fluids

ES Ref.: 18
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9 SU3 ERC7 ESVOC SPERC 7.13a.v1
Processes, tasks activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
---	---

	<b>SAFETY DATA SHEET</b>	Page : 79 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	No other specific measures identified.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS84 - Filling of articles/equipment,CS107 - (closed systems)	E52 - Transfer via enclosed lines.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
equipment operation,CS107 - (closed systems)	No other specific measures identified.	
equipment operation,CS108 - (open systems)	restrict area of openings and provide extract ventilation to emission points when substance handled at elevated temperatures	
CS86 - Rework of articles,CS19 - Remanufacture of reject articles	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	6400
	Fraction of Regional tonnage used locally:	0,0016
	Annual site tonnage (tons/year):	10
Frequency and duration of use	Maximum daily site tonnage (kg/day):	500
	Continuous use/release.	
Environmental factors not influenced by risk management	Number of emission days per year	20
	Local freshwater dilution factor:	10
Other given operational conditions affecting environmental exposure	Local marine water dilution factor:	100
	Release fraction to air from process (initial release prior to RMM):	0,005
	Release fraction to wastewater from process (initial release prior to RMM):	0,000003
	Release fraction to soil from process (initial release prior to RMM):	0,001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion),.No wastewater treatment required.	

	<b>SAFETY DATA SHEET</b>	Page : 80 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Treat air emission to provide a typical removal efficiency of (%):	0
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	7800
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 81 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 19

### Road and construction applications

ES Ref.: 19
ES Type: Worker

Use descriptors	PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13 SU22 ERC8d, ERC8f ESVOC SPERC 8.15.v1
Processes, tasks activities covered	Application of surface coatings and binders in road and construction activities, including paving uses, manual mastic and in the application of roofing and water-proofing membranes. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13)

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)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves

	<b>SAFETY DATA SHEET</b>	Page : 82 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS8 - Drum/batch transfers,CS82 - Non-dedicated facility	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers,CS81 - Dedicated facility	PPE15 - Wear suitable gloves tested to EN374.	
CS25 - Spraying/ fogging by machine application	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,E69 - Ensure operation is undertaken outdoors.,PPE15 - Wear suitable gloves tested to EN374.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS4 - Dipping, immersion and pouring	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8d, ERC8f)

ERC8d	Wide dispersive outdoor use of processing aids in open systems
ERC8f	Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	31000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	15
	Maximum daily site tonnage (kg/day):	42
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,95
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release prior to RMM):	0,04

### Risk management measures

Technical conditions and measures at process level to	Common practices vary across sites thus conservative process release estimates used.
---	--

	<b>SAFETY DATA SHEET</b>	Page : 83 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

prevent release		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	12,2
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	620
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 84 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 20

### Explosives manufacture & use

ES Ref.: 20
ES Type: Worker

Use descriptors	PROC1, PROC3, PROC5, PROC8A, PROC8B SU22 ERC8e
Processes, tasks activities covered	Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer, mixing and charging) and equipment cleaning. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC5, PROC8A, PROC8B)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance

	<b>SAFETY DATA SHEET</b>	Page : 85 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No specific measures identified.	
CS8 - Drum/batch transfers	E64 - Use drum pumps or carefully pour from container.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.,E47 - Handle substance within a closed system.	
CS30 - Mixing operations (open systems)	E54 - Provide extraction ventilation at points where emissions occur.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS36 - Laboratory activities	No specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8e)

ERC8e	Wide dispersive outdoor use of reactive substances in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	13000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	6,7
	Maximum daily site tonnage (kg/day):	18
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,02
	Release fraction to soil from process (initial release prior to RMM):	0,01

	<b>SAFETY DATA SHEET</b>	Page : 86 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	8,8
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	290
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 87 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 21

### Rubber production and processing

ES Ref.: 21
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8A, PROC8B, PROC9, PROC13, PROC14, PROC15, PROC21 SU3, SU10, SU11 ERC1, ERC4, ERC6d ESVOC SPERC 4.19.v1
Processes, tasks activities covered	Manufacture of tyres and general rubber articles within closed or contained systems, including incidental exposures during processing of raw (uncured) rubber, handling and mixing of rubber additives, calendaring, vulcanising, cooling and finishing as well as maintenance. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8A, PROC8B, PROC9, PROC13, PROC14, PROC15, PROC21)

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)
PROC6	Calendering operations
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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC21	Low energy manipulation of substances bound in materials and/or articles

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good
---	---

	<b>SAFETY DATA SHEET</b>	Page : 88 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS14 - Bulk transfers,CS107 - (closed systems)	No other specific measures identified.	
CS14 - Bulk transfers,CS108 - (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS3 - Material transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS91 - Bulk weighing	PPE15 - Wear suitable gloves tested to EN374.,No other specific measures identified.	
CS90 - Small scale weighing	PPE15 - Wear suitable gloves tested to EN374.	
CS92 - Additive premixing	PPE15 - Wear suitable gloves tested to EN374.	
CS64 - Calendering (including Banburys)	E49 - Handle substance within a predominantly closed system provided with extract ventilation.,PPE15 - Wear suitable gloves tested to EN374.	
CS73 - Pressing uncured rubber blanks	PPE15 - Wear suitable gloves tested to EN374.	
CS112 - Tyre build up	E61 - Minimise exposure by extracted full enclosure for the operation or equipment.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.	
CS70 - Vulcanisation	E82 - Provide extract ventilation to material transfer points and other openings.	
CS71 - Cooling cured articles	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
Treatment of articles by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS102 - Finishing operations	PPE15 - Wear suitable gloves tested to EN374.	
CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E81 - Drain or remove substance from equipment prior to break-in or maintenance.,PPE16 - Wear	

	<b>SAFETY DATA SHEET</b>	Page : 89 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC1, ERC4, ERC6d)

ERC1	Manufacture of substances
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	16000
	Fraction of Regional tonnage used locally:	1
	Annual site tonnage (tons/year):	16000
	Maximum daily site tonnage (kg/day):	52000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	0
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	52,8
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	420000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national	

	<b>SAFETY DATA SHEET</b>	Page : 90 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

Conditions and measures related to external recovery of waste	regulations. External recovery and recycling of waste should comply with applicable local and/or national regulations.	
---	---	--

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 91 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 01

### Manufacture of substance

ES Ref.: 01
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15 SU3, SU8, SU9 ERC1, ERC4 ESVOC SPERC 1.1.v1
Processes, tasks activities covered	Manufacture of substance or use as process chemical or extracting agent within closed or contained systems. Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container). Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15)

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

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

#### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health
---	--

	<b>SAFETY DATA SHEET</b>	Page : 92 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
Bulk closed loading and unloading	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
Bulk open loading and unloading	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS36 - Laboratory activities	No other specific measures identified.	
CS85 - Bulk product storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC1, ERC4)

ERC1	Manufacture of substances
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	28000000
	Fraction of Regional tonnage used locally:	0,021
	Annual site tonnage (tons/year):	600000
Frequency and duration of use	Maximum daily site tonnage (kg/day):	2000000
	Continuous use/release.	
Environmental factors not influenced by risk management	Number of emission days per year	300
	Local freshwater dilution factor:	10
Other given operational conditions affecting environmental exposure	Local marine water dilution factor:	100
	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or	Risk from environmental exposure is driven by freshwater sediment.,Prevent discharge of	

	<b>SAFETY DATA SHEET</b>	Page : 93 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

limit discharges, air emissions and releases to soil	undissolved substance to or recover from onsite wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	90
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	90,3
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	3300000
	Assumed domestic sewage treatment plant flow (m3/d):	10000
Conditions and measures related to external treatment of waste for disposal	During manufacturing no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	During manufacturing no waste of the substance is generated.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cfec.org/en/reach-for-industries-libraries.html">http://cfec.org/en/reach-for-industries-libraries.html</a> ).,Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet.,If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.
------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 94 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 02

### Use as an intermediate

ES Ref.: 02
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15 SU3, SU8, SU9 ERC6a ESVOC SPERC 6.1a.v1
Processes, tasks activities covered	Use as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container). Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15)

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

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

#### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health
---	--

	<b>SAFETY DATA SHEET</b>	Page : 95 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
Bulk closed loading and unloading	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
Bulk open loading and unloading	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS36 - Laboratory activities	No other specific measures identified.	
CS85 - Bulk product storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC6a)

ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	350000
	Fraction of Regional tonnage used locally:	0,043
	Annual site tonnage (tons/year):	15000
Frequency and duration of use	Maximum daily site tonnage (kg/day):	50000
	Continuous use/release.	
Environmental factors not influenced by risk management	Number of emission days per year	300
	Local freshwater dilution factor:	10
Other given operational conditions affecting environmental exposure	Local marine water dilution factor:	100
	Release fraction to air from process (initial release prior to RMM):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,Prevent discharge of undissolved substance to or recover from onsite	

	<b>SAFETY DATA SHEET</b>	Page : 96 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	80
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	51,6
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	410000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	This substance is consumed during use and no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 97 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 03

### Distribution of substance

ES Ref.: 03
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC15 SU3 ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7 ESVOC SPERC 1.1b.v1
Processes, tasks activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC15)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective
---	--

	<b>SAFETY DATA SHEET</b>	Page : 98 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
Bulk closed loading and unloading	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
Bulk open loading and unloading	PPE15 - Wear suitable gloves tested to EN374.	
CS6 - Drum and small package filling	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS36 - Laboratory activities	No other specific measures identified.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7)

ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC3	Formulation in materials
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC6c	Industrial use of monomers for manufacture of thermo-plastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	28000000
	Fraction of Regional tonnage used locally:	0,002
	Annual site tonnage (tons/year):	56000
	Maximum daily site tonnage (kg/day):	190000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk	Local freshwater dilution factor:	10

	<b>SAFETY DATA SHEET</b>	Page : 99 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

management	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,000001
	Release fraction to soil from process (initial release prior to RMM):	0,00001

#### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,Prevent discharge of undissolved substance to or recover from onsite wastewater.,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	90
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	2900000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health
-------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 100 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	effects.,Risk Management Measures are based on qualitative risk characterisation.
--	---

**4.2. Environment**

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 101 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 04

### Formulation & (re)packing of substances and mixtures

ES Ref.: 04  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC9, PROC14, PROC15 SU3, SU10 ERC2 ESVOC SPERC 2.2.v1
Processes, tasks activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC9, PROC14, PROC15)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of
---	--

	<b>SAFETY DATA SHEET</b>	Page : 102 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
CS8 - Drum/batch transfers	E64 - Use drum pumps or carefully pour from container.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS30 - Mixing operations (open systems)	E54 - Provide extraction ventilation at points where emissions occur.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	PPE15 - Wear suitable gloves tested to EN374.	
CS6 - Drum and small package filling	PPE15 - Wear suitable gloves tested to EN374.	
CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC2)

ERC2	Formulation of preparations
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	28000000
	Fraction of Regional tonnage used locally:	0,0011
	Annual site tonnage (tons/year):	30000
	Maximum daily site tonnage (kg/day):	100000
Frequency and duration of use	Continuous use/release.	

	<b>SAFETY DATA SHEET</b>	Page : 103 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,00002
	Release fraction to soil from process (initial release prior to RMM):	0,0001

#### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,Prevent discharge of undissolved substance to or recover from onsite wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	0
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	59,9
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	680000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

	<b>SAFETY DATA SHEET</b>	Page : 104 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 105 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 05

### Uses in coatings

ES Ref.: 05
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC10, PROC13, PROC15 SU3 ERC4 ESVOC SPERC 4.3a.v1
Processes, tasks activities covered	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC10, PROC13, PROC15)

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

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

#### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is
---	--

	<b>SAFETY DATA SHEET</b>	Page : 106 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS3 - Material transfers,CS8 - Drum/batch transfers,Transfer from/pouring from containers	PPE15 - Wear suitable gloves tested to EN374.	
CS96 - Preparation of material for application,CS30 - Mixing operations (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Film formation - force drying, stoving and other technologies	E47 - Handle substance within a closed system.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS95 - Film formation - air drying	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE15 - Wear suitable gloves tested to EN374.	
CS97 - Spraying (automatic/robotic)	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,PPE15 - Wear suitable gloves tested to EN374.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS24 - Spraying/ fogging by manual application	PPE29 - Wear a respirator conforming to EN140 with Type A/P2 filter or better.,PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.,E119 - Ensure operatives are trained to minimise exposures.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS98 - Roller, spreader, flow application	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS4 - Dipping, immersion and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	No other specific measures identified.	

	<b>SAFETY DATA SHEET</b>	Page : 107 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	8100
	Fraction of Regional tonnage used locally:	1
	Annual site tonnage (tons/year):	8100
	Maximum daily site tonnage (kg/day):	27000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,98
	Release fraction to wastewater from process (initial release prior to RMM):	0,00007
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).,Prevent discharge of undissolved substance to or recover from onsite wastewater.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	90
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	58,2
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	140000
	Assumed domestic sewage treatment plant flow	2000

	<b>SAFETY DATA SHEET</b>	Page : 108 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(m3/d):	
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario

2.1 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:

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

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 109 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 06

### Uses in coatings

ES Ref.: 06
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC10, PROC11, PROC13, PROC15, PROC19 SU22 ERC8a, ERC8d ESVOC SPERC 8.3b.v1
Processes, tasks activities covered	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation) and equipment cleaning, maintenance and associated laboratory activities. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC10, PROC11, PROC13, PROC15, PROC19)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking
---	--

	<b>SAFETY DATA SHEET</b>	Page : 110 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS3 - Material transfers,CS8 - Drum/batch transfers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS96 - Preparation of material for application,CS29 - Mixing operations (closed systems)	No other specific measures identified.	
CS96 - Preparation of material for application,CS30 - Mixing operations (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS95 - Film formation - air drying	PPE15 - Wear suitable gloves tested to EN374.	
CS24 - Spraying/ fogging by manual application,OC8 - Indoor	E57 - Carry out in a vented booth or extracted enclosure.,PPE15 - Wear suitable gloves tested to EN374.,OC18 - Limit the substance content in the product to 25 %.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS24 - Spraying/ fogging by manual application,OC9 - Outdoor	PPE29 - Wear a respirator conforming to EN140 with Type A/P2 filter or better.,PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.,OC18 - Limit the substance content in the product to 25 %.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.,EI19 - Ensure operatives are trained to minimise exposures.	
CS98 - Roller, spreader, flow application	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.,OC18 - Limit the substance content in the product to 25 %.	
CS4 - Dipping, immersion and pouring	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	

	<b>SAFETY DATA SHEET</b>	Page : 111 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

CS72 - Hand application - fingerpaints, pastels, adhesives	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.,OC17 - Limit the substance content in the product to 5 %.	
CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	2300
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,2
	Maximum daily site tonnage (kg/day):	3,2
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,98
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release prior to RMM):	0,01

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on	50

	<b>SAFETY DATA SHEET</b>	Page : 112 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	release following total wastewater treatment removal (kg/d):	
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 113 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 07

### Use in Oil and Gas field drilling and production operations

ES Ref.: 07  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B SU3 ERC4
Processes, tasks activities covered	Oil field well drilling operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance. Industrial use
Assessment method	ECETOC TRA

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they

	<b>SAFETY DATA SHEET</b>	Page : 114 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	E52 - Transfer via enclosed lines.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS115 - Drilling mud (re-)formulation	No other specific measures identified.	
CS116 - Drill floor operations	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS117 - Operation of solids filtering equipment, Elevated temperature	E71 - Provide the operation with a properly sited receiving hood.	
CS120 - Cleaning of solids filtering equipment	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Cuttings treatment and disposal	E54 - Provide extraction ventilation at points where emissions occur.	
CS2 - Process sampling	No other specific measures identified.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS9 - Pouring from small containers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS39 - Equipment cleaning and maintenance	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles	
<b>Product characteristics</b>		
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic	
<b>Operational conditions</b>		
Amount used	Fraction of EU tonnage used in region:	1
	Regional use tonnage (tons/year):	7750
	Fraction of Regional tonnage used locally:	Not applicable
	Annual site tonnage (tons/year):	Not applicable
	Maximum daily site tonnage (kg/day):	Not applicable
Frequency and duration of use	Number of emission days per year	not applicable
Environmental factors not influenced by risk management	Local marine water dilution factor:	Not applicable
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	Not applicable
	Release fraction to wastewater from process (initial release prior to RMM):	Not applicable

	<b>SAFETY DATA SHEET</b>	Page : 115 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Risk management measures

Technical conditions and measures at process level to prevent release	Discharge to aquatic environment is restricted (see Section 4.2).	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	not applicable	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	Not applicable
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	Not applicable
Organizational measures to prevent/limit release from the site	Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	not applicable
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	not applicable
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	not applicable
	Assumed domestic sewage treatment plant flow (m3/d):	not applicable
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment.,Qualitative approach used to conclude safe use.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Discharge to aquatic environment is restricted by law and industry prohibits release.
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 116 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 08

### Use in Oil and Gas field drilling and production operations

ES Ref.: 08  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B SU22 ERC8d
Processes, tasks activities covered	Oil field well drilling operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance. Professional use
Assessment method	ECETOC TRA

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B)

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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they

	<b>SAFETY DATA SHEET</b>	Page : 117 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS115 - Drilling mud (re-)formulation	No other specific measures identified.	
CS116 - Drill floor operations	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS117 - Operation of solids filtering equipment, Elevated temperature	E71 - Provide the operation with a properly sited receiving hood.	
CS120 - Cleaning of solids filtering equipment	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Cuttings treatment and disposal	E54 - Provide extraction ventilation at points where emissions occur.	
CS2 - Process sampling	No other specific measures identified.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS9 - Pouring from small containers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS39 - Equipment cleaning and maintenance	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8d)

ERC8d	Wide dispersive outdoor use of processing aids in open systems
-------	--

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	1
	Regional use tonnage (tons/year):	7750
	Fraction of Regional tonnage used locally:	Not applicable
	Annual site tonnage (tons/year):	Not applicable
	Maximum daily site tonnage (kg/day):	Not applicable
Frequency and duration of use	Number of emission days per year	not applicable
Environmental factors not influenced by risk management	Local marine water dilution factor:	Not applicable
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	Not applicable
	Release fraction to wastewater from process (initial release prior to RMM):	Not applicable

	<b>SAFETY DATA SHEET</b>	Page : 118 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Risk management measures

Technical conditions and measures at process level to prevent release	Discharge to aquatic environment is restricted (see Section 4.2).	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	not applicable	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	Not applicable
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	Not applicable
Organizational measures to prevent/limit release from the site	Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	not applicable
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	not applicable
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	not applicable
	Assumed domestic sewage treatment plant flow (m3/d):	not applicable
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment.,Qualitative approach used to conclude safe use.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Discharge to aquatic environment is restricted by law and industry prohibits release.
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 119 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 09

### lubricants

ES Ref.: 09  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17, PROC18 SU3 ERC4, ERC7 ESVOC SPERC 4.6a.v1
Processes, tasks activities covered	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17, PROC18)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is
---	--

	<b>SAFETY DATA SHEET</b>	Page : 120 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	E54 - Provide extraction ventilation at points where emissions occur.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS75 - Initial factory fill of equipment	PPE15 - Wear suitable gloves tested to EN374.	
CS17 - Operation and lubrication of high energy open equipment	E54 - Provide extraction ventilation at points where emissions occur.,E68 - Restrict area of openings to equipment.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.	
CS77 - Maintenance (of larger plant items) and machine set up	E66 - Ensure material transfers are under containment or extract ventilation.,E67 - Provide extract ventilation to emission points when contact with warm (>50oC) product is likely.,PPE15 - Wear suitable gloves tested to EN374.	
CS18 - Maintenance of small items	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS19 - Remanufacture of reject articles	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

	<b>SAFETY DATA SHEET</b>	Page : 121 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 2.2 Contributing scenario controlling environmental exposure (ERC4, ERC7)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	27000
	Fraction of Regional tonnage used locally:	0,0036
	Annual site tonnage (tons/year):	100
	Maximum daily site tonnage (kg/day):	5000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	20
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,005
	Release fraction to wastewater from process (initial release prior to RMM):	0,000003
	Release fraction to soil from process (initial release prior to RMM):	0,001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	70
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	78000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

	<b>SAFETY DATA SHEET</b>	Page : 122 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 123 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 10

### lubricants: Low environmental release

ES Ref.: 10
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20 SU22 ERC9a, ERC9b ESVOC SPERC 9.6b.v1
Processes, tasks activities covered	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions
PROC20	Heat and pressure transfer fluids in dispersive, professional use but closed systems

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where
---	--

	<b>SAFETY DATA SHEET</b>	Page : 124 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
Operation of equipment containing engine oils and similar	No other specific measures identified.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.,E40 - Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS81 - Dedicated facility	E64 - Use drum pumps or carefully pour from container.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS82 - Non-dedicated facility	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS17 - Operation and lubrication of high energy open equipment,OC8 - Indoor	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS17 - Operation and lubrication of high energy open equipment,OC9 - Outdoor	E69 - Ensure operation is undertaken outdoors.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.,OC18 - Limit the substance content in the product to 25 %.,PPE15 - Wear suitable gloves tested to EN374.,EI19 - Ensure operatives are trained to minimise exposures.	
CS77 - Maintenance (of larger plant items) and machine set up	E66 - Ensure material transfers are under containment or extract ventilation.,E67 - Provide extract ventilation to emission points when contact with warm (>50oC) product is likely.,PPE15 - Wear suitable gloves tested to EN374.	
CS18 - Maintenance of small items	E81 - Drain or remove substance from equipment prior to break-in or maintenance.,Provide a good standard of general ventilation (not less than 3 to 5	

	<b>SAFETY DATA SHEET</b>	Page : 125 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS78 - Engine lubricant service	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS10 - Spraying,with local exhaust ventilation	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.,E119 - Ensure operatives are trained to minimise exposures.	
CS10 - Spraying,Without local exhaust ventilation	PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE18 - Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.,OC18 - Limit the substance content in the product to 25 %.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	3200
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,6
	Maximum daily site tonnage (kg/day):	4,4
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release prior to RMM):	0,01

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	

	<b>SAFETY DATA SHEET</b>	Page : 126 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	68
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 127 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 11

### lubricants: High environmental release

ES Ref.: 11
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20 SU22 ERC8a, ERC8d ESVOC SPERC 8.6c.v1
Processes, tasks activities covered	Covers the use of formulated lubricants within closed or contained systems including incidental exposures during material transfers, operation of engines and similar articles, equipment maintenance and disposal of waste oil. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process
PROC18	Greasing at high energy conditions
PROC20	Heat and pressure transfer fluids in dispersive, professional use but closed systems

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where
---	--

	<b>SAFETY DATA SHEET</b>	Page : 128 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
Operation of equipment containing engine oils and similar	No other specific measures identified.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.,E40 - Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS81 - Dedicated facility	E64 - Use drum pumps or carefully pour from container.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.,CS82 - Non-dedicated facility	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS17 - Operation and lubrication of high energy open equipment,OC8 - Indoor	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
CS17 - Operation and lubrication of high energy open equipment,OC9 - Outdoor	E69 - Ensure operation is undertaken outdoors.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.,OC18 - Limit the substance content in the product to 25 %.,PPE15 - Wear suitable gloves tested to EN374.,EI19 - Ensure operatives are trained to minimise exposures.	
CS77 - Maintenance (of larger plant items) and machine set up	E66 - Ensure material transfers are under containment or extract ventilation.,E67 - Provide extract ventilation to emission points when contact with warm (>50oC) product is likely.,PPE15 - Wear suitable gloves tested to EN374.	
CS18 - Maintenance of small items	E81 - Drain or remove substance from equipment prior to break-in or maintenance.,Provide a good standard of general ventilation (not less than 3 to 5	

	<b>SAFETY DATA SHEET</b>	Page : 129 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS78 - Engine lubricant service	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS10 - Spraying	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.,E119 - Ensure operatives are trained to minimise exposures.,G16 - If technical measures not practical.,PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE18 - Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.,OC18 - Limit the substance content in the product to 25 %.,OC28 - Avoid carrying out activities involving exposure for more than 4 hours.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	3200
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,6
	Maximum daily site tonnage (kg/day):	4,4
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,15
	Release fraction to wastewater from process (initial release prior to RMM):	0,05
	Release fraction to soil from process (initial release prior to RMM):	0,05

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	

	<b>SAFETY DATA SHEET</b>	Page : 130 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	68
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 131 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 12

### Metal working fluids / rolling oils

ES Ref.: 12  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17 SU3 ERC4 ESVOC SPERC 4.7a.v1
Processes, tasks activities covered	Covers the use in formulated MWFs (MWFs)/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8A, PROC8B, PROC9, PROC10, PROC13, PROC17)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions and in partly open process

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking
---	--

	<b>SAFETY DATA SHEET</b>	Page : 132 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	E54 - Provide extraction ventilation at points where emissions occur.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.,PPE15 - Wear suitable gloves tested to EN374.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No other specific measures identified.	
CS79 - Metal machining operations	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
CS35 - Treatment by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS80 - Automated metal rolling/forming	E49 - Handle substance within a predominantly closed system provided with extract ventilation.	
CS83 - Semi-automated metal rolling/forming	E54 - Provide extraction ventilation at points where emissions occur.	
CS39 - Equipment cleaning and maintenance	E55 - Drain down and flush system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

	<b>SAFETY DATA SHEET</b>	Page : 133 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	10000
	Fraction of Regional tonnage used locally:	0,0097
	Annual site tonnage (tons/year):	100
	Maximum daily site tonnage (kg/day):	5000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	20
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,02
	Release fraction to wastewater from process (initial release prior to RMM):	0,000003
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	70
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	78000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

### 3.1. Health

Information for contributing exposure scenario
--

	<b>SAFETY DATA SHEET</b>	Page : 134 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
-----	---

**3.2. Environment**

Information for contributing exposure scenario:

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

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

**4.1. Health**

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

**4.2. Environment**

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 135 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 13

### Use as binders and release agents

ES Ref.: 13
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8B, PROC10, PROC13, PROC14 SU3 ERC4 ESVOC SPERC 4.10a.v1
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application (including spraying and brushing) and handling of waste. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8B, PROC10, PROC13, PROC14)

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
PROC6	Calendering operations
PROC7	Industrial spraying
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
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of
---	---

	<b>SAFETY DATA SHEET</b>	Page : 136 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS14 - Bulk transfers	E47 - Handle substance within a closed system.	
CS8 - Drum/batch transfers	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS29 - Mixing operations (closed systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS31 - Mold forming	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS32 - Casting operations,CS108 - (open systems)	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying,CS33 - Machine	E61 - Minimise exposure by extracted full enclosure for the operation or equipment.,PPE15 - Wear suitable gloves tested to EN374.	
CS10 - Spraying,CS34 - Manual	PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,E119 - Ensure operatives are trained to minimise exposures.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 137 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	14000
	Fraction of Regional tonnage used locally:	0,18
	Annual site tonnage (tons/year):	2500
	Maximum daily site tonnage (kg/day):	25000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	100
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	1
	Release fraction to wastewater from process (initial release prior to RMM):	0,0000003
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	80
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	170000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

### 3.1. Health

Information for contributing exposure scenario

2.1 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario:

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

	<b>SAFETY DATA SHEET</b>	Page : 138 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

#### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

##### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

##### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 139 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 14

### Use as binders and release agents

ES Ref.: 14
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC8A, PROC8B, PROC10, PROC11, PROC14 SU22 ERC8a, ERC8d ESVOC SPERC 8.10b.v1
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8A, PROC8B, PROC10, PROC11, PROC14)

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
PROC6	Calendering operations
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
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up
---	--

	<b>SAFETY DATA SHEET</b>	Page : 140 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS14 - Bulk transfers,CS107 - (closed systems)	No other specific measures identified.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS29 - Mixing operations (closed systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS31 - Mold forming	PPE15 - Wear suitable gloves tested to EN374.,E54 - Provide extraction ventilation at points where emissions occur.	
CS32 - Casting operations,with local exhaust ventilation	E54 - Provide extraction ventilation at points where emissions occur.,PPE15 - Wear suitable gloves tested to EN374.	
CS32 - Casting operations,Without local exhaust ventilation	PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,PPE29 - Wear a respirator conforming to EN140 with Type A/P2 filter or better.	
CS10 - Spraying,CS34 - Manual,with local exhaust ventilation	E57 - Carry out in a vented booth or extracted enclosure.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,EI19 - Ensure operatives are trained to minimise exposures.	
CS10 - Spraying,CS34 - Manual,Without local exhaust ventilation	PPE32 - Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.,EI19 - Ensure operatives are trained to minimise exposures.	
CS34 - Manual,CS51 - Rolling, Brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d)

ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

	<b>SAFETY DATA SHEET</b>	Page : 141 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	2900
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	1,5
	Maximum daily site tonnage (kg/day):	4
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,95
	Release fraction to wastewater from process (initial release prior to RMM):	0,025
	Release fraction to soil from process (initial release prior to RMM):	0,025

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	62
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

## 3. Exposure estimation and reference to its source

### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

	<b>SAFETY DATA SHEET</b>	Page : 142 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

#### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

##### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

##### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 143 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 15

### Use as a fuel

ES Ref.: 15
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16 SU3 ERC7 ESVOC SPERC 7.12a.v1
Processes, tasks activities covered	Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16)

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)
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
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves

	<b>SAFETY DATA SHEET</b>	Page : 144 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
Use as a fuel,CS107 - (closed systems)	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	4500000
	Fraction of Regional tonnage used locally:	0,34
	Annual site tonnage (tons/year):	1500000
	Maximum daily site tonnage (kg/day):	5000000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,005
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from process (initial release prior to RMM):	0

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	95
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	97,7
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	60,4
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	

	<b>SAFETY DATA SHEET</b>	Page : 145 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	97,7
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	5000000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls.,Combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario

2.1 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:

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

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 146 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 16

### Use as a fuel

ES Ref.: 16
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16 SU22 ERC9a, ERC9b ESVOC SPERC 9.12b.v1
Processes, tasks activities covered	Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16)

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)
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
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves

	<b>SAFETY DATA SHEET</b>	Page : 147 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers	E64 - Use drum pumps or carefully pour from container.,PPE15 - Wear suitable gloves tested to EN374.	
refuelling	PPE15 - Wear suitable gloves tested to EN374.	
Use as a fuel,CS107 - (closed systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).,or,E69 - Ensure operation is undertaken outdoors.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	6700000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	3300
	Maximum daily site tonnage (kg/day):	9200
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,0001
	Release fraction to wastewater from process (initial release prior to RMM):	0,00001
	Release fraction to soil from process (initial release prior to RMM):	0,00001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).,No wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	0
	If discharging to domestic sewage treatment plant,	0

	<b>SAFETY DATA SHEET</b>	Page : 148 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	provide the required onsite wastewater removal efficiency of $\geq$ (%):	
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	140000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls.,Combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 149 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 17

### Use as a fuel

ES Ref.: 17
ES Type: consumer

Use descriptors	PC13 SU21 ERC9a, ERC9b ESVOC SPERC 9.12c.v1
Processes, tasks activities covered	Covers consumer uses in liquid fuels. Consumer use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario consumer end-use (PC13)

PC13	Fuels
------	-------

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	OC15 - Liquid, vapour pressure > 10 Pa

#### Operational conditions

Frequency and duration of use	unless stated differently.,Covers use up to (g)	37500
	Covers skin contact area up to (cm2)	420
Other given operational conditions affecting consumers exposure	Unless otherwise stated,Covers use up to	0,143Uses per day
	Covers exposure up to	2Hours/event
	PC13 - Fuels,Liquid: Automotive Refuelling	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 52. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 210 cm2. For each use event, covers use amounts up to: 37500 g. Covers outdoor use. Covers use in room size of 100 m3. Covers exposure up to 0,05. Hours/event
	PC13 - Fuels,Liquid Garden Equipment - Use	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 26. days/year. covers use up to 1 time/on day of use. For each use event, covers use amounts up to: 750 g. Covers outdoor use. Covers use in room size of 100 m3. Covers exposure up to 2,00. Hours/event
	PC13 - Fuels,Liquid: Garden Equipment - Refuelling	Unless otherwise stated. Covers concentrations up to 100%. Covers use up to 26. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to 420 cm2. For each use event, covers use amounts up to: 750

	<b>SAFETY DATA SHEET</b>	Page : 150 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

		g. Covers use in a one car garage (34 m3) under typical ventilation. Covers use in room size of 34m3. Covers exposure up to 0,03. Hours/event
--	--	---

#### Risk management measures

##### Other risk management measures:

PC13 - Fuels,Liquid: Automotive Refuelling	No specific risk management measure identified beyond those operational conditions stated.	
PC13 - Fuels,Liquid Garden Equipment - Use	No specific risk management measure identified beyond those operational conditions stated.	
PC13 - Fuels,Liquid: Garden Equipment - Refuelling	No specific risk management measure identified beyond those operational conditions stated.	

#### 2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems

#### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

#### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	16000000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	8200
	Maximum daily site tonnage (kg/day):	23000
Frequency and duration of use	Continuous use/release.	
	Emission days (days/year):	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).	
	Release fraction to air from wide dispersive use (regional only):	0,0001
	Release fraction to wastewater from wide dispersive use:	0,00001
	Release fraction to soil from wide dispersive use (regional only):	0,00001

#### Risk management measures

Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	350000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls.,Combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario
--

	<b>SAFETY DATA SHEET</b>	Page : 151 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

2.1	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. Where exposure determinants differ to these source, then they are indicated.
-----	---

**3.2. Environment**

Information for contributing exposure scenario:

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

**4.1. Health**

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
-------------------	--

**4.2. Environment**

Guidance - Environment	Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 152 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 18

### Functional Fluids

ES Ref.: 18
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9 SU3 ERC7 ESVOC SPERC 7.13a.v1
Processes, tasks activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9)

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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

#### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
---	---

	<b>SAFETY DATA SHEET</b>	Page : 153 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
CS14 - Bulk transfers	No other specific measures identified.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS84 - Filling of articles/equipment,CS107 - (closed systems)	E52 - Transfer via enclosed lines.	
CS45 - Filling/ preparation of equipment from drums or containers.	PPE15 - Wear suitable gloves tested to EN374.	
equipment operation,CS107 - (closed systems)	No other specific measures identified.	
equipment operation,CS108 - (open systems)	restrict area of openings and provide extract ventilation to emission points when substance handled at elevated temperatures	
CS86 - Rework of articles,CS19 - Remanufacture of reject articles	PPE15 - Wear suitable gloves tested to EN374.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	6400
	Fraction of Regional tonnage used locally:	0,0016
	Annual site tonnage (tons/year):	10
Frequency and duration of use	Maximum daily site tonnage (kg/day):	500
	Continuous use/release.	
Environmental factors not influenced by risk management	Number of emission days per year	20
	Local freshwater dilution factor:	10
Other given operational conditions affecting environmental exposure	Local marine water dilution factor:	100
	Release fraction to air from process (initial release prior to RMM):	0,005
	Release fraction to wastewater from process (initial release prior to RMM):	0,000003
	Release fraction to soil from process (initial release prior to RMM):	0,001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion),.No wastewater treatment required.	

	<b>SAFETY DATA SHEET</b>	Page : 154 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	Treat air emission to provide a typical removal efficiency of (%):	0
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%):	0
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	7800
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 155 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 19

### Road and construction applications

ES Ref.: 19
ES Type: Worker

Use descriptors	PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13 SU22 ERC8d, ERC8f ESVOC SPERC 8.15.v1
Processes, tasks activities covered	Application of surface coatings and binders in road and construction activities, including paving uses, manual mastic and in the application of roofing and water-proofing membranes. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC8A, PROC8B, PROC9, PROC10, PROC11, PROC13)

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)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.,Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves

	<b>SAFETY DATA SHEET</b>	Page : 156 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	(tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS8 - Drum/batch transfers,CS82 - Non-dedicated facility	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers,CS81 - Dedicated facility	PPE15 - Wear suitable gloves tested to EN374.	
CS25 - Spraying/ fogging by machine application	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.,E69 - Ensure operation is undertaken outdoors.,PPE15 - Wear suitable gloves tested to EN374.	
Roller application or brushing	PPE17 - Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
CS4 - Dipping, immersion and pouring	PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8d, ERC8f)

ERC8d	Wide dispersive outdoor use of processing aids in open systems
ERC8f	Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	31000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	15
	Maximum daily site tonnage (kg/day):	42
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,95
	Release fraction to wastewater from process (initial release prior to RMM):	0,01
	Release fraction to soil from process (initial release prior to RMM):	0,04

### Risk management measures

Technical conditions and measures at process level to	Common practices vary across sites thus conservative process release estimates used.
---	--

	<b>SAFETY DATA SHEET</b>	Page : 157 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

prevent release		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	12,2
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	620
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

	<b>SAFETY DATA SHEET</b>	Page : 158 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 20

### Explosives manufacture & use

ES Ref.: 20
ES Type: Worker

Use descriptors	PROC1, PROC3, PROC5, PROC8A, PROC8B SU22 ERC8e
Processes, tasks activities covered	Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer, mixing and charging) and equipment cleaning. Professional use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC5, PROC8A, PROC8B)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
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

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance

	<b>SAFETY DATA SHEET</b>	Page : 159 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	E47 - Handle substance within a closed system.	
CS16 - General exposures (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS2 - Process sampling	No specific measures identified.	
CS8 - Drum/batch transfers	E64 - Use drum pumps or carefully pour from container.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS14 - Bulk transfers	PPE15 - Wear suitable gloves tested to EN374.,E47 - Handle substance within a closed system.	
CS30 - Mixing operations (open systems)	E54 - Provide extraction ventilation at points where emissions occur.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
CS100 - Production or preparation of articles by tableting, compression, extrusion or pelletisation	PPE15 - Wear suitable gloves tested to EN374.	
CS8 - Drum/batch transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS36 - Laboratory activities	No specific measures identified.	
CS39 - Equipment cleaning and maintenance	E65 - Drain down system prior to equipment opening or maintenance.,PPE16 - Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC8e)

ERC8e	Wide dispersive outdoor use of reactive substances in open systems
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	13000
	Fraction of Regional tonnage used locally:	0,0005
	Annual site tonnage (tons/year):	6,7
	Maximum daily site tonnage (kg/day):	18
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,001
	Release fraction to wastewater from process (initial release prior to RMM):	0,02
	Release fraction to soil from process (initial release prior to RMM):	0,01

	<b>SAFETY DATA SHEET</b>	Page : 160 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	8,8
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	290
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.	

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
------------------------	--

	<b>SAFETY DATA SHEET</b>	Page : 161 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

## 1. Exposure scenario 21

### Rubber production and processing

ES Ref.: 21  
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8A, PROC8B, PROC9, PROC13, PROC14, PROC15, PROC21 SU3, SU10, SU11 ERC1, ERC4, ERC6d ESVOC SPERC 4.19.v1
Processes, tasks activities covered	Manufacture of tyres and general rubber articles within closed or contained systems, including incidental exposures during processing of raw (uncured) rubber, handling and mixing of rubber additives, calendaring, vulcanising, cooling and finishing as well as maintenance. Industrial use
Assessment method	ECETOC TRA The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 2. Operational conditions and risk management measures

### 2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8A, PROC8B, PROC9, PROC13, PROC14, PROC15, PROC21)

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)
PROC6	Calendering operations
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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC21	Low energy manipulation of substances bound in materials and/or articles

#### Product characteristics

Physical form	Liquid
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Vapour pressure	Liquid, vapour pressure < 0,5 kPa at STP.

#### Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

#### Risk management measures

##### Other risk management measures:

General measures applicable to all activities	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good
---	---

	<b>SAFETY DATA SHEET</b>	Page : 162 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.,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.	
CS14 - Bulk transfers,CS107 - (closed systems)	No other specific measures identified.	
CS14 - Bulk transfers,CS108 - (open systems)	PPE15 - Wear suitable gloves tested to EN374.	
CS3 - Material transfers	PPE15 - Wear suitable gloves tested to EN374.	
CS91 - Bulk weighing	PPE15 - Wear suitable gloves tested to EN374.,No other specific measures identified.	
CS90 - Small scale weighing	PPE15 - Wear suitable gloves tested to EN374.	
CS92 - Additive premixing	PPE15 - Wear suitable gloves tested to EN374.	
CS64 - Calendering (including Banburys)	E49 - Handle substance within a predominantly closed system provided with extract ventilation.,PPE15 - Wear suitable gloves tested to EN374.	
CS73 - Pressing uncured rubber blanks	PPE15 - Wear suitable gloves tested to EN374.	
CS112 - Tyre build up	E61 - Minimise exposure by extracted full enclosure for the operation or equipment.,PPE23 - Wear suitable gloves (tested to EN374), coverall and eye protection.	
CS70 - Vulcanisation	E82 - Provide extract ventilation to material transfer points and other openings.	
CS71 - Cooling cured articles	E60 - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.	
Treatment of articles by dipping and pouring	PPE15 - Wear suitable gloves tested to EN374.	
CS102 - Finishing operations	PPE15 - Wear suitable gloves tested to EN374.	
CS36 - Laboratory activities	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	E81 - Drain or remove substance from equipment prior to break-in or maintenance.,PPE16 - Wear	

	<b>SAFETY DATA SHEET</b>	Page : 163 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

	chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Storage	E84 - Store substance within a closed system.	

## 2.2 Contributing scenario controlling environmental exposure (ERC1, ERC4, ERC6d)

ERC1	Manufacture of substances
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
Assessment method	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### Product characteristics

Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic
-------------------------------	--

### Operational conditions

Amount used	Fraction of EU tonnage used in region:	0,1
	Regional use tonnage (tons/year):	16000
	Fraction of Regional tonnage used locally:	1
	Annual site tonnage (tons/year):	16000
	Maximum daily site tonnage (kg/day):	52000
Frequency and duration of use	Continuous use/release.	
	Number of emission days per year	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0,01
	Release fraction to wastewater from process (initial release prior to RMM):	0,00003
	Release fraction to soil from process (initial release prior to RMM):	0,0001

### Risk management measures

Technical conditions and measures at process level to prevent release	Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater sediment.,If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of (%):	0
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):	52,8
	If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%):	0
Organizational measures to prevent/limit release from the site	Prevent discharge of undissolved substance to or recover from onsite wastewater.,Do not apply industrial sludge to natural soils.,Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	94,1
	Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	94,1
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	420000
	Assumed domestic sewage treatment plant flow (m3/d):	2000
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national	

	<b>SAFETY DATA SHEET</b>	Page : 164 / 163
		Revision nr : 1
	<b>CAS 68334-30-5</b>	Issuing date : 27/09/2012
		Supersedes :

Conditions and measures related to external recovery of waste	regulations. External recovery and recycling of waste should comply with applicable local and/or national regulations.	
---	---	--

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

#### 3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### 3.2. Environment

Information for contributing exposure scenario:	
2.2	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### 4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.,Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.,Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.,Available hazard data do not support the need for a DNEL to be established for other health effects.,Risk Management Measures are based on qualitative risk characterisation.
-------------------	--

#### 4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.,Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.,Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.,Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ).
------------------------	---

# SUMMARY OF CHANGES

For 68334-30-5

---

The following changes have been made to this eSDS:

**Version 1.0 updated to Version 1.0 - 21 Jan 2013**

- Sections 2-16 updated

**Version - updated to Version 1.0 - 23 Nov 2012**

- Sections 2-16 updated



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
1/13

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

**1.1 Product identifier**

**Product name:** Hydrogen, compressed

**Trade name:** Hydrogen 3.0, Hydrogen 3.0 Industri, Hydrogen 3.8, Hydrogen 4.0, Hydrogen 4.0 SWAP BODY, Hydrogen 4.5 Chemical, Hydrogen 4.5 Instrument, Hydrogen 4.5 TRACE, Hydrogen 5.0 Detector, Hydrogen 5.5 Laboratory, Hydrogen 5.6 HiQ, Hydrogen 5.7 SRH, Hydrogen 6.0 SCIENTIFIC, HIQ HYDROGEN 6.0

**Additional identification**

**Chemical name:** Hydrogen

**Chemical formula:** H<sub>2</sub>

**INDEX No.** 001-001-00-9

**CAS-No.** 1333-74-0

**EC No.** 215-605-7

**REACH Registration No.** Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.

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

**Identified uses:** Industrial and professional. Perform risk assessment prior to use. Aerosol propellant. Balance gas for mixtures. Calibration gas. Carrier gas. Chemical synthesis. Combustion, melting and cutting processes. Fuel cells. Fuel gas for welding, cutting, heating, brazing and soldering applications. Laboratory use. Laser gas. Process gas. Test gas. Consumer use.

**Uses advised against:** Fuel gas Propellant gas. Shielding gas in gas welding. This gas is not intended to be filled into balloons for consumer use and advertising purposes because of the danger of explosion. Do not inflate commercial balloons.

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

**Supplier**  
Linde Gas AS  
Postboks 13 Nydalen  
N-0409 Oslo Norway

**Telephone:** +4723177200

**E-mail:** sds.ren@linde.com

**1.4 Emergency telephone number:** +47 22 59 13 00 (24h - Giftinformasjonssentralen)



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
2/13

**SECTION 2: Hazards identification**

**2.1 Classification of the substance or mixture**

Classification according to Regulation (EC) No 1272/2008 as amended.

**Physical Hazards**

Flammable gas	Category 1	H220: Extremely flammable gas.
Gases under pressure	Compressed gas	H280: Contains gas under pressure; may explode if heated.

**2.2 Label Elements**



**Signal Words:** Danger

**Hazard Statement(s):** H220: Extremely flammable gas.  
H280: Contains gas under pressure; may explode if heated.

**Precautionary Statements**

<b>Prevention:</b>	P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
<b>Response:</b>	P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: In case of leakage, eliminate all ignition sources.
<b>Storage:</b>	P403: Store in a well-ventilated place.
<b>Disposal:</b>	None.

**2.3 Other hazards:** None.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
3/13

**SECTION 3: Composition/information on ingredients**

**3.1 Substances**

<b>Chemical name</b>	Hydrogen
<b>INDEX No.:</b>	001-001-00-9
<b>CAS-No.:</b>	1333-74-0
<b>EC No.:</b>	215-605-7
<b>REACH Registration No.:</b>	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.
<b>Purity:</b>	100% The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.
<b>Trade name:</b>	Hydrogen 3.0, Hydrogen 3.0 Industri, Hydrogen 3.8, Hydrogen 4.0, Hydrogen 4.0 SWAP BODY, Hydrogen 4.5 Chemical, Hydrogen 4.5 Instrument, Hydrogen 4.5 TRACE, Hydrogen 5.0 Detector, Hydrogen 5.5 Laboratory, Hydrogen 5.6 HiQ, Hydrogen 5.7 SRH, Hydrogen 6.0 SCIENTIFIC, HIQ HYDROGEN 6.0

**SECTION 4: First aid measures**

**General:** In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

**4.1 Description of first aid measures**

**Inhalation:** In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

**Eye contact:** Adverse effects not expected from this product.

**Skin Contact:** Adverse effects not expected from this product.

**Ingestion:** Ingestion is not considered a potential route of exposure.

**4.2 Most important symptoms and effects, both acute and delayed:** Respiratory arrest.

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

**Hazards:** None.

**Treatment:** None.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
4/13

**SECTION 5: Firefighting measures**

**General Fire Hazards:** Heat may cause the containers to explode.

**5.1 Extinguishing media**

**Suitable extinguishing media:** Water. Dry powder. Foam.

**Unsuitable extinguishing media:** Carbon Dioxide.

**5.2 Special hazards arising from the substance or mixture:** None.

**Hazardous Combustion Products:** None.

**5.3 Advice for firefighters**

**Special fire fighting procedures:** In case of fire: Stop leak if safe to do so. Do not extinguish flames at leak because possibility of uncontrolled explosive reignition exists. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

**Special protective equipment for fire-fighters:** Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

**SECTION 6: Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures:** Evacuate area. Provide adequate ventilation. Consider the risk of potentially explosive atmospheres. In case of leakage, eliminate all ignition sources. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

**6.2 Environmental Precautions:** Prevent further leakage or spillage if safe to do so.

**6.3 Methods and material for containment and cleaning up:** Provide adequate ventilation. Eliminate sources of ignition.

**6.4 Reference to other sections:** Refer to sections 8 and 13.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
5/13

**SECTION 7: Handling and storage:**

- 7.1 Precautions for safe handling:** Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Purge air from system before introducing gas. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Assess the risk of a potentially explosive atmosphere and the need for suitable equipment i.e. explosion-proof. Take precautionary measures against static discharges. Keep away from ignition sources (including static discharges). Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres. Use non-sparking tools. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure the complete system has been (or is regularly) checked for leaks before use. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.
- 7.2 Conditions for safe storage, including any incompatibilities:** All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Segregate from oxidant gases and other oxidants being stored. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.
- 7.3 Specific end use(s):** None.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
 Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
 6/13

**SECTION 8: Exposure controls/personal protection**

**8.1 Control Parameters**

**Occupational Exposure Limits**

None of the components have assigned exposure limits.

**8.2 Exposure controls**

**Appropriate engineering controls:**

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below lower explosion limits. Gas detectors should be used when quantities of flammable gases or vapours may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system. Only use permanent leak tight installations (e.g. welded pipes). Take precautionary measures against static discharges.

**Individual protection measures, such as personal protective equipment**

**General information:**

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment. Do not eat, drink or smoke when using the product.

**Eye/face protection:**

Wear eye protection to EN 166 when using gases.  
 Guideline: EN 166 Personal Eye Protection.

**Skin protection**

**Hand Protection:**

Wear working gloves while handling containers  
 Guideline: EN 388 Protective gloves against mechanical risks.

**Body protection:**

Wear fire resistant or flame retardant clothing.  
 Guideline: ISO/TR 2801:2007 Clothing for protection against heat and flame -- General recommendations for selection, care and use of protective clothing.

**Other:**

Wear safety shoes while handling containers  
 Guideline: ISO 20345 Personal protective equipment - Safety footwear.

**Respiratory Protection:**

Not required.

**Thermal hazards:**

No precautionary measures are necessary.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
7/13

**Hygiene measures:** Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

**Environmental exposure controls:** For waste disposal, see section 13 of the SDS.

**SECTION 9: Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

**Appearance**

<b>Physical state:</b>	Gas
<b>Form:</b>	Compressed gas
<b>Color:</b>	Colorless
<b>Odor:</b>	Odorless
<b>Odor Threshold:</b>	Odor threshold is subjective and is inadequate to warn of over exposure.
<b>pH:</b>	Not applicable.
<b>Melting Point:</b>	-259,2 °C
<b>Boiling Point:</b>	-253 °C
<b>Sublimation Point:</b>	Not applicable.
<b>Critical Temp. (°C):</b>	-240,0 °C
<b>Flash Point:</b>	Not applicable to gases and gas mixtures.
<b>Evaporation Rate:</b>	Not applicable to gases and gas mixtures.
<b>Flammability (solid, gas):</b>	Flammable Gas
<b>Flammability Limit - Upper (%):</b>	77 %(V)
<b>Flammability Limit - Lower (%):</b>	4 %(V)
<b>Vapor pressure:</b>	No reliable data available.
<b>Vapor density (air=1):</b>	0,069
<b>Relative density:</b>	0,07
<b>Solubility(ies)</b>	
<b>Solubility in Water:</b>	1,62 mg/l
<b>Partition coefficient (n-octanol/water):</b>	Not known.
<b>Autoignition Temperature:</b>	560 °C
<b>Decomposition Temperature:</b>	Not known.
<b>Viscosity</b>	
<b>Kinematic viscosity:</b>	No data available.
<b>Dynamic viscosity:</b>	No data available.
<b>Explosive properties:</b>	Not applicable.
<b>Oxidizing properties:</b>	Not applicable.

**9.2 Other information:** None.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
8/13

Molecular weight: 2,02 g/mol (H<sub>2</sub>)

**SECTION 10: Stability and reactivity**

- 10.1 Reactivity: No reactivity hazard other than the effects described in sub-section below.
- 10.2 Chemical Stability: Stable under normal conditions.
- 10.3 Possibility of hazardous reactions: Can form a potentially explosive atmosphere in air. May react violently with oxidants.
- 10.4 Conditions to avoid: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- 10.5 Incompatible Materials: Air and oxidizers. For material compatibility see latest version of ISO-11114.
- 10.6 Hazardous Decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**SECTION 11: Toxicological information**

General information: None.

**11.1 Information on toxicological effects**

- Acute toxicity - Oral Product: Based on available data, the classification criteria are not met.
- Acute toxicity - Dermal Product: Based on available data, the classification criteria are not met.
- Acute toxicity - Inhalation Product: Based on available data, the classification criteria are not met.
- Skin Corrosion/Irritation Product: Based on available data, the classification criteria are not met.
- Serious Eye Damage/Eye Irritation Product: Based on available data, the classification criteria are not met.
- Respiratory or Skin Sensitization Product: Based on available data, the classification criteria are not met.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
9/13

<b>Germ Cell Mutagenicity Product</b>	Based on available data, the classification criteria are not met.
<b>Carcinogenicity Product</b>	Based on available data, the classification criteria are not met.
<b>Reproductive toxicity Product</b>	Based on available data, the classification criteria are not met.
<b>Specific Target Organ Toxicity - Single Exposure Product</b>	Based on available data, the classification criteria are not met.
<b>Specific Target Organ Toxicity - Repeated Exposure Product</b>	Based on available data, the classification criteria are not met.
<b>Aspiration Hazard Product</b>	Not applicable to gases and gas mixtures..

**SECTION 12: Ecological information**

**12.1 Toxicity**

**Acute toxicity Product** No ecological damage caused by this product.

**12.2 Persistence and Degradability**

**Product** Not applicable to gases and gas mixtures..

**12.3 Bioaccumulative potential**

**Product** The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

**12.4 Mobility in soil**

**Product** Because of its high volatility, the product is unlikely to cause ground or water pollution.

**12.5 Results of PBT and vPvB assessment**

**Product** Not classified as PBT or vPvB.

**12.6 Other adverse effects:**

**Global Warming Potential**

Global warming potential: 6  
Contains greenhouse gas(es). When discharged in large quantities may contribute to the greenhouse effect.

Hydrogen

EU. Non-Fluorinated Substance GWPs (Annex IV), Regulation 517/2014/EU on fluorinated greenhouse gases



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
10/13

- Global warming potential: 6

**SECTION 13: Disposal considerations**

**13.1 Waste treatment methods**

**General information:** Do not discharge into any place where its accumulation could be dangerous. Consult supplier for specific recommendations. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor.

**Disposal methods:** Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

**European Waste Codes**

**Container:** 16 05 04\*: Gases in pressure containers (including halons) containing dangerous substances.

**SECTION 14: Transport information**

**ADR**

14.1 UN Number: UN 1049  
14.2 UN Proper Shipping Name: HYDROGEN, COMPRESSED  
14.3 Transport Hazard Class(es)  
Class: 2  
Label(s): 2.1  
Hazard No. (ADR): 23  
Tunnel restriction code: (B/D)  
14.4 Packing Group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -

**RID**

14.1 UN Number: UN 1049  
14.2 UN Proper Shipping Name: HYDROGEN, COMPRESSED  
14.3 Transport Hazard Class(es)  
Class: 2  
Label(s): 2.1  
14.4 Packing Group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
11/13

**IMDG**

14.1 UN Number: UN 1049  
14.2 UN Proper Shipping Name: HYDROGEN, COMPRESSED  
14.3 Transport Hazard Class(es)  
Class: 2.1  
Label(s): 2.1  
EmS No.: F-D, S-U  
14.4 Packing Group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -

**IATA**

14.1 UN Number: UN 1049  
14.2 Proper Shipping Name: Hydrogen, compressed  
14.3 Transport Hazard Class(es):  
Class: 2.1  
Label(s): 2.1  
14.4 Packing Group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -  
Other information  
Passenger and cargo aircraft: Forbidden.  
Cargo aircraft only: Allowed.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code:** Not applicable

**Additional identification:** Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

**SECTION 15: Regulatory information**

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

**EU Regulations**

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

Chemical name	CAS-No.	Concentration
Hydrogen	1333-74-0	100%



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
12/13

EU. Directive 2012/18/EU (SEVESO III) on major accident hazards involving dangerous substances, as amended.:

Chemical	CAS-No.	Lower-tier Requirements	Upper-tier Requirements
Hydrogen	1333-74-0	5 t	50 t

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	CAS-No.	Concentration
Hydrogen	1333-74-0	100%

**National Regulations**

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 89/686/EEC on personal protective equipment Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX) Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.  
This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

**SECTION 16: Other information**

Revision Information: Not relevant.



**SAFETY DATA SHEET**  
**Hydrogen, compressed**

Issue Date: 16.01.2013  
 Last revised date: 30.03.2020

Version: 1.1

SDS No.: 000010021694  
 13/13

**Key literature references and sources for data:**

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:  
 Agency for Toxic Substances and Diseases Registry (ATSDR) (<http://www.atsdr.cdc.gov/>).  
 European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.  
 European Chemical Agency: Information on Registered Substances <http://apps.echa.europa.eu/registered/registered-sub.aspx#search>  
 European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.  
 International Programme on Chemical Safety (<http://www.inchem.org/>)  
 ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.  
 Matheson Gas Data Book, 7th Edition.  
 National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.  
 The ESIS (European chemical Substances Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).  
 The European Chemical Industry Council (CEFIC) ERICards.  
 United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)  
 Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).  
 Substance specific information from suppliers.  
 Details given in this document are believed to be correct at the time of publication.

**Wording of the H-statements in section 2 and 3**

H220 Extremely flammable gas.  
 H280 Contains gas under pressure; may explode if heated.

**Classification according to Regulation (EC) No 1272/2008 as amended.**

Flam. Gas 1, H220  
 Press. Gas Compr. Gas, H280

**Other information:**

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Ensure equipment is adequately earthed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

**Last revised date:**

30.03.2020

**Disclaimer:**

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.



## SAFETY DATA SHEET

### SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

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

##### 1.1. Product identifier

<b>Product name</b>	SODIUM HYPOCHLORITE SOLUTION 5% - < 20%
<b>Product number</b>	47852
<b>Synonyms; trade names</b>	BLEACH, HYPO, BRIDOS, EUROCHLOR, EVERCHLOR CLEAR, SODIUM HYPOCHLORITE SOLUTION > 2.5%, SOD HYPOCHLORITE 14/15%, SOD HYPOCHLORITE 14/15% SLY, SOD HYPOCHLORITE 5%, SODIUM HYPOCHLORITE 12 %, SODIUM HYPOCHLORITE 15% SOLUTION, SODIUM HYPOCHLORITE SOLUTION 16 - 18 %, SODIUM HYPOCHLORITE 7% SOLUTION, SODIUM HYPOCHLORITE 13% SOLUTION, SODIUM HYPOCHLORITE SOLUTION > 10%, SODIUM HYPOCHLORITE, GE6078360, GE6078364, GE6078358 SODIUM HYPOCHLORITE SOLUTION 14/15 %, GE6078358, GE6078363, GE6078365, GE6078359, SODIUM HYPOCHLORITE 15% UNI 901:2007, SODIUM HYPOCHLORITE 18% UNI 901:2007, SODIUM HYPOCHLORITE 12% UNI 901:2007, SOD HYPOCHLORITE 6% SOL, SODIUM HYPOCHLORITE 14%, BIOTREAT 4549, SODIUM HYPOCHLORITE 7.5% SOLUTION, SODIUM HYPOCHLORITE 14/15%, SODIUM HYPOCHLORITE LOW BROMATE, SOD HYPOCHLORITE 14/15% AKZO, SODIUM HYPOCHLORITE 150 g/l, CHLOROT(NATRIUMHYPOCHLORITE8%), SODIUM HYPOCHLORITE SOLUTION 47 - 50, BRIDOS CHLOR LIQ BLACK, BIOSPERSE 3001, BROMAX, HYPOCHLORITE SDE 55 HT (SODIUM HYPOCHLORITE), SODIUM HYPO 14/15% ULB, JAVEL 47 50 TYPE 1, SODIUM HYPOCHLORITE 58% PCL, JAVEL 58%
<b>REACH registration number</b>	01-2119488154-34-XXXX
<b>CAS number</b>	7681-52-9
<b>EU index number</b>	017-011-00-1
<b>EC number</b>	231-668-3

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

<b>Identified uses</b>	Detergent. Cleaning agent. Disinfectant. Chemical Intermediate For further information, see attached Exposure Scenario.
------------------------	---

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

<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com
-----------------	---

##### 1.4. Emergency telephone number

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

**Emergency telephone**                      SGS - +32 (0)3 575 55 55 (24h)

**Sds No.**    47852

### SECTION 2: Hazards identification

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

##### Classification (EC 1272/2008)

**Physical hazards**                              Met. Corr. 1 - H290  
**Health hazards**                                Skin Corr. 1B - H314 Eye Dam. 1 - H318  
**Environmental hazards**                      Aquatic Acute 1 - H400 Aquatic Chronic 2 - H411

#### 2.2. Label elements

**EC number**                                        231-668-3

##### **Hazard pictograms**



**Signal word**                                      Danger

**Hazard statements**                            H290 May be corrosive to metals.  
 H314 Causes severe skin burns and eye damage.  
 H400 Very toxic to aquatic life.  
 H411 Toxic to aquatic life with long lasting effects.

**Precautionary statements**                P234 Keep only in original packaging.  
 P260 Do not breathe vapour/ spray.  
 P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  
 P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P501 Dispose of contents/ container in accordance with national regulations.

**Supplemental label information**                              EUH031 Contact with acids liberates toxic gas.

**Contains**    SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

#### 2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

### SECTION 3: Composition/information on ingredients

#### 3.1. Substances

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

<b>SODIUM HYPOCHLORITE SOLUTION, ... % Cl ACTIVE</b>		<b>5% - &lt;20%</b>
CAS number: 7681-52-9	EC number: 231-668-3	REACH registration number: 01-2119488154-34-XXXX
M factor (Acute) = 10	M factor (Chronic) = 1	

### Classification

Skin Corr. 1B - H314  
 Eye Dam. 1 - H318  
 Aquatic Acute 1 - H400  
 Aquatic Chronic 1 - H410

The full text for all hazard statements is displayed in Section 16.

<b>Product name</b>	SODIUM HYPOCHLORITE SOLUTION 5% - < 20%
<b>REACH registration number</b>	01-2119488154-34-XXXX
<b>EU index number</b>	017-011-00-1
<b>CAS number</b>	7681-52-9
<b>EC number</b>	231-668-3
<b>Composition comments</b>	The data shown are in accordance with the latest EC Directives.

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

<b>Inhalation</b>	Remove person to fresh air and keep comfortable for breathing. Keep affected person warm and at rest. Get medical attention immediately.
<b>Ingestion</b>	Never give anything by mouth to an unconscious person. Do not induce vomiting. Rinse mouth thoroughly with water. Get medical attention.
<b>Skin contact</b>	Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention.
<b>Eye contact</b>	Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention immediately. Continue to rinse.

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

<b>Inhalation</b>	Gas or vapour in high concentrations may irritate the respiratory system. Generates toxic gas in contact with acid. Chlorine.
<b>Ingestion</b>	Ingestion may cause severe irritation of the mouth, the oesophagus and the gastrointestinal tract.
<b>Skin contact</b>	Chemical burns.
<b>Eye contact</b>	Causes burns. Risk of serious damage to eyes. May cause permanent damage if eye is not immediately irrigated.

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

<b>Notes for the doctor</b>	Treat symptomatically.
-----------------------------	------------------------

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

**Suitable extinguishing media** Use fire-extinguishing media suitable for the surrounding fire. Extinguish with the following media: Water spray.

**Unsuitable extinguishing media** Do not use water jet as an extinguisher, as this will spread the fire.

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

**Specific hazards** Dry product is combustible Toxic to aquatic life with long lasting effects.

**Hazardous combustion products** Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours. Chlorine. Oxygen.

### 5.3. Advice for firefighters

**Protective actions during firefighting** Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Contain and collect extinguishing water.

**Special protective equipment for firefighters** Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

## SECTION 6: Accidental release measures

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

**Personal precautions** Wear protective clothing as described in Section 8 of this safety data sheet. Avoid inhalation of spray mist and contact with skin and eyes. Provide adequate ventilation.

### 6.2. Environmental precautions

**Environmental precautions** Do not discharge into drains or watercourses or onto the ground. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

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

**Methods for cleaning up** Absorb spillage with inert, damp, non-combustible material. Flush contaminated area with plenty of water. Collect and place in suitable waste disposal containers and seal securely. For waste disposal, see Section 13. Contain and collect extinguishing water.

### 6.4. Reference to other sections

**Reference to other sections** Wear protective clothing as described in Section 8 of this safety data sheet. For waste disposal, see section 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

**Usage precautions** Avoid spilling. Avoid contact with skin and eyes. Avoid inhalation of vapours and spray/mists. Provide adequate ventilation. Contact with acids liberates toxic gas. Chlorine.

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

**Storage precautions** Protect from freezing and direct sunlight. Store in tightly-closed, original container in a well-ventilated place. Store away from the following materials: Acids. Flammable/combustible materials. Ammonia. May be corrosive to metals.

**Storage class** Corrosive storage.

### 7.3. Specific end use(s)

**Specific end use(s)** The identified uses for this product are detailed in Section 1.2.

## SECTION 8: Exposure controls/Personal protection

### 8.1. Control parameters

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE (CAS: 7681-52-9)

<b>Ingredient comments</b>	No exposure limits known for ingredient(s).
<b>DNEL</b>	Industry - Inhalation; Long term : 1.55 mg/m <sup>3</sup> Industry - Inhalation; Short term : 3.1 mg/m <sup>3</sup> Consumer - Inhalation; Long term : 1.55 mg/m <sup>3</sup> Consumer - Inhalation; Short term : 3.1 mg/m <sup>3</sup>
<b>PNEC</b>	- Sediment (Freshwater); 0.00021 mg/l - Sediment (Marinewater); 0.000042 mg/l - Intermittent release; 0.00026 mg/l - STP; 0.03 mg/l

### 8.2. Exposure controls

#### Protective equipment



#### Appropriate engineering controls

Provide adequate ventilation. Avoid inhalation of vapours. Observe any occupational exposure limits for the product or ingredients.

#### Eye/face protection

Wear tight-fitting, chemical splash goggles or face shield. Personal protective equipment for eye and face protection should comply with European Standard EN166.

#### Hand protection

The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. Chemical-resistant, impervious gloves complying with an approved standard should be worn if a risk assessment indicates skin contact is possible. For exposure up to 8 hours, wear gloves made of the following material: Nitrile rubber. Protective gloves should have a minimum thickness of 0.50 mm. To protect hands from chemicals, gloves should comply with European Standard EN374.

#### Other skin and body protection

Wear rubber apron. Wear rubber footwear.

#### Hygiene measures

Provide eyewash station and safety shower. Wash at the end of each work shift and before eating, smoking and using the toilet. Remove contaminated clothing and wash the skin thoroughly with soap and water after work. Eating, smoking and water fountains prohibited in immediate work area.

#### Respiratory protection

If ventilation is inadequate, suitable respiratory protection must be worn. EN 136/140/141/145/143/149

## SECTION 9: Physical and chemical properties

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

<b>Appearance</b>	Liquid.
<b>Colour</b>	Green-yellow.
<b>Odour</b>	Chlorine.
<b>Odour threshold</b>	No information available.
<b>pH</b>	pH (concentrated solution): > 11
<b>Melting point</b>	No information available.
<b>Initial boiling point and range</b>	No information available.

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

Flash point	> 100°C
Evaporation rate	No information available.
Evaporation factor	No information available.
Flammability (solid, gas)	No information available.
Upper/lower flammability or explosive limits	No information available.
Other flammability	No information available.
Vapour pressure	No information available.
Vapour density	Data lacking.
Relative density	~ 1.2
Bulk density	No information available.
Solubility(ies)	Soluble in water.
Partition coefficient	Not available.
Auto-ignition temperature	No information available.
Decomposition Temperature	No information available.
Viscosity	No information available.
Explosive properties	Not considered to be explosive.
Explosive under the influence of a flame	No information available.
Oxidising properties	Does not meet the criteria for classification as oxidising.

### 9.2. Other information

Other information	Not available.
Refractive index	No information available.
Particle size	No information available.
Molecular weight	No information available.
Volatility	No information available.
Saturation concentration	No information available.
Critical temperature	No information available.
Volatile organic compound	No information available.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Reactivity	Generates toxic gas in contact with acid.
------------	---

### 10.2. Chemical stability

Stability	Stable at normal ambient temperatures and when used as recommended. Titer reduction of about 0.2 to 0.25 ° chlorometric per day at 17 ° C The stability of the solution decreases under the action of heat, light and in the presence of impurities (traces of iron, nickel, copper, cobalt, aluminum, manganese)
-----------	---

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

### 10.3. Possibility of hazardous reactions

**Possibility of hazardous reactions** Generates toxic gas in contact with acid.

### 10.4. Conditions to avoid

**Conditions to avoid** Avoid excessive heat for prolonged periods of time. Avoid exposure to high temperatures or direct sunlight.

### 10.5. Incompatible materials

**Materials to avoid** Strong acids. Amines. contact with metals may result in decomposition with the formation of Oxygen

### 10.6. Hazardous decomposition products

**Hazardous decomposition products** Oxygen. hypochlorous acid Chlorine.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Toxicological effects** No information available.

#### Skin corrosion/irritation

**Skin corrosion/irritation** Causes severe burns.

#### Serious eye damage/irritation

**Serious eye damage/irritation** Causes severe burns.

#### Respiratory sensitisation

**Respiratory sensitisation** No information available.

#### Skin sensitisation

**Skin sensitisation** No information available.

#### Germ cell mutagenicity

**Genotoxicity - in vitro** No information available.

#### Carcinogenicity

**Carcinogenicity** No information available.

#### Reproductive toxicity

**Reproductive toxicity - fertility** No information available.

#### Specific target organ toxicity - single exposure

**STOT - single exposure** No information available.

#### Specific target organ toxicity - repeated exposure

**STOT - repeated exposure** No information available.

#### Aspiration hazard

**Aspiration hazard** No information available.

#### Inhalation

Gas or vapour in high concentrations may irritate the respiratory system.

#### Ingestion

May cause chemical burns in mouth, oesophagus and stomach.

#### Skin contact

Causes burns.

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

**Eye contact** Causes burns. Causes serious eye damage.

### Toxicological information on ingredients.

#### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

##### Acute toxicity - oral

Acute toxicity oral (LD<sub>50</sub> mg/kg) 1,100.0

Species Rat

##### Acute toxicity - dermal

Acute toxicity dermal (LD<sub>50</sub> mg/kg) 2,000.0

Species Rat

##### Acute toxicity - inhalation

Acute toxicity inhalation (LC<sub>50</sub> vapours mg/l) 10,500.0

Species Rat

ATE inhalation (vapours mg/l) 10,500.0

##### Skin corrosion/irritation

Skin corrosion/irritation Corrosive to skin.

##### Serious eye damage/irritation

Serious eye damage/irritation Corrosive

##### Skin sensitisation

Skin sensitisation Not sensitising.

##### Germ cell mutagenicity

Genotoxicity - in vitro This substance has no evidence of mutagenic properties.

##### Carcinogenicity

Carcinogenicity There is no evidence that the product can cause cancer.

##### Reproductive toxicity

Reproductive toxicity - fertility This substance has no evidence of toxicity to reproduction.

##### Specific target organ toxicity - single exposure

STOT - single exposure Irritating to respiratory system.

##### Specific target organ toxicity - repeated exposure

STOT - repeated exposure Based on available data the classification criteria are not met.

##### Aspiration hazard

Aspiration hazard None.

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

<b>Inhalation</b>	May cause damage to mucous membranes in nose, throat, lungs and bronchial system. May cause respiratory system irritation.
<b>Ingestion</b>	May cause chemical burns in mouth, oesophagus and stomach.
<b>Skin contact</b>	May cause serious chemical burns to the skin.
<b>Eye contact</b>	Causes burns. Causes serious eye damage.

### SECTION 12: Ecological information

**Ecotoxicity** Very toxic to aquatic life with long lasting effects.

#### Ecological information on ingredients.

##### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**Ecotoxicity** Very toxic to aquatic life with long lasting effects.

#### 12.1. Toxicity

**Toxicity** Toxic to aquatic life with long lasting effects.

#### Ecological information on ingredients.

##### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**Toxicity** Very toxic to aquatic organisms.

#### Acute aquatic toxicity

**LE(C)<sub>50</sub>** 0.01 < L(E)C<sub>50</sub> ≤ 0.1

**M factor (Acute)** 10

**Acute toxicity - fish** LC<sub>50</sub>, 96 hours: 0.06 mg/l, Freshwater fish

**Acute toxicity - aquatic invertebrates** EC<sub>50</sub>, 48 hours: 0.141 mg/l, Daphnia magna

**Acute toxicity - aquatic plants** EC<sub>50</sub>, 72 hours: 0.04 mg/l, Scenedesmus subspicatus

#### Chronic aquatic toxicity

**M factor (Chronic)** 1

**Chronic toxicity - fish early life stage** NOEC, 28 days: 0.04 mg/l, Freshwater fish

#### 12.2. Persistence and degradability

**Persistence and degradability** Substance is inorganic.

#### Ecological information on ingredients.

##### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**Persistence and degradability** Not applicable. Substance is inorganic.

#### 12.3. Bioaccumulative potential

**Bioaccumulative potential** Bioaccumulation is unlikely.

**Partition coefficient** Not available.

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

### Ecological information on ingredients.

#### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**Bioaccumulative potential** The product does not contain any substances expected to be bioaccumulating.

**Partition coefficient** : -3.42

### 12.4. Mobility in soil

**Mobility** The product is soluble in water.

### Ecological information on ingredients.

#### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**Mobility** The product is soluble in water.

### 12.5. Results of PBT and vPvB assessment

**Results of PBT and vPvB assessment** This substance is not classified as PBT or vPvB according to current EU criteria.

### Ecological information on ingredients.

#### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**Results of PBT and vPvB assessment** This substance is not considered to be persistent, bioaccumulating and toxic (PBT) or very persistent nor very bioaccumulating (vPvB).

### 12.6. Other adverse effects

**Other adverse effects** None known.

### Ecological information on ingredients.

#### SODIUM HYPOCHLORITE SOLUTION, ... % CI ACTIVE

**Other adverse effects** Not known.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

**General information** Do not puncture or incinerate, even when empty. Waste is classified as hazardous waste.

**Disposal methods** Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

## SECTION 14: Transport information

**General** Wear protective clothing as described in Section 8 of this safety data sheet.

### 14.1. UN number

**UN No. (ADR/RID)** 1791

**UN No. (IMDG)** 1791

**UN No. (ICAO)** 1791

**UN No. (ADN)** 1791

### 14.2. UN proper shipping name

**Proper shipping name (ADR/RID)** HYPOCHLORITE SOLUTION

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

**Proper shipping name (IMDG)** HYPOCHLORITE SOLUTION (CONTAINS SODIUM HYPOCHLORITE SOLUTION, ... % Cl ACTIVE)

**Proper shipping name (ICAO)** HYPOCHLORITE SOLUTION

**Proper shipping name (ADN)** HYPOCHLORITE SOLUTION

### 14.3. Transport hazard class(es)

ADR/RID class	8
ADR/RID classification code	C9
ADR/RID label	8
IMDG class	8
ICAO class/division	8
ADN class	8

#### Transport labels



### 14.4. Packing group

ADR/RID packing group	II
IMDG packing group	II
ICAO packing group	II
ADN packing group	II

### 14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant



### 14.6. Special precautions for user

IMDG Code segregation group	8. Hypochlorites
EmS	F-A, S-B
ADR transport category	2
Emergency Action Code	2X
Hazard Identification Number (ADR/RID)	80
Tunnel restriction code	(E)

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

**SECTION 15: Regulatory information**

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

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

#### **EU legislation**

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

Commission Regulation (EU) No 2015/830 of 28 May 2015.

This product may impact SEVESO storage regulations.

#### **Restrictions (Annex XVII Regulation 1907/2006)**

This product is/contains a substance that is included in REGULATION (EC) No 1907/2006 (REACH) ANNEX XVII - RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, MIXTURES AND ARTICLES. Entry number: 3

#### **Seveso Directive - Control of major accident hazards E1**

### 15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

#### Inventories

##### **EU - EINECS/ELINCS**

All the ingredients are listed or exempt.

### **SECTION 16: Other information**

## SODIUM HYPOCHLORITE SOLUTION 5% - < 20%

<b>Abbreviations and acronyms used in the safety data sheet</b>	<p>ATE: Acute Toxicity Estimate.</p> <p>ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.</p> <p>ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.</p> <p>CAS: Chemical Abstracts Service.</p> <p>DNEL: Derived No Effect Level.</p> <p>IATA: International Air Transport Association.</p> <p>IMDG: International Maritime Dangerous Goods.</p> <p>Kow: Octanol-water partition coefficient.</p> <p>LC<sub>50</sub>: Lethal Concentration to 50 % of a test population.</p> <p>LD<sub>50</sub>: Lethal Dose to 50% of a test population (Median Lethal Dose).</p> <p>PBT: Persistent, Bioaccumulative and Toxic substance.</p> <p>PNEC: Predicted No Effect Concentration.</p> <p>REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.</p> <p>RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.</p> <p>vPvB: Very Persistent and Very Bioaccumulative.</p> <p>IARC: International Agency for Research on Cancer.</p> <p>MARPOL 73/78: International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978.</p> <p>cATpE: Converted Acute Toxicity Point Estimate.</p> <p>BCF: Bioconcentration Factor.</p> <p>BOD: Biochemical Oxygen Demand.</p> <p>EC<sub>50</sub>: 50% of maximal Effective Concentration.</p> <p>LOAEC: Lowest Observed Adverse Effect Concentration.</p> <p>LOAEL: Lowest Observed Adverse Effect Level.</p> <p>NOAEC: No Observed Adverse Effect Concentration.</p> <p>NOAEL: No Observed Adverse Effect Level.</p> <p>NOEC: No Observed Effect Concentration.</p> <p>LOEC: Lowest Observed Effect Concentration.</p> <p>DMEL: Derived Minimal Effect Level.</p> <p>EL50: Exposure Limit 50</p> <p>hPa: Hectopascal</p> <p>LL50: Lethal Loading fifty</p> <p>OECD: Organisation for Economic Co-operation and Development</p> <p>POW: Octanol-water partition coefficient</p> <p>SCBA: self-contained breathing apparatus</p> <p>STP: Sewage Treatment Plant</p> <p>VOC: Volatile Organic Compounds</p>
<b>Classification abbreviations and acronyms</b>	<p>Acute Tox. = Acute toxicity</p> <p>Aquatic Acute = Hazardous to the aquatic environment (acute)</p> <p>Aquatic Chronic = Hazardous to the aquatic environment (chronic)</p>
<b>Key literature references and sources for data</b>	Supplier's information.
<b>Classification procedures according to Regulation (EC) 1272/2008</b>	<p>Met. Corr. 1 - H290: Calculation method. Skin Corr. 1B - H314: Calculation method. Eye Dam. 1 - H318: Calculation method. Aquatic Chronic 2 - H411: Calculation method. Aquatic Acute 1 - H400: Calculation method.</p>
<b>Revision comments</b>	NOTE: Lines within the margin indicate significant changes from the previous revision.
<b>Revision date</b>	17/03/2021

**SODIUM HYPOCHLORITE SOLUTION 5% - < 20%**

<b>Version number</b>	3.002
<b>Supersedes date</b>	07/07/2020
<b>SDS number</b>	47852
<b>SDS status</b>	Approved.
<b>Hazard statements in full</b>	H290 May be corrosive to metals. H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage. H400 Very toxic to aquatic life. H410 Very toxic to aquatic life with long lasting effects. H411 Toxic to aquatic life with long lasting effects.
<b>Signature</b>	Jitendra Panchal

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty, guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.



## Exposure scenario Consumer Use

### Identification

<b>Product name</b>	Sodium Hypochlorite
<b>REACH registration number</b>	01-2119488154-34-XXXX
<b>CAS number</b>	7681-52-9
<b>EC number</b>	231-668-3
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Consumer Use
<b>Product category</b>	PC34 Textile dyes and impregnating products PC35 Washing and cleaning products PC37 Water treatment chemicals.
<b>Main sector</b>	SU21 Consumer uses

#### Environment

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) ERC8e Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
---------------------------------------	--

### 2. Conditions of use affecting exposure (Non-industrial - Environment 1)

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 15 %.

#### Frequency and duration of use

Emission days: 365 days/year

#### Environmental factors not influenced by risk management measures

<b>Dilution</b>	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
-----------------	---

## Consumer Use

### Risk management measures

STP type                      Municipal STP.

### Conditions and measures related to external treatment of waste for disposal

Waste treatment            External treatment and disposal of waste should comply with applicable local and/or national regulations.

## 2. Conditions of use affecting exposure (Non-industrial - Health 1)

### Product characteristics

Physical state              Liquid

Concentration details      Covers concentrations up to 15 %.

### Frequency and duration of use

Covers daily exposure up to 30minutes

### Other given operational conditions affecting Non-industrial exposure

Setting                      Indoor.

Temperature                Assumes activities are at ambient temperature (unless stated differently).

## 3. Exposure estimation (Environment 1)

Qualitative approach used to conclude safe use.

## 3. Exposure estimation (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

## 4. Guidance to check compliance with the exposure scenario (Health 1)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e. RCRs > 1), additional RMM or a site-specific chemical safety assessment is required.



## Exposure scenario

### Industrial and professional cleaning

#### Identification

<b>Product name</b>	Sodium Hypochlorite
<b>REACH registration number</b>	01-2119488154-34-XXXX
<b>CAS number</b>	7681-52-9
<b>EC number</b>	231-668-3
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Industrial and professional cleaning
<b>Product category</b>	PC35 Washing and cleaning products
<b>Main sector</b>	SU3 Industrial uses SU22 Professional uses
<b>Sector of use</b>	SU4 Manufacture of food products
<b><u>Environment</u></b>	
<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article) ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) ERC8e Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
<b><u>Worker</u></b>	
<b>Process category</b>	PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC11 Non industrial spraying PROC13 Treatment of articles by dipping and pouring. PROC15 Use as laboratory reagent.

## Industrial and professional cleaning

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

**Environmental release category** ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
ERC8e Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)

#### Product characteristics

**Physical state** Liquid  
**Vapour pressure** 2.5 kPa @ 20°C  
**Concentration details** Covers concentrations up to 10 %.

#### Frequency and duration of use

Continuous release.  
Emission days: 365 days/year

#### Environmental factors not influenced by risk management measures

**Dilution** Local freshwater dilution factor: 10 (Default)  
Local marine water dilution factor: 100 (Default)

#### Risk management measures

**Good practice** Ensure operatives are trained to minimise exposures.  
**Technical measures** Bund storage facilities to prevent soil and water pollution in the event of spillage.  
**STP type** Municipal STP.  
**STP details** Assumed onsite sewage treatment plant flow: 2000 m<sup>3</sup>/day

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

**Process category** PROC5 Mixing or blending in batch processes  
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities  
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
PROC11 Non industrial spraying  
PROC13 Treatment of articles by dipping and pouring.  
PROC15 Use as laboratory reagent.

#### Product characteristics

**Physical state** Liquid  
**Vapour pressure** 2.5 kPa @ 20°C  
**Concentration details** Covers concentrations up to 10 %.

#### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

#### Other given operational conditions affecting workers exposure

**Setting** Indoor/outdoor use.  
**Temperature** Assumes use at not more than 20°C above ambient temperature, unless stated differently.  
**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

#### Risk management measures

## Industrial and professional cleaning

Use suitable eye protection and gloves.

Assumes a good basic standard of occupational hygiene is implemented.

### 3. Exposure estimation (Environment 1)

Qualitative approach used to conclude safe use.

### 3. Exposure estimation (Health 1)

<b>Sector of use</b>	SU3 Industrial uses
<b>Assessment method</b>	Used ART model.
<b>Exposure</b>	<p>PROC5 Mixing or blending in batch processes  Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC7 Industrial spraying  Worker - inhalation, long-term - local and systemic: Exposure 1.20 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.77</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities  Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  Worker - inhalation, long-term - local and systemic: Exposure 0.91 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.59</p> <p>PROC10 Roller application or brushing  Worker - inhalation, long-term - local and systemic: Exposure 1.00 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.65</p> <p>PROC13 Treatment of articles by dipping and pouring.  Worker - inhalation, long-term - local and systemic: Exposure 0.70 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.45</p>

### 4. Guidance to check compliance with the exposure scenario (Health 1)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e. RCRs > 1), additional RMM or a site-specific chemical safety assessment is required.

### 3. Exposure estimation (Health 2)

<b>Sector of use</b>	SU22 Professional uses
<b>Assessment method</b>	Used ART model.

## Industrial and professional cleaning

### Exposure

PROC5 Mixing or blending in batch processes

Worker - inhalation, long-term - local and systemic: Exposure 1.00 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.65

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, long-term - local and systemic: Exposure 1.10 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.71

PROC10 Roller application or brushing

Worker - inhalation, long-term - local and systemic: Exposure 1.20 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.77

PROC11 Non industrial spraying

Worker - inhalation, long-term - local and systemic: Exposure 1.00 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.65

PROC13 Treatment of articles by dipping and pouring.

Worker - inhalation, long-term - local and systemic: Exposure 1.20 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.77

PROC15 Use as laboratory reagent.

Worker - inhalation, long-term - local and systemic: Exposure 0.85 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.55

### 4. Guidance to check compliance with the exposure scenario (Health 2)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e. RCRs > 1), additional RMM or a site-specific chemical safety assessment is required.



## Exposure scenario Industrial Use

### Identification

<b>Product name</b>	Sodium Hypochlorite
<b>REACH registration number</b>	01-2119488154-34-XXXX
<b>CAS number</b>	7681-52-9
<b>EC number</b>	231-668-3
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Industrial Use
<b>Product category</b>	PC19 Intermediate. PC34 Textile dyes and impregnating products PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC37 Water treatment chemicals.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals SU10 Formulation [mixing] of preparations and/or re-packaging SU4 Manufacture of food products SU5 Manufacture of textiles, leather, fur SU6 Manufacture of paper and paper products

#### Environment

<b>Environmental release category</b>	ERC6a Use of intermediate ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	--

#### Worker

## Industrial Use

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	--

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	<p>ERC6a Use of intermediate</p> <p>ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)</p> <p>ERC6d Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)</p>
---------------------------------------	---

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	2.5 kPa @ 20°C
<b>Concentration details</b>	Covers concentrations up to 15 %.

#### Frequency and duration of use

Emission days: 360 days/year

#### Environmental factors not influenced by risk management measures

<b>Dilution</b>	<p>Local freshwater dilution factor: 10 (Default)</p> <p>Local marine water dilution factor: 100 (Default)</p>
-----------------	--

#### Risk management measures

<b>Good practice</b>	Ensure operatives are trained to minimise exposures.
<b>Technical measures</b>	Bund storage facilities to prevent soil and water pollution in the event of spillage.
<b>STP type</b>	Municipal STP.
<b>STP details</b>	Assumed onsite sewage treatment plant flow: 2000 m <sup>3</sup> /day

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Industrial Use

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	--

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	2.5 kPa @ 20°C
<b>Concentration details</b>	Covers concentrations up to 25 %.

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor/outdoor use.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently).

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

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

**Organisational measures** Ensure operatives are trained to minimise exposures.

### Risk management measures

Use eye protection to EN 166, designed to protect against liquid splashes.  
Wear suitable gloves tested to EN374.  
Gloves should have a breakthrough time of 8 hours.  
Assumes a good basic standard of occupational hygiene is implemented.

### 3. Exposure estimation (Environment 1)

Qualitative approach used to conclude safe use.

### 3. Exposure estimation (Health 1)

## Industrial Use

<b>Assessment method</b>	Used ART model.
<b>Exposure</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Worker - inhalation, long-term - local and systemic: Exposure 0.02 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.01</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions Worker - inhalation, long-term - local and systemic: Exposure 1.10 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.71</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition Worker - inhalation, long-term - local and systemic: Exposure 1.10 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.71</p> <p>PROC4 Chemical production where opportunity for exposure arises Worker - inhalation, long-term - local and systemic: Exposure 1.20 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.77</p> <p>PROC5 Mixing or blending in batch processes Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) Worker - inhalation, long-term - local and systemic: Exposure 0.91 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.59</p> <p>PROC13 Treatment of articles by dipping and pouring. Worker - inhalation, long-term - local and systemic: Exposure 0.70 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.45</p>

### 4. Guidance to check compliance with the exposure scenario (Health 1)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e. RCRs > 1), additional RMM or a site-specific chemical safety assessment is required.



## Exposure scenario Manufacturing and Formulation

### Identification

Product name	Sodium Hypochlorite
REACH registration number	01-2119488154-34-XXXX
CAS number	7681-52-9
EC number	231-668-3
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

Main title	Manufacturing and Formulation
Process scope	Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities.
Main sector	SU3 Industrial uses
Sector of use	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU10 Formulation [mixing] of preparations and/or re-packaging

#### Environment

Environmental release category	ERC1 Manufacture of the substance ERC2 Formulation into mixture
--------------------------------	--

#### Worker

## Manufacturing and Formulation

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC14 Tableting, compression, extrusion, pelletisation, granulation</p> <p>PROC15 Use as laboratory reagent.</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	<p>ERC1 Manufacture of the substance</p> <p>ERC2 Formulation into mixture</p>
---------------------------------------	---

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	2.5 kPa @ 20°C
<b>Concentration details</b>	Covers concentrations up to 25 %.

#### Frequency and duration of use

Emission days: 360 days/year

#### Environmental factors not influenced by risk management measures

<b>Dilution</b>	<p>Local freshwater dilution factor: 10 (Default)</p> <p>Local marine water dilution factor: 100 (Default)</p>
-----------------	--

#### Risk management measures

<b>Good practice</b>	Ensure operatives are trained to minimise exposures. Handle all packages and containers carefully to minimise spills.
<b>STP type</b>	Municipal STP.
<b>STP details</b>	Assumed domestic sewage treatment plant flow: 2000 m <sup>3</sup> /day

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

<b>Water</b>	Onsite wastewater treatment required.
<b>Soil</b>	Bund storage facilities to prevent soil and water pollution in the event of spillage.

#### Conditions and measures related to external treatment of waste for disposal

<b>Waste treatment</b>	Dispose of waste in accordance with environmental legislation.
<b>Disposal method</b>	Contain and dispose of waste according to local regulations.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Manufacturing and Formulation

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC14 Tableting, compression, extrusion, pelletisation, granulation</p> <p>PROC15 Use as laboratory reagent.</p>
-------------------------	---

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	2.5 kPa @ 20°C
<b>Concentration details</b>	Covers concentrations up to 25 %.

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor/outdoor use.
<b>Temperature</b>	Assumes use at not more than 20°C above ambient temperature, unless stated differently.
<b>Ventilation rate</b>	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Technical conditions and measures at process level (source) to prevent release

<b>Technical protective measures</b>	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.
--------------------------------------	---

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

<b>Organisational measures</b>	Ensure operatives are trained to minimise exposures.
--------------------------------	--

### Risk management measures

Wear suitable gloves tested to EN374.  
 Gloves should have a breakthrough time of 8 hours.  
 Use eye protection to EN 166, designed to protect against liquid splashes.  
 Assumes a good basic standard of occupational hygiene is implemented.

## 3. Exposure estimation (Environment 1)

Qualitative approach used to conclude safe use.

## Manufacturing and Formulation

### 3. Exposure estimation (Health 1)

<b>Assessment method</b>	Used ART model.
<b>Exposure</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Worker - inhalation, long-term - local and systemic: Exposure 0.02 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.01</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions Worker - inhalation, long-term - local and systemic: Exposure 1.10 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.71</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition Worker - inhalation, long-term - local and systemic: Exposure 1.10 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.71</p> <p>PROC4 Chemical production where opportunity for exposure arises Worker - inhalation, long-term - local and systemic: Exposure 1.20 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.77</p> <p>PROC5 Mixing or blending in batch processes Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Worker - inhalation, long-term - local and systemic: Exposure 1.25 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.81</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) Worker - inhalation, long-term - local and systemic: Exposure 0.91 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.59</p> <p>PROC14 Tableting, compression, extrusion, pelletisation, granulation Worker - inhalation, long-term - local and systemic: Exposure 0.23 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.15</p> <p>PROC15 Use as laboratory reagent. Worker - inhalation, long-term - local and systemic: Exposure 0.70 mg/m<sup>3</sup>, DNEL 1.55 mg/m<sup>3</sup>, RCR 0.45</p>

### 4. Guidance to check compliance with the exposure scenario (Health 1)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e. RCRs > 1), additional RMM or a site-specific chemical safety assessment is required.



Dear Subscriber,

This front sheet has been attached to the Safety Data Sheet (SDS) as an indication that it does not meet the current requirements of Article 31 of REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) which governs the content of a SDS, the equivalent UK REACH legislation or similar international legislation comparable with Annex 4 of the United Nations Globally Harmonized System (GHS). The SDS may refer to obsolete hazard classification systems or predate the implementation of current legislative systems.

As this is the latest version of the SDS made available to EcoOnline no warranty either expressed or implied is given as to the suitability or accuracy of its content, therefore the use of any information within the SDS is at the sole discretion and responsibility of yourselves as subscribers to the EcoOnline COSHH database.

While EcoOnline used the information within the attached SDS to compile the associated COSHH assessment, the classification used by EcoOnline to compile the assessment may differ from the classification assigned by the supplier or distributor if it is appropriate to do so under the classification requirements of relevant European Directives and UK national legislation.

It is strongly advised that you contact the supplier/manufacturer of the material to obtain a revised copy of the SDS that conforms to the appropriate standards.

Should you require any more information, please contact the CMS helpdesk on **+44 (0)1296 678464**, or at **[CMS.helpdesk@ecoonline.com](mailto:CMS.helpdesk@ecoonline.com)**

**SAFETY DATA SHEET  
NATURAL GAS**

---

**1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND THE COMPANY**

---

PRODUCT NAME: Natural gas

SYNONYMS, TRADE NAMES: Compressed Natural Gas

SUPPLIER: National Grid plc  
NG House  
Warwick Technology Park  
Gallows Hill  
Warwick  
CV34 6DA

SUPPLY METHOD: This data sheet is for natural gas supplied via a pipeline distribution system. Within the UK the following gas pressures may be found:  
National Transmission System - 70 to 85bar  
Distribution Network – 7 to 70bar  
Local distribution – 75mbar to 7bar

NORMAL CONDITIONS OF USAGE: This data sheet assumes that natural gas is taken from the pipeline distribution system using only appliances and other equipment intended to be used with natural gas. These appliances should be purpose designed and built to recognized safety standards, be properly adjusted and kept serviced, be installed in adequately ventilated locations and supplied with the necessary flueing systems or other means of disposal of combustion products.

EMERGENCY TELEPHONES: 0800 111999

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPOSITION COMMENTS: The composition of natural gas is complex and variable therefore the characteristics are based on the major component, which is methane.

INGREDIENT NAME	CAS No	EC No	CONTENTS (% vol/vol)	RISK (R No)
METHANE	74-82-8	200-812-7	82 – 97	R12
ETHANE	74-84-0	200-814-8	2.8 – 10.2	R12
NITROGEN	7727-37-9	231-783-9	0.1 – 7.7	
PROPANE	74-98-6	200-827-9	0.1 – 3.7	R12
CARBON DIOXIDE	124-38-9	204-696-9	0 – 4	
ISO BUTANE	75-28-5	200-857-2	0.01 – 0.44	R12
N BUTANE	106-97-8	203-448-7	0.01 – 0.75	R12
NEO PENTANE	463-82-1	207-343-7	0 – 0.055	R12
ISO PENTANE	78-78-4	201-142-8	0 – 0.25	R65, R66, R67, R12
N PENTANE	109-66-0	203-692-4	0 – 0.17	R65, R66, R67, R12
N HEXANE	110-54-3	203-777-6	0 – 0.015	R38, R65, R67, R11
BENZENE	71-43-2	200-753-7	0 – 0.015	R45, R48/23/24/25, R11
CYCLOHEXANE	110-82-7	203-806-2	0 – 0.0015	R38, R65, R67, R11
TOLUENE	108-88-3	203-625-9	0 – 0.001	R20, R11
XYLENES (COMBINED ISOMERS)	1330-20-7	215-535-7	0 – 0.001	R20/21, R38, R10
HYDROGEN SULPHIDE	7783-06-4	231-977-3	0 – 0.0003	R26, R12
ETHYL MERCAPTAN	75-08-1	200-837-3	0 – 0.00002	R20, R12
TERTIARY BUTYL MERCAPTAN	75-66-1	200-890-2	0 – 0.00013	R20, R36, R11
DIMETHYL SULPHIDE	75-18-3	200-846-2	0 – 0.00004	R22, R36, R11
DI-ETHYL SULPHIDE	352-93-2	206-526-9	0 – 0.0001	R11
METHYL ETHYL SULPHIDE	624-89-5	210-868-4	0 – 0.00002	R11
MONO ETHYLENE GLYCOL	107-21-1	203-473-3	0 – 0.01	R22
PETROLEUM DISTILLATE			0 – 0.0003	R45

Explanations of Risk No's are found in Section 16, Other Information.

---

### 3. HAZARD IDENTIFICATION

---

Natural gas is extremely flammable forming a flammable mixture at a concentration of 5% gas in air (by volume). Therefore, the most likely hazard from natural gas exposure is fire.

Gas supply may be at high pressure, up to 85bar (see Section 1)

---

### 4. FIRST AID MEASURES

---

GENERAL: NOTE: Keep affected person away from heat, sparks and flames.

CAUTION: First aid personnel must be aware of own risk during rescue.

Move the exposed person to fresh air at once.

INHALATION: Move exposed person to fresh air at once. Get prompt medical attention. Perform artificial respiration if breathing has stopped. When breathing is difficult, properly trained personnel may assist affected person by administering 100% oxygen. Keep the affected person warm and at rest.

SKIN: Promptly stop exposure.

---

### 5. FIRE FIGHTING MEASURES

---

EXTINGUISHING MEDIA: Fire can be extinguished using – water spray, fog or mist; foam or carbon dioxide (CO<sub>2</sub>); dry chemical or sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES: In the event of a fire, steps should be taken to shut off the gas supply and the local fire brigade and supplier informed.

UNUSUAL FIRE & EXPLOSION HAZARDS: Extremely flammable. May re-ignite after fire is extinguished.

HAZARDOUS COMBUSTION PRODUCTS: Carbon dioxide (CO<sub>2</sub>) and carbon monoxide (CO).

PROTECTIVE MEASURES IN FIRE: Protective clothing and pressure-demand breathing apparatus.

---

### 6. ACCIDENTAL RELEASE MEASURES

---

PERSONAL PRECAUTIONS: In the event of a gas leak, the supply should be shut off, the area ventilated and the local supplier informed. Electrical switches should not be turned on or off, portable electrical apparatus including hand held torches should not be operated and all other possible sources of ignition removed or rendered inoperable. In circumstances of excessive leakage the building should be evacuated

ENVIRONMENTAL PRECAUTIONS: Prevent product from escaping into the environment.

SPILL CLEAN UP METHODS: Stop leak if possible without risk. Ventilate area.

## 7. HANDLING AND STORAGE

USAGE PRECAUTIONS: Appliances and other equipment intended to be used with natural gas should be purpose designed and built to recognized safety standards, be properly adjusted and kept serviced, be installed in adequately ventilated locations and supplied with the necessary flueing systems or other means of disposal of combustion products.

Lack of adequate ventilation and/or leakage of combustion products into the workspace may give rise to carbon monoxide poisoning. In the event, effected personnel should be evacuated from the area and medical advice sought.

STORAGE PRECAUTIONS: Not applicable. Storage at supplier's premises only. Product supplied to customer in piped gas distribution system.

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

INGREDIENT NAME	CAS No.	OCCUPATIONAL EXPOSURE STANDARD (in UK)	
		LONG-TERM EXPOSURE (8-HOUR TWA)	SHORT-TERM EXPOSURE (15 MINUTES)
METHANE	74-82-8		
ETHANE	74-84-0		
NITROGEN	7727-37-9	none	none
PROPANE	74-98-6		
CARBON DIOXIDE	124-38-9	0.5 %	1.5 %
ISO BUTANE	75-28-5	0.06 %	0.075 %
N BUTANE	106-97-8	(combined butanes)	(combined butanes)
NEO PENTANE	463-82-1		
ISO PENTANE	78-78-4	none	none
N PENTANE	109-66-0		
N HEXANE	110-54-3	0.002 %	-
BENZENE	71-43-2	0.0001 % max exposure limit	-
CYCLOHEXANE	110-82-7	0.001 %	0.003 %
TOLUENE	108-88-3	0.005 %	0.015 %
XYLENES (COMBINED ISOMERS)	1330-20-7	0.005 %	0.01 %
HYDROGEN SULPHIDE	7783-06-4	0.0005 %	0.001 %
ETHYL MERCAPTAN	75-08-1	0.00005 %	0.0002 %
TERTIARY BUTYL MERCAPTAN	75-66-1	none	none
DIMETHYL SULPHIDE	75-18-3		
DI-ETHYL SULPHIDE	352-93-2		

INGREDIENT NAME	CAS No.	OCCUPATIONAL EXPOSURE STANDARD (in UK)	
		LONG-TERM EXPOSURE (8-HOUR TWA)	SHORT-TERM EXPOSURE (15 MINUTES)
METHYL ETHYL SULPHIDE	624-89-5		
MONO ETHYLENE GLYCOL	107-21-1	52 mg m <sup>-3</sup>	104 mg m <sup>-3</sup>
PETROLEUM DISTILLATE		none	none

INGREDIENT COMMENTS: Natural gas in air will form a flammable mixture before the concentration levels in the above table are reached with the exception of benzene. Therefore, the most likely hazard from natural gas exposure is fire. Prolonged exposure to natural gas should be avoided.

VENTILATION: Product is supplied via pipeline installation; ventilation is required only in case of spillage or fire.

RESPIRATORS: Under normal conditions of usage, see Section 1, respiratory protection is not required. If gas concentration reaches 1% gas in air or above a suitable respirator should be used.

PROTECTIVE GLOVES: Under normal conditions of usage protective gloves are not required.

EYE PROTECTION: Under normal working conditions eye protection is not required.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

APPEARANCE:	Gas
COLOUR:	Colourless
ODOUR/TASTE:	Below 7bar - characteristic gas smell Above 7bar - odorant may not be added, so gas may have no smell or may smell faintly of hydrocarbons
SOLUBILITY DESCRIPTION:	Soluble in water. Soluble in alcohol, ether, most organic solvents
SOLUBILITY VALUE (g/100g H <sub>2</sub> O 20 °C):	0.0026
MOL. WEIGHT (AT WT):	16
BOILING POINT (°C):	-161 at 760mm Hg
MELT/FREEZ. POINT (°C):	-183
RELATIVE DENSITY	0.65 @ 20°C
FLASH POINT:	-222 METHOD: CC (Closed Cup)
AUTO IGNITION TEMP. (°C)	560

FLAMMABILITY LIMIT – LOWER (%) 5  
 FLAMMABILITY LIMIT – UPPER (%) 15

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under ambient conditions  
 CONDITIONS TO AVOID: Avoid heat, flames and other sources of ignition  
 MATERIALS TO AVOID: Avoid contact with oxidizing materials and halogens  
 HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide (CO<sub>2</sub>) and Carbon Monoxide (CO)

**11. TOXICOLOGICAL INFORMATION**

*(Post-combustion toxicological info?)*

INHALATION: Short-term exposure may cause headaches, dizziness, drowsiness, nausea and vomiting. High vapour concentration may lead to unconsciousness due to absence of oxygen.  
 Long-term exposure may cause cancer or other serious damage to health.  
 SKIN: Not expected to be a health risk via this route  
 EYES: Not expected to be a health risk via this route  
 INGESTION: Not expected to be a health risk via this route.  
 HEALTH WARNINGS: Gas or vapour displaces oxygen available for breathing leading to asphyxia.  
 ROUTE OF ENTRY: Inhalation  
 MEDICAL SYMPTOMS: Short-term exposure: Upper respiratory irritation. Dizziness. High vapour concentration may cause suffocation. Cyanosis (blue tissue conditions, nails, lips and/or skin). Unconsciousness, possible death.

*use document  
 European Doc:  
 EH 140*

**12. ECOLOGICAL INFORMATION**

Not regarded as dangerous for any part of the local environment; including air, water, soil or ozone layer. Methane emissions contribute to global warming.

---

### 13. DISPOSAL CONSIDERATIONS

---

Not applicable to product as supplied on piped distribution system, but care must be taken to ensure adequate ventilation and/or flueing facilities from appliances to remove combustion products.

---

### 14. TRANSPORT INFORMATION

---

LABEL FOR CONVEYANCE:	Extremely flammable gas – red diamond with a flame symbol
GENERAL:	Transport data is given for further information. Pipeline gas distribution systems are not subject to conveyance regulations.
ROAD TRANSPORT:	
UN No ROAD:	1971
ADR CLASS No:	Class 2: Gases. Division 2.1: Flammable gases
ADR CLASS:	2
ADR ITEM No:	2(b)
HAZARD No (ADR):	23 Flammable gas
ADR MARGINAL:	2201
ADR LABEL No:	2.1
HAZCHEM CODE:	2(S)E
CEFIC TEC(R) No:	20G04
PROPER SHIPPING NAME:	METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content
RAIL TRANSPORT:	
RID CLASS No:	2
RID ITEM No:	2(b)
SEA TRANSPORT:	
UN No. SEA:	1971
IMDG CLASS:	2.1
IMDG PAGE No:	21.56
IMDG PACK GR:	N/A
EmS No:	2-02
MFAG TABLE No:	620
MARINE POLLUTANT:	No
AIR TRANSPORT:	
UN No., AIR:	1971

ICAO CLASS: 2.1  
 AIR SUB CLASS: --  
 AIR PACK GR: N/A

## 15. REGULATORY INFORMATION

UK REGULATORY REFERENCES: This safety data sheet conforms to the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. Exemptions from Regulations 8 and 12 exist, as a pipeline supply cannot be defined as a package.

GUIDANCE NOTES: Attention is drawn to the Gas Safety (Installation & Use) Regulations 1998, the Gas Safety (Management) Regulations 1996, relevant British Standards and appropriate National Grid Standards, codes of practice and guidance notes, all of which deal with the design, application and safe use of gas and gas fire equipment.

## 16. OTHER INFORMATION

Explanation of Risk Numbers in Section 2:

RISK NUMBER	RISK PHRASE
R10	Flammable
R11	Highly flammable
R12	Extremely flammable
R20	Harmful by inhalation
R21	Harmful in contact with skin
R22	Harmful if swallowed
R23	Toxic by inhalation
R24	Toxic in contact with skin
R25	Toxic if swallowed
R26	Very toxic by inhalation
R36	Irritating to eyes
R38	Irritating to skin
R45	May cause cancer
R48	Danger of serious damage to health by prolonged exposure
R65	Harmful: may cause lung damage if swallowed

- R66 Repeated exposure may cause skin dryness or cracking
- R67 Vapours may cause drowsiness and dizziness

**Document history**

Revision Date: January 2006

Replaces MDS issued May 2005  
SDS issued March 2005, February 2004, March 2000, September 1997, August 1995

SAFETY DATA SHEET

# Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

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

### 1.1. Product identifier

#### Trade name

Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

#### Other names / Synonyms

Caustic Soda Liquor, Sodium Hydroxide Solution, Lye

The Poisons Act 1972, as amended by the Control of Poisons and Explosives Precursors Regulations 2015 and the Control of Explosives Precursors and Poisons Regulations 2023, applies to 'reportable poisons' supplied by Industrial Chemicals Limited, although there is no requirement to verify professional users:

Sodium hydroxide, above 12% w/w CAS No. 1310-73-2

Please be aware that the purchaser may have duties in relation to regulated and reportable substances. Further information is available from GOV.UK. e.g. see Guidance supplying explosives precursors and poisons.

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

#### Relevant identified uses of the substance or mixture

Treatment of drinking water, European Committee Approval, Treatment of waste water, pH regulating, Manufacture of substance, Manufacturing soaps, Cleaning product  
Restricted to professional users.

#### Use descriptors (UK REACH)

Sectors of use	Description
	Intermediate Industrial use. pH regulating agent Treatment of drinking water, has received approval by the European Committee for Standardisation. Raw material. Washing and cleaning products Formulating packaged products Professional use Consumer use

#### Uses advised against

None known.

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

#### ▼ Company and address

##### **Industrial Chemicals Limited**

Jupiter House,  
Warley Hill Business Park,  
The Drive,  
Warley,  
Brentwood,  
Essex,  
CM13 3BE  
United Kingdom  
+44 (0)1375 389000  
+44 (0)1375 389110  
www.icgl.co.uk

#### E-mail

sds@icgl.co.uk

#### Revision

12/02/2024

#### SDS Version

7.0

#### Date of previous version

01/09/2023 (6.0)

### 1.4. Emergency telephone number

Contact The National Poisons Information Service (dial 111, 24 h service).

See section 4 "First aid measures".

## SECTION 2: Hazards identification

Classified according to Regulation (EC) No. 1272/2008 (CLP) as retained and amended in UK law.

### 2.1. Classification of the substance or mixture

Met. Corr. 1; H290, May be corrosive to metals.  
 Skin Corr. 1A; H314, Causes severe skin burns and eye damage.  
 Eye Dam. 1; H318, Causes serious eye damage.

### 2.2. Label elements

Hazard pictogram(s)



Signal word

Danger

Hazard statement(s)

May be corrosive to metals. (H290)  
 Causes severe skin burns and eye damage. (H314)

Precautionary statement(s)

General

-

Prevention

Do not breathe vapour/mist. (P260)  
 Wear face protection/protective gloves/protective clothing. (P280)

Response

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. (P303+P361+P353)  
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.  
 Continue rinsing. (P305+P351+P338)

Storage

Store in a container with a resistant inner liner. (P406)

Disposal

Dispose of contents/container in accordance with local regulation (P501)

Hazardous substances

sodium hydroxide;caustic soda

Additional labelling

Not applicable.

### 2.3. Other hazards

#### ▼ Additional warnings

This mixture/product does not contain any substances known to fulfil the criteria for PBT and vPvB classification.  
 This product does not contain any substances considered to be endocrine disruptors in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Not applicable. This product is a mixture.

### 3.2. Mixtures

Product/substance	Identifiers	% w/w	Classification	Note
sodium hydroxide;caustic soda	CAS No.: 1310-73-2 EC No.: 215-185-5 UK-REACH: 01-6126796028-6-0018 Index No.: 011-002-00-6	5-51%	Met. Corr. 1, H290 Skin Corr. 1A, H314 Eye Dam. 1, H318	

See full text of H-phrases in section 16. Occupational exposure limits are listed in section 8, if these are available.

## Other information

-

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

##### General information

In the case of accident: Contact a doctor or casualty department – take the label or this safety data sheet. Contact a doctor if in doubt about the injured person's condition or if the symptoms persist. Never give an unconscious person water or other drink.

##### Inhalation

Upon breathing difficulties or irritation of the respiratory tract: Bring the person into fresh air and stay with him/her.

##### ▼ Skin contact

Flush exposed area with water for a long time - at least 30 minutes. It may be necessary to flush for several hours. Use a comfortable water temperature (20-30 °C). Contact Poison Information/doctor/hospital for further advice on follow-up and treatment.

Upon irritation: rinse with water. In the event of continued irritation, seek medical assistance.

##### Eye contact

If in eyes: Flush eyes with plenty of water or salt water (20-30 °C) for at least 30 minutes and continue until irritation stops. Remove contact lenses. Make sure you flush under the upper and lower eyelids. Seek medical assistance immediately and continue flushing during transport.

##### Ingestion

In the case of ingestion, contact a doctor immediately. If the person is conscious, give them water. DO NOT try to induce vomiting unless this is recommended by a doctor. Hold head facing down to prevent vomit from returning to the mouth and throat. Prevent shock by keeping the injured person warm and calm. Initiate immediate resuscitation if breathing stops. If unconscious, roll the injured person into recovery position. Call an ambulance.

##### Burns

Not applicable.

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

Tissue-damaging effects: This product contains substances with skin corrosive properties. Inhaled vapour or aerosols may produce adverse effects to lungs, irritations and burns in the respiratory organs as well as coughing. Dermal contact and contact with the eye cause irreversible effects.

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

IF exposed or concerned:

Get immediate medical advice/attention.

##### Information to medics

Bring this safety data sheet or the label from this product.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media: Alcohol-resistant foam, carbon dioxide, powder, water mist.

Unsuitable extinguishing media: Waterjets should not be used, since they can spread the fire.

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

Fire will result in dense smoke. Exposure to combustion products may harm your health. Closed containers, which are exposed to fire, should be cooled with water. Do not allow fire-extinguishing water to enter the sewage system and nearby surface waters.

If the product is exposed to high temperatures, e.g. in the event of fire, dangerous decomposition compounds are produced. These are:

Some metal oxides

#### 5.3. Advice for firefighters

Wear self-contained breathing apparatus and protective clothing to prevent contact. Upon direct exposure contact The National Poisons Information Service (dial 111, 24 h service) in order to obtain further advice.

Hazchem Code: 2R

### SECTION 6: Accidental release measures

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

Avoid direct contact with spilled substances.

Ensure adequate ventilation, especially in confined areas.  
Contaminated areas may be slippery.

#### 6.2. Environmental precautions

Avoid discharge to lakes, streams, sewers, etc.  
Keep unauthorized persons away from the spill

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

Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations.  
Wherever possible cleaning should be performed with normal cleaning agents. Avoid use of solvents.

#### 6.4. Reference to other sections

See section 13 "Disposal considerations" on handling of waste.  
See section 8 "Exposure controls/personal protection" for protective measures.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Avoid direct contact with the product.  
Smoking, drinking and consumption of food is not allowed in the work area.  
See section 8 "Exposure controls/personal protection" for information on personal protection.

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

Containers that have been opened must be carefully resealed and kept upright to prevent leakage.  
Store in a container with a resistant inner liner.

##### Recommended storage material

Use containers made of the following materials: Suitable plastic material. Polyethylene-lined mild steel.

##### Storage temperature

Dry, cool and well ventilated  
Vessels should not be open to air

##### Incompatible materials

Strong acids  
Aluminium  
Magnesium  
Zinc  
Tin  
Bronze

#### 7.3. Specific end use(s)

This product should only be used for applications quoted in section 1.2.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

sodium hydroxide;caustic soda  
Short term exposure limit (15 minutes) (mg/m<sup>3</sup>): 2

The Control of Substances Hazardous to Health Regulations 2002. SI 2002/2677 The Stationery Office 2002.  
EH40/2005 Workplace exposure limits (Fourth Edition 2020).

#### DNEL

sodium hydroxide;caustic soda

Duration:	Route of exposure:	DNEL:
Long term – Local effects - Workers	Inhalation	1 mg/m <sup>3</sup>

#### PNEC

No data available.

#### 8.2. ▼ Exposure controls

Compliance with the given occupational exposure limits values should be controlled on a regular basis.

##### General recommendations

Smoking, drinking and consumption of food is not allowed in the work area.

##### Exposure scenarios

There are no exposure scenarios implemented for this product.

##### Exposure limits

Professional users are subjected to the legally set maximum concentrations for occupational exposure. See occupational hygiene limit values above.

#### Appropriate technical measures

The formation of vapours must be kept at a minimum and below current limit values (see above). Installation of a local exhaust system if normal air flow in the work room is not sufficient is recommended. Ensure eyewash and emergency showers are clearly marked.

Ensure that eyewash stations and safety showers are located within easy reach.

Apply standard precautions during use of the product. Avoid inhalation of vapours.

#### ▼ Hygiene measures

In between use of the product and at the end of the working day all exposed areas of the body must be washed thoroughly. Pay special attention to hands, forearms and face.

#### Measures to avoid environmental exposure

Keep damming materials near the workplace. If possible, collect spillage during work.

#### Individual protection measures, such as personal protective equipment


##### Generally

Use only UKCA marked protective equipment.




##### Respiratory Equipment

Type	Class	Colour	Standards
If mists are formed, a respirator must be worn. If ventilation is inadequate, suitable respiratory protection must be worn. Wear a respirator fitted with the following cartridge: Particulate filter, type P2.			


##### Skin protection

Recommended	Type/Category	Standards
Chemical suit, PVC		

##### Hand protection

Material	Glove thickness (mm)	Breakthrough time (min.)	Standards	
Cotton/Latex	-	> 120	EN374-2, EN374-3, EN388	
Vinyl/PVC	-	-	EN388	
Latex/Neoprene	0.6	-	EN374-2, EN388	

##### Eye protection

Type	Standards	
Chemical splash goggles		
Face shield	EN166	

## SECTION 9: Physical and chemical properties

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

#### Physical state

Liquid

#### Colour

Colourless

#### Odour / Odour threshold

Odourless

#### pH

-

#### pH in solution

(14%)

#### Density (g/cm<sup>3</sup>)

-

#### Relative density

For 50% Membrane grade (20 °C)

#### Kinematic viscosity

For 50% Membrane grade cP (20 °C)

#### Particle characteristics

Does not apply to liquids.

### Phase changes

#### Melting point/Freezing point (°C)

12 For 50% Membrane grade

#### Softening point/range (waxes and pastes) (°C)

Does not apply to liquids.

#### Boiling point (°C)

142°C @ For 50% Membrane grade

#### Vapour pressure

Testing not relevant or not possible due to the nature of the product.

#### Relative vapour density

Testing not relevant or not possible due to the nature of the product.

#### Decomposition temperature (°C)

Testing not relevant or not possible due to the nature of the product.

### Data on fire and explosion hazards

#### Flash point (°C)

Testing not relevant or not possible due to the nature of the product.

#### Flammability (°C)

Testing not relevant or not possible due to the nature of the product.

#### Auto-ignition temperature (°C)

Testing not relevant or not possible due to the nature of the product.

#### Lower and upper explosion limit (% v/v)

Testing not relevant or not possible due to the nature of the product.

### Solubility

#### Solubility in water

Miscible with Water

#### n-octanol/water coefficient (LogKow)

Testing not relevant or not possible due to the nature of the product.

#### Solubility in fat (g/L)

Testing not relevant or not possible due to the nature of the product.

### 9.2. Other information

#### Decomposition temperature (Self-reactive substances and mixtures) (°C)

Thermally stable to boiling point; does not decompose. Precipitation of metal hydroxide crystals can occur below 12C.

#### Oxidizing properties

Testing not relevant or not possible due to the nature of the product.

#### Other physical and chemical parameters

No data available.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No data available.

### 10.2. Chemical stability

The product is stable under the conditions, noted in section 7 "Handling and storage".

### 10.3. Possibility of hazardous reactions

None known.

### 10.4. Conditions to avoid

None known.

### 10.5. Incompatible materials

Strong acids

Aluminium

Magnesium

Zinc

Tin

Bronze

### 10.6. Hazardous decomposition products

Thermal decomposition may produce corrosive vapours.

## SECTION 11: Toxicological information

### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008 as retained and amended in UK law

#### Acute toxicity

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

#### Skin corrosion/irritation

Causes severe skin burns and eye damage.

#### Serious eye damage/irritation

Causes serious eye damage.

#### Respiratory sensitisation

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

#### Skin sensitisation

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

#### Germ cell mutagenicity

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

#### Carcinogenicity

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

#### Reproductive toxicity

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

#### STOT-single exposure

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

#### STOT-repeated exposure

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

#### Aspiration hazard

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

### 11.2. Information on other hazards

#### Long term effects

Tissue-damaging effects: This product contains substances with skin corrosive properties. Inhaled vapour or aerosols may produce adverse effects to lungs, irritations and burns in the respiratory organs as well as coughing. Dermal contact and contact with the eye cause irreversible effects.

#### ▼ Endocrine disrupting properties

This mixture/product does not contain any substances known to have hormone-disrupting properties in relation to health.

#### Other information

None known.

## SECTION 12: Ecological information

### 12.1. Toxicity

No data available.

### 12.2. ▼ Persistence and degradability

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

**12.3. ▼ Bioaccumulative potential**

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

**12.4. Mobility in soil**

No data available.

**12.5. ▼ Results of PBT and vPvB assessment**

This mixture/product does not contain any substances known to fulfil the criteria for PBT and vPvB classification.

**12.6. ▼ Endocrine disrupting properties**

This mixture/product does not contain any substances considered to have endocrine-disrupting properties in relation to the environment.

**12.7. Other adverse effects**

None known.

**SECTION 13: Disposal considerations**

**Waste treatment methods**

Product is covered by the regulations on hazardous waste.

HP 8 – Corrosive

Dispose of contents/container to an approved waste disposal plant.

Regulation (EU) No 1357/2014 of 18 December 2014 on waste as retained and amended in UK law.

**EWC code**



Not applicable.

**Specific labelling**

**Contaminated packing**

Packaging containing residues of the product must be disposed of similarly to the product.

**SECTION 14: Transport information**

	<b>14.1 UN / ID</b>	<b>14.2 UN proper shipping name</b>	<b>14.3 Hazard class(es)</b>	<b>14.4 PG*</b>	<b>14.5 Env**</b>	<b>Other information:</b>
ADR	UN1824	SODIUM HYDROXIDE SOLUTION	Transport hazard class: 8 Label: 8 Classification code: C5 	II	No	Limited quantities: 1 L Tunnel restriction code: (E) See below for additional information.
IMDG	UN1824	SODIUM HYDROXIDE SOLUTION	Transport hazard class: 8 Label: 8 Classification code: C5 	II	No	Limited quantities: 1 L EmS: F-A S-B See below for additional information.
IATA	UN1824	SODIUM HYDROXIDE SOLUTION	Transport hazard class: 8 Label: 8 Classification code: C5 	II	No	See below for additional information.

\* Packing group

\*\* Environmental hazards

**Additional information**

ADR / See Table A, section 3.2.1 for any information on special provisions, requirements, or warnings in connection with transport. See section 5.4.3, for instructions in writing regarding mitigation of damages in relation to incidents or

accidents during transport.

IMDG / See section 3.2.1, for any information on special provisions, requirements, or warnings in connection with transport.

IATA / See Table 4.2 for any information on special provisions, requirements, or warnings in connection with transport.

This product is within scope of the regulations of transport of dangerous goods.

Hazchem Code: 2R

#### 14.6. Special precautions for user

Not applicable.

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

No data available.

### SECTION 15: Regulatory information

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

##### Restrictions for application

Restricted to professional users.

People under the age of 18 shall not be exposed to this product.

##### Demands for specific education

No specific requirements.

##### SEVESO - Categories / dangerous substances

Not applicable.

##### Additional information

Not applicable.

##### Sources

The Management of Health and Safety at Work Regulations 1999.

Regulation (EU) No 1357/2014 of 18 December 2014 on waste as retained and amended in UK law.

Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP) as retained and amended in UK law.

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as retained and amended in UK law.

#### 15.2. Chemical safety assessment

No

### SECTION 16: Other information

#### Full text of H-phrases as mentioned in section 3

H290, May be corrosive to metals.

H314, Causes severe skin burns and eye damage.

H318, Causes serious eye damage.

#### The full text of identified uses as mentioned in section 1

= Intermediate Industrial use. pH regulating agent Treatment of drinking water, has received approval by the European Committee for Standardisation. Raw material. Washing and cleaning products Formulating packaged products Professional use Consumer use

#### ▼ Abbreviations and acronyms

ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway

ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road

ATE = Acute Toxicity Estimate

BCF = Bioconcentration Factor

CAS = Chemical Abstracts Service

CE = Conformité Européenne (European conformity)

CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]

CSA = Chemical Safety Assessment

CSR = Chemical Safety Report

DMEL = Derived Minimal Effect Level

DNEL = Derived No Effect Level

EINECS = European Inventory of Existing Commercial chemical Substances

ES = Exposure Scenario

EUH statement = CLP-specific Hazard statement

EuPCS = European Product Categorisation System

EWC = European Waste Catalogue

GHS = Globally Harmonized System of Classification and Labelling of Chemicals  
IARC = International Agency for Research on Cancer (IARC)  
IATA = International Air Transport Association  
IBC = Intermediate Bulk Container  
IMDG = International Maritime Dangerous Goods  
LogPow = logarithm of the octanol/water partition coefficient  
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)  
OECD = Organisation for Economic Co-operation and Development  
PBT = Persistent, Bioaccumulative and Toxic  
PNEC = Predicted No Effect Concentration  
RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail  
RRN = REACH Registration Number  
SCL = A specific concentration limit  
SVHC = Substances of Very High Concern  
STOT-RE = Specific Target Organ Toxicity - Repeated Exposure  
STOT-SE = Specific Target Organ Toxicity - Single Exposure  
TWA = Time weighted average  
UN = United Nations  
UVBC = Unknown or variable composition, complex reaction products or of biological materials  
VOC = Volatile Organic Compound  
vPvB = Very Persistent and Very Bioaccumulative

#### Additional information

The classification of the substance/mixture in regard of health hazards are in accordance with the calculation methods given by Regulation (EC) No. 1272/2008 (CLP) as retained and amended in UK law.

#### ▼ The safety data sheet is validated by

LWetton

#### Other

A change (in proportion to the last essential change (first cipher in SDS version, see section 1)) is marked with a blue triangle.

The information in this safety data sheet applies only to this specific product (mentioned in section 1) and is not necessarily correct for use with other chemicals/products.

It is recommended to hand over this safety data sheet to the actual user of the product. Information in this safety data sheet cannot be used as a product specification.

Country-language: GB-en



## SAFETY DATA SHEET SULPHURIC ACID 15 - 50%

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

#### 1.1. Product identifier

Product name	SULPHURIC ACID 15 - 50%
Product number	22900
Synonyms; trade names	VO-PH 8100, SULPHURIC ACID 16%, SULPHURIC ACID 37%, SULPHURIC ACID 50%, SULPHURIC ACID 20%, SULPHURIC ACID 30%, SULPHURIC ACID 37.5% SOL, SULPHURIC ACID 25%, SULPHURIC ACID 30% SOLUTION, SULPHURIC ACID 36%, SULPHURIC ACID 34%, SULPHURIC ACID 40%, SULPHURIC ACID 36 SOLUTION, BATTERY ACID 1350 (45%), SULPHURIC ACID 50% UNI 899:2009, IMA MINI LIQUIDE, SULPHURIC ACID 15% SOL, pH LESS, BATTERY ACID 1280 (38%), SULPHURIC ACID 50% AD, SULPHURIC ACID 38.3%, SULPHURIC ACID MAX. 40%, PH MINUS ASB, BATTERY ACID 1140 20% SOL, SULPHURIC ACID 37% FCC ed 7, BATTERY ACID 30% SOL, BATTERY ACID 1400 50% SOLUTION, BATTERY ACID 1180 25% SOL, BATTERY ACID 1240 33% SOL, BATTERY ACID 1260 35% SOL, SULPHURIC ACID 44%, GRANUDOS CLEANING ACID 35%, GRANUDOS CLEANINGACID 45%, PH MINUS LIQUID 25% CPS, PH MINUS LIQUID 15%, BATTERY ACID 40%, BATTERY ACID 1100 15% SOL
REACH registration number	01-2119458838-20-XXXX
CAS number	7664-93-9
EU index number	016-020-00-8
EC number	231-639-5

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

Identified uses	Chemical Chemical Intermediate Process Additive Industrial cleaner Laboratory reagent.
-----------------	--

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

Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com
----------	--

#### 1.4. Emergency telephone number

Emergency telephone	SGS - +32 (0)3 575 55 55 (24h)
Sds No.	22900

### SECTION 2: Hazards identification

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

##### Classification (EC 1272/2008)

Physical hazards	Not Classified
------------------	----------------

## SULPHURIC ACID 15 - 50%

**Health hazards** Skin Corr. 1A - H314 Eye Dam. 1 - H318

**Environmental hazards** Not Classified

### 2.2. Label elements

**EC number** 231-639-5

**Hazard pictograms**



**Signal word** Danger

**Hazard statements** H314 Causes severe skin burns and eye damage.

**Precautionary statements** P260 Do not breathe vapour/ spray.  
 P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
 P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  
 P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.  
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P501 Dispose of contents/ container in accordance with national regulations.

**Supplemental label information** Acquisition, possession or use by the general public is restricted.

### 2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

**Product name** SULPHURIC ACID 15 - 50%

**REACH registration number** 01-2119458838-20-XXXX

**EU index number** 016-020-00-8

**CAS number** 7664-93-9

**EC number** 231-639-5

**Composition comments** The data shown are in accordance with the latest EC Directives.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

**Inhalation** Move affected person to fresh air at once. Get medical attention immediately.

**Ingestion** Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Never give anything by mouth to an unconscious person. Do not induce vomiting. Get medical attention immediately.

**Skin contact** Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention immediately.

**Eye contact** Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention immediately. Continue to rinse.

## SULPHURIC ACID 15 - 50%

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

Inhalation	Coughing, chest tightness, feeling of chest pressure.
Ingestion	May cause chemical burns in mouth and throat.
Skin contact	May cause serious chemical burns to the skin.
Eye contact	Causes serious eye damage. May cause permanent damage if eye is not immediately irrigated.

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

Notes for the doctor	No specific recommendations. If in doubt, get medical attention promptly.
----------------------	---

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media	Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.

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

Specific hazards	When heated and in case of fire, toxic vapours/gases may be formed.
Hazardous combustion products	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours. Oxides of the following substances: Sulphur. Carbon.

### 5.3. Advice for firefighters

Special protective equipment for firefighters	Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.
---	---

## SECTION 6: Accidental release measures

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

Personal precautions	Provide adequate ventilation. Wear protective clothing as described in Section 8 of this safety data sheet. Follow precautions for safe handling described in this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes.
----------------------	---

### 6.2. Environmental precautions

Environmental precautions	Do not discharge into drains or watercourses or onto the ground. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.
---------------------------	--

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

Methods for cleaning up	Stop leak if safe to do so. Absorb spillage with non-combustible, absorbent material. Neutralise spilled material with crushed limestone, slaked lime (calcium hydroxide), soda ash (sodium carbonate) or sodium bicarbonate. Collect and place in suitable waste disposal containers and seal securely. Label the containers containing waste and contaminated materials and remove from the area as soon as possible. Flush contaminated area with plenty of water. For waste disposal, see Section 13.
-------------------------	---

### 6.4. Reference to other sections

Reference to other sections	Wear protective clothing as described in Section 8 of this safety data sheet. For waste disposal, see Section 13.
-----------------------------	---

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

## SULPHURIC ACID 15 - 50%

### Usage precautions

Provide adequate ventilation. Wear protective clothing as described in Section 8 of this safety data sheet. Follow precautions for safe handling described in this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. Avoid spilling.

### Advice on general occupational hygiene

Do not eat, drink or smoke when using this product. Wash after use and before eating, smoking and using the toilet. Remove contaminated clothing and protective equipment before entering eating areas. Take off immediately all contaminated clothing and wash it before reuse. Eye wash facilities and emergency shower must be available when handling this product.

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

#### Storage precautions

Store in tightly-closed, original container in a dry, cool and well-ventilated place. Avoid contact with the following materials: Strong alkalis. Strong oxidising agents. Strong reducing agents.

#### Storage class

Corrosive storage.

### 7.3. Specific end use(s)

#### Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

## SECTION 8: Exposure controls/Personal protection

### 8.1. Control parameters

#### Occupational exposure limits

Long-term exposure limit (8-hour TWA): WEL 0,05 mg/m<sup>3</sup>

Short-term exposure limit (15-minute): WEL

WEL = Workplace Exposure Limit

### Ingredient comments

WEL = Workplace Exposure Limits

### 8.2. Exposure controls

#### Protective equipment



### Appropriate engineering controls

Provide adequate general and local exhaust ventilation. As this product contains ingredients with exposure limits, process enclosures, local exhaust ventilation or other engineering controls should be used to keep worker exposure below any statutory or recommended limits, if use generates dust, fumes, gas, vapour or mist. Eye wash facilities and emergency shower must be available when handling this product.

### Eye/face protection

Eyewear complying with an approved standard should be worn if a risk assessment indicates eye contact is possible. The following protection should be worn: Wear tight-fitting, chemical splash goggles or face shield. Personal protective equipment for eye and face protection should comply with European Standard EN166.

### Hand protection

The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. The selected gloves should have a breakthrough time of at least 8 hours. Viton rubber (fluoro rubber). Thickness: > 0.7 mm To protect hands from chemicals, gloves should comply with European Standard EN374.

### Other skin and body protection

Wear appropriate clothing to prevent any possibility of liquid contact and repeated or prolonged vapour contact.

## SULPHURIC ACID 15 - 50%

<b>Hygiene measures</b>	When using do not eat, drink or smoke. Wash at the end of each work shift and before eating, smoking and using the toilet. Remove contaminated clothing and protective equipment before entering eating areas. Eye wash facilities and emergency shower must be available when handling this product.
<b>Respiratory protection</b>	Respiratory protection complying with an approved standard should be worn if a risk assessment indicates inhalation of contaminants is possible. Ensure all respiratory protective equipment is suitable for its intended use and is 'CE'-marked. If ventilation is inadequate, suitable respiratory protection must be worn. Gas filter, type E. EN 136/140/141/145/143/149

### SECTION 9: Physical and chemical properties

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

<b>Appearance</b>	Liquid.
<b>Colour</b>	Colourless.
<b>Odour</b>	Odourless.
<b>Odour threshold</b>	No information available.
<b>pH</b>	pH (concentrated solution): <1
<b>Melting point</b>	<-8°C
<b>Initial boiling point and range</b>	100°C
<b>Flash point</b>	No information available.
<b>Evaporation rate</b>	No information available.
<b>Evaporation factor</b>	No information available.
<b>Flammability (solid, gas)</b>	No information available.
<b>Upper/lower flammability or explosive limits</b>	No information available.
<b>Other flammability</b>	No information available.
<b>Vapour pressure</b>	No information available.
<b>Vapour density</b>	No information available.
<b>Relative density</b>	1.10 - 1.40 @ 15°C
<b>Bulk density</b>	No information available.
<b>Solubility(ies)</b>	Soluble in water.
<b>Partition coefficient</b>	Not available.
<b>Auto-ignition temperature</b>	No information available.
<b>Decomposition Temperature</b>	No information available.
<b>Viscosity</b>	No information available.
<b>Explosive properties</b>	No information available.
<b>Explosive under the influence of a flame</b>	No information available.
<b>Oxidising properties</b>	Not available.

#### 9.2. Other information

## SULPHURIC ACID 15 - 50%

<b>Other information</b>	Not determined.
<b>Refractive index</b>	No information available.
<b>Particle size</b>	No information available.
<b>Molecular weight</b>	No information available.
<b>Volatility</b>	No information available.
<b>Saturation concentration</b>	No information available.
<b>Critical temperature</b>	No information available.
<b>Volatile organic compound</b>	No information available.

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

**Reactivity** There are no known reactivity hazards associated with this product.

#### 10.2. Chemical stability

**Stability** Stable at normal ambient temperatures and when used as recommended.

#### 10.3. Possibility of hazardous reactions

**Possibility of hazardous reactions** Not determined.

#### 10.4. Conditions to avoid

**Conditions to avoid** Avoid excessive heat for prolonged periods of time.

#### 10.5. Incompatible materials

**Materials to avoid** Strong alkalis. Strong oxidising agents. Strong reducing agents.

#### 10.6. Hazardous decomposition products

**Hazardous decomposition products** Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours. Oxides of the following substances: Sulphur. Carbon.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

##### Acute toxicity - oral

**Notes (oral LD<sub>50</sub>)** No information available.

##### Skin corrosion/irritation

**Animal data** Causes severe burns.

##### Serious eye damage/irritation

**Serious eye damage/irritation** Causes serious eye damage.

##### Respiratory sensitisation

**Respiratory sensitisation** No information available.

##### Skin sensitisation

**Skin sensitisation** No information available.

##### Germ cell mutagenicity

**Genotoxicity - in vitro** No information available.

##### Carcinogenicity

## SULPHURIC ACID 15 - 50%

**Carcinogenicity** No information available.

### Reproductive toxicity

**Reproductive toxicity - fertility** No information available.

### Specific target organ toxicity - single exposure

**STOT - single exposure** No information available.

### Specific target organ toxicity - repeated exposure

**STOT - repeated exposure** No information available.

### Aspiration hazard

**Aspiration hazard** No information available.

**Inhalation** Gas or vapour in high concentrations may irritate the respiratory system. This product is corrosive. Coughing, chest tightness, feeling of chest pressure.

**Ingestion** May cause chemical burns in mouth, oesophagus and stomach.

**Skin contact** Corrosive. May cause serious chemical burns to the skin. Prolonged contact causes serious tissue damage.

**Eye contact** Causes serious eye damage. May cause permanent damage if eye is not immediately irrigated.

## SECTION 12: Ecological information

**Ecotoxicity** The product may affect the acidity (pH) of water which may have hazardous effects on aquatic organisms.

### 12.1. Toxicity

**Toxicity** No information available.

### 12.2. Persistence and degradability

**Persistence and degradability** Not applicable.

### 12.3. Bioaccumulative potential

**Bioaccumulative potential** The product is not bioaccumulating.

**Partition coefficient** Not available.

### 12.4. Mobility in soil

**Mobility** The product is soluble in water.

### 12.5. Results of PBT and vPvB assessment

**Results of PBT and vPvB assessment** This substance is not classified as PBT or vPvB according to current EU criteria.

### 12.6. Other adverse effects

**Other adverse effects** Not determined.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

**General information** Waste is classified as hazardous waste. Do not puncture or incinerate, even when empty.

**Disposal methods** Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

## SULPHURIC ACID 15 - 50%

### SECTION 14: Transport information

**General** Wear protective clothing as described in Section 8 of this safety data sheet.

#### 14.1. UN number

UN No. (ADR/RID)	2796
UN No. (IMDG)	2796
UN No. (ICAO)	2796
UN No. (ADN)	2796

#### 14.2. UN proper shipping name

Proper shipping name (ADR/RID)	SULPHURIC ACID or BATTERY FLUID, ACID
Proper shipping name (IMDG)	SULPHURIC ACID or BATTERY FLUID, ACID
Proper shipping name (ICAO)	SULPHURIC ACID or BATTERY FLUID, ACID
Proper shipping name (ADN)	SULPHURIC ACID or BATTERY FLUID, ACID

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

ADR/RID class	8
ADR/RID classification code	C1
ADR/RID label	8
IMDG class	8
ICAO class/division	8
ADN class	8

#### Transport labels



#### 14.4. Packing group

ADR/RID packing group	II
IMDG packing group	II
ICAO packing group	II
ADN packing group	II

#### 14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant  
No.

#### 14.6. Special precautions for user

EmS	F-A, S-B
ADR transport category	2
Emergency Action Code	2R

## SULPHURIC ACID 15 - 50%

Hazard Identification Number 80  
(ADR/RID)

Tunnel restriction code (E)

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not determined.

## SECTION 15: Regulatory information

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

**EU legislation**

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

Commission Regulation (EU) No 2015/830 of 28 May 2015.

### 15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

### Inventories

#### **EU - EINECS/ELINCS**

All the ingredients are listed or exempt.

## SECTION 16: Other information

## SULPHURIC ACID 15 - 50%

### Abbreviations and acronyms used in the safety data sheet

ATE: Acute Toxicity Estimate.  
 ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.  
 ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.  
 CAS: Chemical Abstracts Service.  
 DNEL: Derived No Effect Level.  
 IATA: International Air Transport Association.  
 IMDG: International Maritime Dangerous Goods.  
 Kow: Octanol-water partition coefficient.  
 LC<sub>50</sub>: Lethal Concentration to 50 % of a test population.  
 LD<sub>50</sub>: Lethal Dose to 50% of a test population (Median Lethal Dose).  
 PBT: Persistent, Bioaccumulative and Toxic substance.  
 PNEC: Predicted No Effect Concentration.  
 REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.  
 RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.  
 vPvB: Very Persistent and Very Bioaccumulative.  
 IARC: International Agency for Research on Cancer.  
 MARPOL 73/78: International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978.  
 cATpE: Converted Acute Toxicity Point Estimate.  
 BCF: Bioconcentration Factor.  
 BOD: Biochemical Oxygen Demand.  
 EC<sub>50</sub>: 50% of maximal Effective Concentration.  
 LOAEC: Lowest Observed Adverse Effect Concentration.  
 LOAEL: Lowest Observed Adverse Effect Level.  
 NOAEC: No Observed Adverse Effect Concentration.  
 NOAEL: No Observed Adverse Effect Level.  
 NOEC: No Observed Effect Concentration.  
 LOEC: Lowest Observed Effect Concentration.  
 DMEL: Derived Minimal Effect Level.  
 EL50: Exposure Limit 50  
 hPa: Hectopascal  
 LL50: Lethal Loading fifty  
 OECD: Organisation for Economic Co-operation and Development  
 POW: Octanol-water partition coefficient  
 SCBA: self-contained breathing apparatus  
 STP: Sewage Treatment Plant  
 VOC: Volatile Organic Compounds

### Classification abbreviations and acronyms

Acute Tox. = Acute toxicity  
 Aquatic Acute = Hazardous to the aquatic environment (acute)  
 Aquatic Chronic = Hazardous to the aquatic environment (chronic)

### Key literature references and sources for data

Supplier's information.

### Revision comments

NOTE: Lines within the margin indicate significant changes from the previous revision.

Revision date

13/08/2019

Version number

3.000

Supersedes date

04/06/2019

SDS number

22900

## SULPHURIC ACID 15 - 50%

**SDS status**

Approved.

**Hazard statements in full**

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

**Signature**

Lisa Bland



## Exposure scenario

Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

### 1. Title of exposure scenario

<b>Main title</b>	Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers
<b>Process scope</b>	Use as an intermediate
<b>Product category</b>	PC19 Intermediate.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU4 Manufacture of food products SU6b Manufacture of pulp, paper and paper products SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals SU14 Manufacture of basic metals, including alloys

#### Environment

<b>Environmental release category</b>	ERC6a Use of intermediate
---------------------------------------	---------------------------

#### Worker

## Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

**Environmental release category** ERC6a Use of intermediate

#### Product characteristics

**Physical state** Liquid

**Concentration details** Percentage of risk driving substance contained in product: >90%

#### Amounts used

Daily amount per site: 100 - 500 tonnes

#### Frequency and duration of use

Continuous use/release.

#### Risk management measures

**Technical measures** Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

#### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p>
-------------------------	---

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Outdoor.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

<b>Technical protective measures</b>	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Handle substance within a closed system. Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.
--------------------------------------	---

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

## Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
Use a full-face respirator, selected in accordance with EN 529.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC6a Use of intermediate

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 0.00088 mg/l, PNEC 0.0025 mg/l, RCR 0.352  
freshwater sediment: Exposure 0.00073 mg/l, PNEC 0.002 mg/l, RCR 0.365  
Marine water: Exposure 0.00012 mg/l, PNEC 0.00025 mg/l, RCR 0.48  
marine sediment: Exposure 0.000103 mg/l, PNEC 0.002 mg/l, RCR 0.051

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure**

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
Worker - inhalation, short-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.2e-3  
Worker - inhalation, long-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.4e-3

PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-1  
Worker - inhalation, long-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-1

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities  
Worker - inhalation, short-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.3e-1  
Worker - inhalation, long-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 4.6e-1

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure 1.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.2e-3  
Worker - inhalation, long-term - local: Exposure 4.8e-6 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-5

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
Worker - inhalation, short-term - local: Exposure 3.2e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 3.2e-2  
Worker - inhalation, long-term - local: Exposure 2.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 5.6e-2



**Exposure scenario**  
**Use as a Processing aid, catalyst, dehydrating agent and pH regulator**

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

### 1. Title of exposure scenario

<b>Main title</b>	Use as a Processing aid, catalyst, dehydrating agent and pH regulator
<b>Product category</b>	PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU4 Manufacture of food products SU5 Manufacture of textiles, leather, fur SU6b Manufacture of pulp, paper and paper products SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals SU11 Manufacture of rubber products SU23 Electricity, steam, gas, water supply and sewage treatment

#### Environment

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

## Use as a Processing aid, catalyst, dehydrating agent and pH regulator

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

**Environmental release category** ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

#### Product characteristics

**Physical state** Liquid

**Concentration details** Percentage of risk driving substance contained in product: >90%

#### Amounts used

Daily amount per site: 100 - 500 tonnes

#### Frequency and duration of use

Continuous use/release.

#### Risk management measures

**Technical measures** Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

#### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Use as a Processing aid, catalyst, dehydrating agent and pH regulator

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Outdoor.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

<b>Technical protective measures</b>	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.
--------------------------------------	---

## Use as a Processing aid, catalyst, dehydrating agent and pH regulator

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
Use a full-face respirator, selected in accordance with EN 529.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 5.9e-6 mg/l, PNEC 0.0025 mg/l, RCR 2.3e-3  
freshwater sediment: Exposure 4.75e-6 mg/l, PNEC 0.002 mg/l, RCR 2.35e-3  
Marine water: Exposure 8.56e-7 mg/l, PNEC 0.00025 mg/l, RCR 3.4e-3  
marine sediment: Exposure 6.9e-7 mg/l, PNEC 0.002 mg/l, RCR 3.4e-4  
  
The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.3e-9 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.3e-8  
Worker - dermal, long-term - local: Exposure 3.6e-9 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.9e-7  
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
Worker - inhalation, short-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.2e-3  
Worker - inhalation, long-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.4e-3  
PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-1  
Worker - inhalation, long-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-1  
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities  
Worker - inhalation, short-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.3e-1  
Worker - inhalation, long-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 4.6e-1  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure 1.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.2e-3  
Worker - inhalation, long-term - local: Exposure 4.8e-6 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-5  
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
Worker - inhalation, short-term - local: Exposure 3.2e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 3.2e-2  
Worker - inhalation, long-term - local: Exposure 2.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 5.6e-2  
PROC13 Treatment of articles by dipping and pouring.  
Worker - inhalation, short-term - local: Exposure 1.8e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.8e-1  
Worker - inhalation, long-term - local: Exposure 6.2e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 3.2e-1



## Exposure scenario

### Use for extractions and processing of minerals and ores

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use for extractions and processing of minerals and ores
<b>Product category</b>	PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC40 Extraction agents.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU2a Mining (without offshore industries) SU14 Manufacture of basic metals, including alloys

#### Environment

<b>Environmental release category</b>	ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises
-------------------------	---

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Control of environmental exposure

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

##### Product characteristics

<b>Physical state</b>	Liquid
-----------------------	--------

## Use for extractions and processing of minerals and ores

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual amount per site: 480 tonnes  
Worst case assumption

### Frequency and duration of use

Continuous use/release.

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

**Technical measures** Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
PROC4 Chemical production where opportunity for exposure arises

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure < 0.5 kPa at STP.

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual site tonnage: 480 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

**Setting** Outdoor.

**Temperature** Assumes activities reflect a hot process.

**Ventilation rate** Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

## Use for extractions and processing of minerals and ores

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Handle substance within a closed system. Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)  
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

**Assessment method** Used EUSES model.

**Environmental exposure** ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)  
Fresh water: Exposure 2.5e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.01  
freshwater sediment: Exposure 2.0e-5 mg/l, PNEC 0.002 mg/l, RCR 0.01  
Marine water: Exposure 3.6e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0144  
marine sediment: Exposure 2.9e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0145  
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)  
Fresh water: Exposure 2.6e-8 mg/l, PNEC 0.0025 mg/l, RCR 1.1e-4  
freshwater sediment: Exposure 2.0e-8 mg/l, PNEC 0.002 mg/l, RCR 1.0e-5  
Marine water: Exposure 3.8e-9 mg/l, PNEC 0.00025 mg/l, RCR 31.5e-5  
marine sediment: Exposure 3.0e-9 mg/l, PNEC 0.002 mg/l, RCR 1.0e-6

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
Worker - inhalation, short-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.2e-3  
Worker - inhalation, long-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.4e-3  
PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-1  
Worker - inhalation, long-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-1



## Exposure scenario

### Use in surface treatments, purification and etching

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in surface treatments, purification and etching
<b>Product category</b>	PC14 Metal surface treatment products PC15 Non-metal-surface treatment products.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU2a Mining (without offshore industries) SU14 Manufacture of basic metals, including alloys SU15 Manufacture of fabricated metal products, except machinery and equipment SU16 Manufacture of computer, electronic and optical products, electrical equipment

#### Environment

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

## Use in surface treatments, purification and etching

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

**Environmental release category** ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

#### Product characteristics

**Physical state** Liquid

**Concentration details** Percentage of risk driving substance contained in product: >90%

#### Amounts used

Annual amount per site: 50 - 200 tonnes

#### Frequency and duration of use

Continuous use/release.

#### Risk management measures

**Technical measures** Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

#### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Use in surface treatments, purification and etching

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual amount per site: 200 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor. Unless otherwise stated. PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Outdoor.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

## Use in surface treatments, purification and etching

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 5.9e-7 mg/l, PNEC 0.0025 mg/l, RCR 2.3e-4  
freshwater sediment: Exposure 4.75e-7 mg/l, PNEC 0.002 mg/l, RCR 2.35e-4  
Marine water: Exposure 8.56e-8 mg/l, PNEC 0.00025 mg/l, RCR 3.4e-5  
marine sediment: Exposure 6.9e-8 mg/l, PNEC 0.002 mg/l, RCR 3.4e-5

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

## Use in surface treatments, purification and etching

### Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.3e-9$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.3e-8$

Worker - inhalation, long-term - local: Exposure  $3.6e-9$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.9e-7$

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.2e-7$

Worker - inhalation, long-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.8e-6$

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - inhalation, short-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $4.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $8.4e-3$

PROC4 Chemical production where opportunity for exposure arises

Worker - inhalation, short-term - local: Exposure  $1.4e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.4e-1$

Worker - inhalation, long-term - local: Exposure  $1.4e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $2.8e-1$

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - inhalation, short-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $2.3e-1$

Worker - inhalation, long-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $4.6e-1$

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure  $1.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.8e-6$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $9.6e-5$

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure  $3.2e-3$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $3.2e-2$

Worker - inhalation, long-term - local: Exposure  $2.8e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $5.6e-2$

PROC13 Treatment of articles by dipping and pouring.

Worker - inhalation, short-term - local: Exposure  $1.8e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.8e-1$

Worker - inhalation, long-term - local: Exposure  $6.2e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $3.2e-1$



## Exposure scenario Use in electrolytic process

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

### 1. Title of exposure scenario

<b>Main title</b>	Use in electrolytic process
<b>Product category</b>	PC14 Metal surface treatment products PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU14 Manufacture of basic metals, including alloys SU15 Manufacture of fabricated metal products, except machinery and equipment SU17 General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment

#### Environment

<b>Environmental release category</b>	ERC5 Use at industrial site leading to inclusion into/onto article ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC13 Treatment of articles by dipping and pouring.
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

## Use in electrolytic process

**Environmental release category** ERC5 Use at industrial site leading to inclusion into/onto article  
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

### Product characteristics

**Physical state** Liquid

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 50 - 200 tonnes

### Frequency and duration of use

Continuous use/release.

### Risk management measures

**Technical measures** Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
PROC13 Treatment of articles by dipping and pouring.

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure < 0.5 kPa at STP.

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

## Use in electrolytic process

<b>Setting</b>	Indoor. Unless otherwise stated.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

<b>Environmental release category</b>	ERC5 Use at industrial site leading to inclusion into/onto article ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
<b>Assessment method</b>	Used EUSES model.
<b>Environmental exposure</b>	ERC5 Use at industrial site leading to inclusion into/onto article Fresh water: Exposure 6.81e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.039 freshwater sediment: Exposure 4.48e-5 mg/l, PNEC 0.002 mg/l, RCR 0.022 Marine water: Exposure 9.87e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.039 marine sediment: Exposure 7.94e-6 mg/l, PNEC 0.002 mg/l, RCR 3.9e-3 ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article) Fresh water: Exposure 1.36e-7 mg/l, PNEC 0.0025 mg/l, RCR 5.2e-5 freshwater sediment: Exposure 1.17e-7 mg/l, PNEC 0.002 mg/l, RCR 5.5e-5 Marine water: Exposure 1.97e-8 mg/l, PNEC 0.00025 mg/l, RCR 3.8e-4 marine sediment: Exposure 1.59e-8 mg/l, PNEC 0.002 mg/l, RCR 7.9e-6  The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

## Use in electrolytic process

### Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.3e-9$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.3e-8$

Worker - dermal, long-term - local: Exposure  $3.6e-9$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.9e-7$

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.2e-7$

Worker - inhalation, long-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.8e-6$

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure  $1.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.8e-6$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $9.6e-5$

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure  $3.2e-3$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $3.2e-2$

Worker - inhalation, long-term - local: Exposure  $2.8e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $5.6e-2$

PROC13 Treatment of articles by dipping and pouring.

Worker - inhalation, short-term - local: Exposure  $1.8e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.8e-1$

Worker - inhalation, long-term - local: Exposure  $6.2e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $3.2e-1$



## Exposure scenario

### Use in gas purification, scrubbing, flue gas scrubbing

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in gas purification, scrubbing, flue gas scrubbing
<b>Product category</b>	PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products)

#### Environment

<b>Environmental release category</b>	ERC7 Use of functional fluid at industrial site
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Control of environmental exposure

<b>Environmental release category</b>	ERC7 Use of functional fluid at industrial site
---------------------------------------	---

##### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

## Use in gas purification, scrubbing, flue gas scrubbing

### Amounts used

Annual site tonnage: 30000 tonnes

### Frequency and duration of use

Continuous use/release.

### Risk management measures

#### Technical measures

Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

#### Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure < 0.5 kPa at STP.

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

**Setting** Indoor. Unless otherwise stated.

**Temperature** Assumes activities reflect a hot process.

**Ventilation rate** Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

## Use in gas purification, scrubbing, flue gas scrubbing

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC7 Use of functional fluid at industrial site

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 8.86e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.0352  
freshwater sediment: Exposure 7.13e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0355  
Marine water: Exposure 1.28e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.048  
marine sediment: Exposure 1.03e-5 mg/l, PNEC 0.002 mg/l, RCR 0.005

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.3e-9 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.3e-8  
Worker - dermal, long-term - local: Exposure 3.6e-9 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.9e-7  
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure 1.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.2e-3  
Worker - inhalation, long-term - local: Exposure 4.8e-6 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-5



## Exposure scenario

### Use in production of lead acid batteries containing sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in production of lead acid batteries containing sulphuric acid
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU2a Mining (without offshore industries) SU14 Manufacture of basic metals, including alloys SU15 Manufacture of fabricated metal products, except machinery and equipment SU16 Manufacture of computer, electronic and optical products, electrical equipment

#### Environment

<b>Environmental release category</b>	ERC2 Formulation into mixture ERC5 Use at industrial site leading to inclusion into/onto article
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Control of environmental exposure

<b>Environmental release category</b>	ERC2 Formulation into mixture ERC5 Use at industrial site leading to inclusion into/onto article
---------------------------------------	---

##### Product characteristics

## Use in production of lead acid batteries containing sulphuric acid

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 90 %. Maximum concentration after dilution for use: 40 %

### Amounts used

Annual amount per site: 2500 tonnes

### Frequency and duration of use

Continuous use/release.

### Risk management measures

<b>Good practice</b>	Carefully handle the substance to minimise releases.
<b>Technical measures</b>	Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

<b>Air</b>	Exhaust air scrubber.
<b>Water</b>	Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

<b>Sludge treatment</b>	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
<b>Waste treatment</b>	Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
-------------------------	--

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Covers concentrations up to 90 %. Maximum concentration after dilution for use: 40 %

### Amounts used

Annual site tonnage: 2500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor. Unless otherwise stated.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently).

## Use in production of lead acid batteries containing sulphuric acid

**Ventilation rate** Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

**Environmental release category** ERC2 Formulation into mixture  
ERC5 Use at industrial site leading to inclusion into/onto article

**Assessment method** Used EUSES model.

**Environmental exposure** ERC2 Formulation into mixture  
Fresh water: Exposure 3.69e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.0147  
freshwater sediment: Exposure 2.97e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0148  
Marine water: Exposure 5.35e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0212  
marine sediment: Exposure 4.3e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0021  
ERC5 Use at industrial site leading to inclusion into/onto article  
Fresh water: Exposure 7.38e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.0295  
freshwater sediment: Exposure 5.94e-5 mg/l, PNEC 0.002 mg/l, RCR 0.029  
Marine water: Exposure 1.07e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.042  
marine sediment: Exposure 8.8e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0044

The use is assessed to be safe.

## 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

## Use in production of lead acid batteries containing sulphuric acid

### Exposure

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $1.6 \times 10^{-3}$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.6 \times 10^{-2}$

Worker - inhalation, long-term - local: Exposure  $1.4 \times 10^{-3}$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $2.8 \times 10^{-2}$

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - inhalation, short-term - local: Exposure  $1.6 \times 10^{-2}$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.6 \times 10^{-1}$

Worker - inhalation, long-term - local: Exposure  $1.4 \times 10^{-2}$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $2.8 \times 10^{-1}$

PROC4 Chemical production where opportunity for exposure arises

Worker - inhalation, short-term - local: Exposure  $1.4 \times 10^{-3}$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.4 \times 10^{-2}$

Worker - inhalation, long-term - local: Exposure  $1.2 \times 10^{-3}$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $2.4 \times 10^{-2}$

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure  $1.4 \times 10^{-3}$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.4 \times 10^{-2}$

Worker - inhalation, long-term - local: Exposure  $1.2 \times 10^{-3}$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $2.4 \times 10^{-2}$



## Exposure scenario

### Use in maintenance of sulphuric acid contained batteries

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in maintenance of sulphuric acid contained batteries
<b>Main sector</b>	SU22 Professional uses

#### Environment

<b>Environmental release category</b>	ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC9b Widespread use of functional fluid (outdoor)
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC19 Manual activities involving hand contact
-------------------------	---

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC9b Widespread use of functional fluid (outdoor)
---------------------------------------	---

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 90 %.

#### Amounts used

Annual site tonnage: 2500 tonnes  
Worst case assumption

#### Frequency and duration of use

Continuous use/release.

## Use in maintenance of sulphuric acid contained batteries

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC19 Manual activities involving hand contact

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers concentrations up to 90 %.

### Amounts used

Annual site tonnage: 2500 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** Assumes activities are at room temperature.

**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

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

**Organisational measures** Avoid carrying out activities involving exposure for more than 4 hours.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

**Environmental release category** ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
ERC9b Widespread use of functional fluid (outdoor)

**Assessment method** Used EUSES model.

**Environmental exposure** ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
Fresh water: Exposure 2.26e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.009  
freshwater sediment: Exposure 2.67e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0133  
marine sediment: Exposure 1.84e-5 mg/l, PNEC 0.002 mg/l, RCR 0.009  
Marine water: Exposure 2.26e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.09  
ERC9b Widespread use of functional fluid (outdoor)  
Fresh water: Exposure 5.64e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.02  
freshwater sediment: Exposure 1.84e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0092  
marine sediment: Exposure 4.69e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0023  
Marine water: Exposure 5.64e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.22

## 3. Exposure estimation (Health 1)

## Use in maintenance of sulphuric acid contained batteries

<b>Process category</b>	PROC19 Manual activities involving hand contact
<b>Assessment method</b>	Used ART model.
<b>Exposure</b>	Worker - inhalation, short-term - local: Exposure $2.3e-3$ mg/m <sup>3</sup> , DNEL 0.1 mg/m <sup>3</sup> , RCR $2.3e-2$ Worker - inhalation, long-term - local: Exposure $2.0e-3$ mg/m <sup>3</sup> , DNEL 0.1 mg/m <sup>3</sup> , RCR $2.0e-2$



## Exposure scenario

### Recycling of lead acid batteries containing sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Recycling of lead acid batteries containing sulphuric acid
<b>Main sector</b>	SU3 Industrial uses

#### Environment

<b>Environmental release category</b>	ERC1 Manufacture of the substance
---------------------------------------	-----------------------------------

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC1 Manufacture of the substance
---------------------------------------	-----------------------------------

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 40 %.

#### Amounts used

Annual amount per site: 2500 tonnes

## Recycling of lead acid batteries containing sulphuric acid

### Frequency and duration of use

Continuous use/release.

### Risk management measures

#### Good practice

Carefully handle the substance to minimise releases.

#### Technical measures

Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

#### Air

Exhaust air scrubber.

#### Water

Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

#### Sludge treatment

Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

#### Waste treatment

Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

#### Process category

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC4 Chemical production where opportunity for exposure arises  
 PROC5 Mixing or blending in batch processes  
 PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

### Product characteristics

#### Physical state

Liquid

#### Vapour pressure

Vapour pressure < 0.5 kPa at STP.

#### Concentration details

Covers concentrations up to 40 %.

### Amounts used

Annual site tonnage: 2500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

#### Setting

Indoor. Unless otherwise stated.

#### Temperature

Assumes activities are at ambient temperature (unless stated differently).

#### Ventilation rate

Handle substance within a predominantly closed system provided with extract ventilation.  
 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Technical conditions and measures at process level (source) to prevent release

## Recycling of lead acid batteries containing sulphuric acid

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC1 Manufacture of the substance

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 7.38e-6 mg/l, PNEC 0.0025 mg/l, RCR 0.00292  
freshwater sediment: Exposure 5.94e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0029  
Marine water: Exposure 1.07e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0042  
marine sediment: Exposure 8.6e-7 mg/l, PNEC 0.002 mg/l, RCR 4.3e-4

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 1.4e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-2  
Worker - inhalation, long-term - local: Exposure 1.2e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.4e-2  
PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 4.6e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.6e-2  
Worker - inhalation, long-term - local: Exposure 4.0e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.0e-2  
PROC5 Mixing or blending in batch processes  
Worker - inhalation, short-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR  
Worker - inhalation, long-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR  
Worker - inhalation, long-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR



## Exposure scenario

### Use of lead acid batteries containing sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use of lead acid batteries containing sulphuric acid
<b>Article category</b>	AC3 Electrical batteries and accumulators
<b>Main sector</b>	SU21 Consumer uses

#### Environment

<b>Environmental release category</b>	ERC9b Widespread use of functional fluid (outdoor)
---------------------------------------	--

#### Worker

<b>Process category</b>	PROC19 Manual activities involving hand contact
-------------------------	---

#### 2. Conditions of use affecting exposure (Non-industrial - Environment 1)

##### Control of environmental exposure (Non-industrial)

<b>Environmental release category</b>	ERC9b Widespread use of functional fluid (outdoor)
---------------------------------------	--

##### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 40 %.

##### Amounts used

Annual amount per site: 2500 tonnes  
Worst case assumption

##### Frequency and duration of use

## Use of lead acid batteries containing sulphuric acid

Intermittent.

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

## 2. Conditions of use affecting exposure (Non-industrial - Health 1)

### Control of Non-industrial exposure

**Process category** PROC19 Manual activities involving hand contact

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers concentrations up to 40 %.

### Amounts used

Annual amount per site: 2500 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).  
Worst case assumption

Avoid carrying out activities involving exposure for more than 4 hours.

### Other given operational conditions affecting Non-industrial exposure

**Setting** Indoor.

**Temperature** Assumes activities are at room temperature.

**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Other given operational conditions affecting Non-industrial exposure

**Exposure route** Inhalation Dermal

**Consumer information** Avoid using without gloves.

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. No specific risk management measure identified beyond those operational conditions stated.

## 3. Exposure estimation (Environment 1)

**Environmental release category** ERC9b Widespread use of functional fluid (outdoor)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 5.64e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.02  
freshwater sediment: Exposure 1.84e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0092  
marine sediment: Exposure 4.69e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0023  
Marine water: Exposure 5.64e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.22

## 3. Exposure estimation (Health 1)

**Process category** PROC19 Manual activities involving hand contact

**Assessment method** Used ART model.

**Exposure** Worker - inhalation, short-term - local: Exposure 2.3e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.3e-2  
Worker - inhalation, long-term - local: Exposure 2.0e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.0e-2



## Exposure scenario Use as a laboratory chemical

### Identification

Product name	Sulphuric Acid
REACH registration number	01-2119458838-20-XXXX
CAS number	7664-93-9
EC number	231-639-5
Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

### 1. Title of exposure scenario

Main title	Use as a laboratory chemical
Process scope	Use of small quantities within laboratory settings, including material transfers and equipment cleaning.
Product category	PC21 Laboratory chemicals.
Main sector	SU22 Professional uses
<b><u>Environment</u></b>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
<b><u>Worker</u></b>	
Process category	PROC15 Use as laboratory reagent.

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### **Control of environmental exposure**

Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
--------------------------------	--

#### **Product characteristics**

Physical state	Liquid
Concentration details	Covers concentrations up to 90 %.

#### **Amounts used**

## Use as a laboratory chemical

Annual site tonnage: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Continuous use/release.

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

**STP type** Onsite STP.

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC15 Use as laboratory reagent.

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers concentrations up to 90 %.

### Amounts used

Annual site tonnage: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** Assumes activities are at room temperature.

**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Handle in a fume cupboard or under extract ventilation.

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

**Organisational measures** Avoid carrying out activities involving exposure for more than 4 hours.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

**Environmental release category** ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
ERC9b Widespread use of functional fluid (outdoor)

**Assessment method** Used EUSES model.

## Use as a laboratory chemical

<b>Environmental exposure</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 1.34e-4 mg/l, PNEC 0.0025 mg/l, RCR 0.0536 freshwater sediment: Exposure 2.67e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0133 marine sediment: Exposure 6.04e-6 mg/l, PNEC 0.002 mg/l, RCR 0.003 Marine water: Exposure 1.08e-4 mg/l, PNEC 0.00025 mg/l, RCR 0.43 ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 2.21e-6 mg/l, PNEC 0.0025 mg/l, RCR 8.8e-4 freshwater sediment: Exposure 1.7e-6 mg/l, PNEC 0.002 mg/l, RCR 8.5e-4 marine sediment: Exposure 5.54e-8 mg/l, PNEC 0.002 mg/l, RCR 2.7e-5 Marine water: Exposure 5.54e-8 mg/l, PNEC 0.00025 mg/l, RCR 2.1e-4
-------------------------------	--

### 3. Exposure estimation (Health 1)

<b>Process category</b>	PROC15 Use as laboratory reagent.
<b>Assessment method</b>	Used ART model.
<b>Exposure</b>	Worker - inhalation, short-term - local: Exposure 2.7e-4 mg/m <sup>3</sup> , DNEL 0.1 mg/m <sup>3</sup> , RCR 2.7e-3 Worker - inhalation, long-term - local: Exposure 2.3e-4 mg/m <sup>3</sup> , DNEL 0.05 mg/m <sup>3</sup> , RCR 4.6e-3



## Exposure scenario Use in industrial cleaning

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

### 1. Title of exposure scenario

<b>Main title</b>	Use in industrial cleaning
<b>Product category</b>	PC35 Washing and cleaning products
<b>Main sector</b>	SU3 Industrial uses

#### Environment

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
---------------------------------------	--

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring.
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
---------------------------------------	--

## Use in industrial cleaning

### Product characteristics

Physical state	Liquid
Concentration details	Covers concentrations up to 10 %.

### Amounts used

Annual amount per site: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Intermittent.

### Risk management measures

Good practice	Ensure operatives are trained to minimise exposures. Carefully handle the substance to minimise releases.
Technical measures	Provide extract ventilation to points where emissions occur.
STP type	Onsite STP.

### Conditions and measures related to external treatment of waste for disposal

Sludge treatment	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
Waste treatment	Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

Process category	<p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC10 Roller application or brushing</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
------------------	--

### Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure < 0.5 kPa at STP.
Concentration details	Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual amount per site: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

## Use in industrial cleaning

<b>Setting</b>	Indoor.
<b>Temperature</b>	Assumes activities are at room temperature.
<b>Ventilation rate</b>	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
<b>Assessment method</b>	Used EUSES model.
<b>Environmental exposure</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 1.34e-4 mg/l, PNEC 0.0025 mg/l, RCR 0.0536 freshwater sediment: Exposure 2.67e-5 mg/l, PNEC 0.002 mg/l, RCR 0.013 Marine water: Exposure 1.08e-4 mg/l, PNEC 0.00025 mg/l, RCR 0.43 marine sediment: Exposure 6.04e-6 mg/l, PNEC 0.002 mg/l, RCR 0.003 ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 2.21e-6 mg/l, PNEC 0.0025 mg/l, RCR 8.8e-4 freshwater sediment: Exposure 1.7e-6 mg/l, PNEC 0.002 mg/l, RCR 8.5e-4 marine sediment: Exposure 5.54e-8 mg/l, PNEC 0.002 mg/l, RCR 2.7e-5 Marine water: Exposure 5.54e-8 mg/l, PNEC 0.00025 mg/l, RCR 2.1e-4  The use is assessed to be safe.

## 3. Exposure estimation (Health 1)

<b>Assessment method</b>	Used ART model.
--------------------------	-----------------

## Use in industrial cleaning

### Exposure

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure 5.5e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-3

Worker - inhalation, long-term - local: Exposure 4.8e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-3

PROC5 Mixing or blending in batch processes

Worker - inhalation, short-term - local: Exposure 6.1e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 6.1e-1

Worker - inhalation, long-term - local: Exposure 2.7e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 5.3e-2

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - inhalation, short-term - local: Exposure 5.5e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-2

Worker - inhalation, long-term - local: Exposure 4.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-2

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure 5.5e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-2

Worker - inhalation, long-term - local: Exposure 4.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-2

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure 5.5e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-2

Worker - inhalation, long-term - local: Exposure 4.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-2

PROC10 Roller application or brushing

Worker - inhalation, short-term - local: Exposure 3.0e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 3.0e-1

Worker - inhalation, long-term - local: Exposure 2.7e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 0.54

PROC13 Treatment of articles by dipping and pouring.

Worker - inhalation, short-term - local: Exposure 6.1e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 6.1e-2

Worker - inhalation, long-term - local: Exposure 5.3e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.1e-1



## Exposure scenario

### Use in the mixing, preparation and repackaging of sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in the mixing, preparation and repackaging of sulphuric acid
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU10 Formulation [mixing] of preparations and/or re-packaging

#### Environment

<b>Environmental release category</b>	ERC2 Formulation into mixture
---------------------------------------	-------------------------------

#### Worker

<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC2 Formulation into mixture
---------------------------------------	-------------------------------

#### Product characteristics

## Use in the mixing, preparation and repackaging of sulphuric acid

**Physical state** Liquid

**Concentration details** Covers concentrations up to 90 %.

### Amounts used

Annual amount per site: 300000 tonnes  
Worst case assumption

### Frequency and duration of use

Continuous use/release.

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

**Technical measures** Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
PROC5 Mixing or blending in batch processes  
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure < 0.5 kPa at STP.

**Concentration details** Covers concentrations up to 90 %.

### Amounts used

Annual site tonnage: 2500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

## Use in the mixing, preparation and repackaging of sulphuric acid

<b>Setting</b>	Indoor. Unless otherwise stated.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently).
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

<b>Environmental release category</b>	ERC2 Formulation into mixture
<b>Assessment method</b>	Used EUSES model.
<b>Environmental exposure</b>	Fresh water: Exposure 4.43e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.01 freshwater sediment: Exposure 3.56e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0178 Marine water: Exposure 6.42e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0256 marine sediment: Exposure 5.16e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0025  The use is assessed to be safe.

## 3. Exposure estimation (Health 1)

<b>Assessment method</b>	Used ART model.
--------------------------	-----------------

## Use in the mixing, preparation and repackaging of sulphuric acid

### Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.3e-9$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.3e-8$

Worker - inhalation, long-term - local: Exposure  $9.4e-9$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.9e-7$

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - inhalation, short-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $4.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $8.4e-3$

PROC5 Mixing or blending in batch processes

Worker - inhalation, short-term - local: Exposure  $1.8e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.8e-1$

Worker - inhalation, long-term - local: Exposure  $1.6e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $3.2e-1$

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - inhalation, short-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $2.3e-1$

Worker - inhalation, long-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $4.6e-1$

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure  $1.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.8e-6$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $9.6e-5$

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure  $3.2e-3$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $3.2e-2$

Worker - inhalation, long-term - local: Exposure  $2.8e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $5.6e-2$



## SAFETY DATA SHEET SULPHURIC ACID 51 - 99%

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

#### 1.1. Product identifier

Product name	SULPHURIC ACID 51 - 99%
Product number	22901
Synonyms; trade names	DIPPING ACID, HYDROGEN SULPHATE, NORDHAUSEN ACID, OIL OF VITRIOL, SPIRIT OF SULPHUR, VITRIOL BROWN OIL, SULPHURIC ACID 96% ACIPRO PLUS, SULPHURIC ACID PURISS, SULPHURIC ACID CHEM. PURE 96%, SULPHURIC ACID 98 - 99%, SULPHURIC ACID 98-99% Q.P, SULPHURIC ACID 78% SOL, SULPHURIC ACID 96% SOL, SULPHURIC ACID CP 96% SOL, SULPHURIC ACID 63.5%, SULPHURIC ACID 97%, SULPHURIC ACID 70%, SULPHURIC ACID 69% SOL, SULPHURIC ACID 90%, SULPHURIC ACID 96%, SULPHURIC ACID 96% UNI 899:2009, SULPHURIC ACID HG 96% SOL, SULPHURIC ACID CP 96% SOL PVS, SULPHURIC ACID 98% BP, SULPHURIC ACID 98% AR, SULPHURIC ACID MAX. 97%, SULPHURIC ACID 96% CZ, SULPHURIC ACID 65%, SULFURIC ACID 94%, SULPHURIC ACID 93%, SULPHURIC ACID 96% UM, SULPHURIC ACID 96% SOL, HYDREX 9536, SULPHURIC ACID 96% AR, SULPHURIC ACID 96% SOL SWDE, SULPHURIC ACID 98.8%, SULPHURIC ACID 96.5%, SULPHURIC ACID 60%, SULPHURIC ACID 70% SOL PVS, SULPHURIC ACID 77%, SULPHURIC ACID 55%, SULPHURIC ACID 78% SOL PVS, SULPHURIC ACID 79% SOL
REACH registration number	01-2119458838-20-XXXX
CAS number	7664-93-9
EU index number	016-020-00-8
EC number	231-639-5

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

Identified uses	Industrial application Chemical Intermediate Lab Reagent
-----------------	--

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

Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com
----------	---

#### 1.4. Emergency telephone number

Emergency telephone	SGS - +32 (0)3 575 55 55 (24h)
Sds No.	22901

### SECTION 2: Hazards identification

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

## SULPHURIC ACID 51 - 99%

### Classification (EC 1272/2008)

Physical hazards	Not Classified
Health hazards	Skin Corr. 1A - H314 Eye Dam. 1 - H318
Environmental hazards	Not Classified

### 2.2. Label elements

EC number 231-639-5

#### Hazard pictograms



Signal word Danger

Hazard statements H314 Causes severe skin burns and eye damage.

Precautionary statements P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.  
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P501 Dispose of contents/ container in accordance with national regulations.

Supplemental label information Acquisition, possession or use by the general public is restricted.

### 2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Product name	SULPHURIC ACID 51 - 99%
REACH registration number	01-2119458838-20-XXXX
EU index number	016-020-00-8
CAS number	7664-93-9
EC number	231-639-5
Composition comments	The data shown are in accordance with the latest EC Directives.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

Inhalation	Move affected person to fresh air at once. Get medical attention.
Ingestion	Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Do not induce vomiting. Get medical attention immediately.
Skin contact	Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention immediately.
Eye contact	Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention immediately. Continue to rinse.

## SULPHURIC ACID 51 - 99%

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

Inhalation	Inhalation of vapour or mist may cause lung oedema.
Ingestion	Causes severe burns.
Skin contact	Causes severe burns.
Eye contact	Causes severe burns. This product is strongly corrosive. Immediate first aid is imperative.

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

Notes for the doctor	No specific recommendations. If in doubt, get medical attention promptly.
----------------------	---

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media	Foam, carbon dioxide or dry powder.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.

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

Specific hazards	Oxides of the following substances: Sulphur. Reactions with the following materials may generate heat: Water
Hazardous combustion products	Fire or high temperatures create: Oxides of: Sulphur.

### 5.3. Advice for firefighters

Special protective equipment for firefighters	Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.
---	---

## SECTION 6: Accidental release measures

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

Personal precautions	Follow precautions for safe handling described in this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. Provide adequate ventilation.
----------------------	---

### 6.2. Environmental precautions

Environmental precautions	Avoid the spillage or runoff entering drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.
---------------------------	---

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

Methods for cleaning up	Neutralise spilled material with crushed limestone, slaked lime (calcium hydroxide), soda ash (sodium carbonate) or sodium bicarbonate. Flush contaminated area with plenty of water. Collect and place in suitable waste disposal containers and seal securely. For waste disposal, see Section 13.
-------------------------	--

### 6.4. Reference to other sections

Reference to other sections	Wear protective clothing as described in Section 8 of this safety data sheet.
-----------------------------	---

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Usage precautions	Avoid spilling. Avoid contact with skin and eyes. Avoid inhalation of vapours and spray/mists. Provide adequate ventilation. Never add water directly to this product as it may cause a vigorous reaction or boiling. Always dilute by carefully pouring the product into water.
-------------------	--

## SULPHURIC ACID 51 - 99%

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

**Storage precautions** May attack some plastics, rubber and coatings. Store in tightly-closed, original container in a well-ventilated place. Protect from freezing and direct sunlight. Do not store for long periods. Do not store in large quantities. Store away from the following materials: Reducing agents. Keep away from flammable and combustible materials. Moisture. Metals  
Flammable/combustible materials. Unsuitable container materials: Common metals.

**Storage class** Corrosive storage.

### 7.3. Specific end use(s)

**Specific end use(s)** The identified uses for this product are detailed in Section 1.2.

## SECTION 8: Exposure controls/Personal protection

### 8.1. Control parameters

#### Occupational exposure limits

Long-term exposure limit (8-hour TWA): WEL 0,05 mg/m<sup>3</sup>

Short-term exposure limit (15-minute): WEL 3 mg/m<sup>3</sup>

WEL = Workplace Exposure Limit.

**DNEL** Industry - Inhalation; Short term local effects: 0.1 mg/m<sup>3</sup>  
Industry - Inhalation; Long term local effects: 0.05 mg/m<sup>3</sup>

**PNEC**

- Fresh water; 0.0025 mg/l
- Sediment; 0.002 mg/l
- marine water; 0.00025 mg/l
- Sediment (Marinewater); 0.002 mg/l
- STP; 8.8 mg/l

### 8.2. Exposure controls

#### Protective equipment



#### Appropriate engineering controls

Provide adequate general and local exhaust ventilation.

#### Eye/face protection

Wear chemical splash goggles. Eyewear complying with an approved standard should be worn if a risk assessment indicates eye contact is possible. Personal protective equipment for eye and face protection should comply with European Standard EN166.

#### Hand protection

The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. Viton rubber (fluoro rubber). Thickness: 0.7 mm The selected gloves should have a breakthrough time of at least 8 hours. To protect hands from chemicals, gloves should comply with European Standard EN374.

#### Other skin and body protection

Wear suitable protective clothing as protection against splashing or contamination.

#### Hygiene measures

Provide eyewash station. Provide shower facilities near the workplace.

#### Respiratory protection

Respiratory protection must be used if the airborne contamination exceeds the recommended occupational exposure limit. Gas filter, type E. EN 136/140/141/145/143/149

## SECTION 9: Physical and chemical properties

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

## SULPHURIC ACID 51 - 99%

<b>Appearance</b>	Oily liquid. Hygroscopic. Liquid.
<b>Colour</b>	Colourless.
<b>Odour</b>	Odourless.
<b>Odour threshold</b>	No information available.
<b>pH</b>	pH (concentrated solution): <1
<b>Melting point</b>	~18 - -35°C
<b>Initial boiling point and range</b>	163 - 338°C
<b>Flash point</b>	No information available.
<b>Evaporation rate</b>	No information available.
<b>Evaporation factor</b>	No information available.
<b>Flammability (solid, gas)</b>	No information available.
<b>Upper/lower flammability or explosive limits</b>	No information available.
<b>Other flammability</b>	No information available.
<b>Vapour pressure</b>	0.04 - 2.14 kPa
<b>Vapour density</b>	3.4
<b>Relative density</b>	1.41 - 1.83 @ @ 20°C
<b>Bulk density</b>	No information available.
<b>Solubility(ies)</b>	Soluble in water.
<b>Partition coefficient</b>	log Pow: -2.20
<b>Auto-ignition temperature</b>	No information available.
<b>Decomposition Temperature</b>	274 - 340°C
<b>Viscosity</b>	11 - 28 mPa s @ 20°C
<b>Explosive properties</b>	Not considered to be explosive.
<b>Explosive under the influence of a flame</b>	No information available.
<b>Oxidising properties</b>	There are no chemical groups present in the product that are associated with oxidising properties.
<b><u>9.2. Other information</u></b>	
<b>Refractive index</b>	No information available.
<b>Particle size</b>	No information available.
<b>Molecular weight</b>	98.08
<b>Volatility</b>	No information available.
<b>Saturation concentration</b>	No information available.
<b>Critical temperature</b>	No information available.
<b>Volatile organic compound</b>	No information available.

## SULPHURIC ACID 51 - 99%

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

**Reactivity** Reactions with the following materials may generate heat: Water Organic materials The following materials may react violently with the product: Flammable/combustible materials. Alkalis - inorganic. Alkalis - organic. The following materials may react with the product: Strong reducing agents.

#### 10.2. Chemical stability

**Stability** Stable at normal ambient temperatures and when used as recommended. Reacts with water.

#### 10.3. Possibility of hazardous reactions

**Possibility of hazardous reactions** Reactions with the following materials may generate heat: Water

#### 10.4. Conditions to avoid

**Conditions to avoid** Avoid excessive heat for prolonged periods of time. Avoid heat, flames and other sources of ignition. Water, moisture.

#### 10.5. Incompatible materials

**Materials to avoid** Strong alkalis. Strong oxidising agents. Strong reducing agents. Water, steam, water mixtures. Amines. Alkalis - inorganic. Alkalis - organic. Metals Organic materials Flammable/combustible materials.

#### 10.6. Hazardous decomposition products

**Hazardous decomposition products** Oxides of the following substances: Sulphur. When water is added, the product reacts with a number of metals forming hydrogen gas, which may form explosive vapour/air mixtures.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

##### Acute toxicity - oral

**Acute toxicity oral (LD<sub>50</sub> mg/kg)** 2,140.0

**Species** Rat

##### Skin corrosion/irritation

**Skin corrosion/irritation** Causes severe burns.

##### Serious eye damage/irritation

**Serious eye damage/irritation** Causes severe burns.

##### Respiratory sensitisation

**Respiratory sensitisation** No information available.

##### Skin sensitisation

**Skin sensitisation** No information available.

##### Germ cell mutagenicity

**Genotoxicity - in vitro** No information available.

##### Carcinogenicity

**Carcinogenicity** No information available.

##### Reproductive toxicity

**Reproductive toxicity - fertility** No information available.

## SULPHURIC ACID 51 - 99%

### Specific target organ toxicity - single exposure

STOT - single exposure No information available.

### Specific target organ toxicity - repeated exposure

STOT - repeated exposure No information available.

### Aspiration hazard

Aspiration hazard No information available.

### Inhalation

Repeated exposure may cause chronic upper respiratory irritation. Tracheobronchitis, pulmonary oedema.

### Ingestion

Causes severe burns. Nausea, vomiting. Liquid irritates mucous membranes and may cause abdominal pain if swallowed.

### Skin contact

Causes burns. Corrosive. Prolonged contact causes serious tissue damage.

### Eye contact

Causes severe burns.

## SECTION 12: Ecological information

### Ecotoxicity

The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. The product may affect the acidity (pH) of water which may have hazardous effects on aquatic organisms.

#### 12.1. Toxicity

Toxicity No information available.

#### 12.2. Persistence and degradability

Persistence and degradability The product contains only inorganic substances which are not biodegradable.

#### 12.3. Bioaccumulative potential

Bioaccumulative potential The product does not contain any substances expected to be bioaccumulating.

#### Partition coefficient

log Pow: -2.20

#### 12.4. Mobility in soil

#### Mobility

The product is soluble in water.

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

#### Results of PBT and vPvB assessment

This substance is not classified as PBT or vPvB according to current EU criteria.

#### 12.6. Other adverse effects

Other adverse effects None known.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

#### General information

Do not puncture or incinerate, even when empty. Waste is classified as hazardous waste.

#### Disposal methods

Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

## SECTION 14: Transport information

### General

Wear protective clothing as described in Section 8 of this safety data sheet.

**SULPHURIC ACID 51 - 99%****14.1. UN number**

UN No. (ADR/RID)	1830
UN No. (IMDG)	1830
UN No. (ICAO)	1830
UN No. (ADN)	1830

**14.2. UN proper shipping name**

Proper shipping name (ADR/RID)	SULPHURIC ACID
Proper shipping name (IMDG)	SULPHURIC ACID
Proper shipping name (ICAO)	SULPHURIC ACID
Proper shipping name (ADN)	SULPHURIC ACID

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

ADR/RID class	8
ADR/RID classification code	C1
ADR/RID label	8
IMDG class	8
ICAO class/division	8
ADN class	8

**Transport labels****14.4. Packing group**

ADR/RID packing group	II
IMDG packing group	II
ICAO packing group	II
ADN packing group	II

**14.5. Environmental hazards**

Environmentally hazardous substance/marine pollutant  
No.

**14.6. Special precautions for user**

EmS	F-A, S-B
ADR transport category	2
Emergency Action Code	2P
Hazard Identification Number (ADR/RID)	80
Tunnel restriction code	(E)

## SULPHURIC ACID 51 - 99%

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not determined.

### SECTION 15: Regulatory information

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

##### EU legislation

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

Commission Regulation (EU) No 2015/830 of 28 May 2015.

##### Restrictions (Annex XVII Regulation 1907/2006)

This product is/contains a substance that is included in REGULATION (EC) No 1907/2006 (REACH) ANNEX XVII - RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, MIXTURES AND ARTICLES. Entry number: 3

#### 15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

##### Inventories

##### EU - EINECS/ELINCS

All the ingredients are listed or exempt.

### SECTION 16: Other information

## SULPHURIC ACID 51 - 99%

### Abbreviations and acronyms used in the safety data sheet

ATE: Acute Toxicity Estimate.  
 ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.  
 ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.  
 CAS: Chemical Abstracts Service.  
 DNEL: Derived No Effect Level.  
 IATA: International Air Transport Association.  
 IMDG: International Maritime Dangerous Goods.  
 Kow: Octanol-water partition coefficient.  
 LC<sub>50</sub>: Lethal Concentration to 50 % of a test population.  
 LD<sub>50</sub>: Lethal Dose to 50% of a test population (Median Lethal Dose).  
 PBT: Persistent, Bioaccumulative and Toxic substance.  
 PNEC: Predicted No Effect Concentration.  
 REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.  
 RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.  
 vPvB: Very Persistent and Very Bioaccumulative.  
 IARC: International Agency for Research on Cancer.  
 MARPOL 73/78: International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978.  
 cATpE: Converted Acute Toxicity Point Estimate.  
 BCF: Bioconcentration Factor.  
 BOD: Biochemical Oxygen Demand.  
 EC<sub>50</sub>: 50% of maximal Effective Concentration.  
 LOAEC: Lowest Observed Adverse Effect Concentration.  
 LOAEL: Lowest Observed Adverse Effect Level.  
 NOAEC: No Observed Adverse Effect Concentration.  
 NOAEL: No Observed Adverse Effect Level.  
 NOEC: No Observed Effect Concentration.  
 LOEC: Lowest Observed Effect Concentration.  
 DMEL: Derived Minimal Effect Level.  
 EL50: Exposure Limit 50  
 hPa: Hectopascal  
 LL50: Lethal Loading fifty  
 OECD: Organisation for Economic Co-operation and Development  
 POW: Octanol-water partition coefficient  
 SCBA: self-contained breathing apparatus  
 STP: Sewage Treatment Plant  
 VOC: Volatile Organic Compounds

### Classification abbreviations and acronyms

Acute Tox. = Acute toxicity  
 Aquatic Acute = Hazardous to the aquatic environment (acute)  
 Aquatic Chronic = Hazardous to the aquatic environment (chronic)

### Key literature references and sources for data

Supplier's information.

### Revision comments

NOTE: Lines within the margin indicate significant changes from the previous revision.

### Revision date

03/10/2020

### Version number

3.002

### Supersedes date

04/06/2019

### SDS number

22901

## SULPHURIC ACID 51 - 99%

**SDS status**

Approved.

**Hazard statements in full**

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

**Signature**

Jitendra Panchal



## Exposure scenario

Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers
<b>Process scope</b>	Use as an intermediate
<b>Product category</b>	PC19 Intermediate.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU4 Manufacture of food products SU6b Manufacture of pulp, paper and paper products SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals SU14 Manufacture of basic metals, including alloys

#### Environment

<b>Environmental release category</b>	ERC6a Use of intermediate
---------------------------------------	---------------------------

#### Worker

## Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

**Environmental release category** ERC6a Use of intermediate

#### Product characteristics

**Physical state** Liquid

**Concentration details** Percentage of risk driving substance contained in product: >90%

#### Amounts used

Daily amount per site: 100 - 500 tonnes

#### Frequency and duration of use

Continuous use/release.

#### Risk management measures

**Technical measures** Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

#### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p>
-------------------------	---

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Outdoor.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

<b>Technical protective measures</b>	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Handle substance within a closed system. Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.
--------------------------------------	---

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

## Use as an Intermediate in manufacture of inorganic and organic chemicals including fertilizers

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
Use a full-face respirator, selected in accordance with EN 529.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC6a Use of intermediate

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 0.00088 mg/l, PNEC 0.0025 mg/l, RCR 0.352  
freshwater sediment: Exposure 0.00073 mg/l, PNEC 0.002 mg/l, RCR 0.365  
Marine water: Exposure 0.00012 mg/l, PNEC 0.00025 mg/l, RCR 0.48  
marine sediment: Exposure 0.000103 mg/l, PNEC 0.002 mg/l, RCR 0.051

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
Worker - inhalation, short-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.2e-3  
Worker - inhalation, long-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.4e-3  
PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-1  
Worker - inhalation, long-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-1  
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities  
Worker - inhalation, short-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.3e-1  
Worker - inhalation, long-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 4.6e-1  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure 1.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.2e-3  
Worker - inhalation, long-term - local: Exposure 4.8e-6 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-5  
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
Worker - inhalation, short-term - local: Exposure 3.2e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 3.2e-2  
Worker - inhalation, long-term - local: Exposure 2.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 5.6e-2



**Exposure scenario**  
**Use as a Processing aid, catalyst, dehydrating agent and pH regulator**

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Use as a Processing aid, catalyst, dehydrating agent and pH regulator
<b>Product category</b>	PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU4 Manufacture of food products SU5 Manufacture of textiles, leather, fur SU6b Manufacture of pulp, paper and paper products SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals SU11 Manufacture of rubber products SU23 Electricity, steam, gas, water supply and sewage treatment

#### Environment

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

## Use as a Processing aid, catalyst, dehydrating agent and pH regulator

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

#### Amounts used

Daily amount per site: 100 - 500 tonnes

#### Frequency and duration of use

Continuous use/release.

#### Risk management measures

<b>Technical measures</b>	Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).
---------------------------	--

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

<b>Air</b>	Negligible air emissions as process operates in a contained system. Exhaust air scrubber.
<b>Water</b>	Onsite wastewater treatment required. pH adjustment

#### Conditions and measures related to external treatment of waste for disposal

<b>Sludge treatment</b>	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
<b>Waste treatment</b>	Ensure all waste water is collected and treated via a WWTP.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Use as a Processing aid, catalyst, dehydrating agent and pH regulator

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Outdoor.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

<b>Technical protective measures</b>	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.
--------------------------------------	---

## Use as a Processing aid, catalyst, dehydrating agent and pH regulator

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.  
Use a full-face respirator, selected in accordance with EN 529.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 5.9e-6 mg/l, PNEC 0.0025 mg/l, RCR 2.3e-3  
freshwater sediment: Exposure 4.75e-6 mg/l, PNEC 0.002 mg/l, RCR 2.35e-3  
Marine water: Exposure 8.56e-7 mg/l, PNEC 0.00025 mg/l, RCR 3.4e-3  
marine sediment: Exposure 6.9e-7 mg/l, PNEC 0.002 mg/l, RCR 3.4e-4

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.3e-9 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.3e-8  
Worker - dermal, long-term - local: Exposure 3.6e-9 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.9e-7  
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
Worker - inhalation, short-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.2e-3  
Worker - inhalation, long-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.4e-3  
PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-1  
Worker - inhalation, long-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-1  
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities  
Worker - inhalation, short-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.3e-1  
Worker - inhalation, long-term - local: Exposure 2.3e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 4.6e-1  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure 1.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.2e-3  
Worker - inhalation, long-term - local: Exposure 4.8e-6 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-5  
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
Worker - inhalation, short-term - local: Exposure 3.2e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 3.2e-2  
Worker - inhalation, long-term - local: Exposure 2.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 5.6e-2  
PROC13 Treatment of articles by dipping and pouring.  
Worker - inhalation, short-term - local: Exposure 1.8e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.8e-1  
Worker - inhalation, long-term - local: Exposure 6.2e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 3.2e-1



## Exposure scenario

### Use for extractions and processing of minerals and ores

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use for extractions and processing of minerals and ores
<b>Product category</b>	PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC40 Extraction agents.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU2a Mining (without offshore industries) SU14 Manufacture of basic metals, including alloys

#### Environment

<b>Environmental release category</b>	ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises
-------------------------	---

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Control of environmental exposure

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

##### Product characteristics

<b>Physical state</b>	Liquid
-----------------------	--------

## Use for extractions and processing of minerals and ores

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual amount per site: 480 tonnes  
Worst case assumption

### Frequency and duration of use

Continuous use/release.

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

**Technical measures** Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
PROC4 Chemical production where opportunity for exposure arises

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure < 0.5 kPa at STP.

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual site tonnage: 480 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

**Setting** Outdoor.

**Temperature** Assumes activities reflect a hot process.

**Ventilation rate** Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

## Use for extractions and processing of minerals and ores

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Handle substance within a closed system. Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)  
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

**Assessment method** Used EUSES model.

**Environmental exposure** ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)  
Fresh water: Exposure 2.5e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.01  
freshwater sediment: Exposure 2.0e-5 mg/l, PNEC 0.002 mg/l, RCR 0.01  
Marine water: Exposure 3.6e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0144  
marine sediment: Exposure 2.9e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0145  
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)  
Fresh water: Exposure 2.6e-8-6 mg/l, PNEC 0.0025 mg/l, RCR 1.1e-4  
freshwater sediment: Exposure 2.0e-8 mg/l, PNEC 0.002 mg/l, RCR 1.0e-5  
Marine water: Exposure 3.8e-9 mg/l, PNEC 0.00025 mg/l, RCR 31.5e-5  
marine sediment: Exposure 3.0e-9 mg/l, PNEC 0.002 mg/l, RCR 1.0e-6

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6  
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
Worker - inhalation, short-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.2e-3  
Worker - inhalation, long-term - local: Exposure 4.2e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.4e-3  
PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-1  
Worker - inhalation, long-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-1



## Exposure scenario

### Use in surface treatments, purification and etching

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in surface treatments, purification and etching
<b>Product category</b>	PC14 Metal surface treatment products PC15 Non-metal-surface treatment products.
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU2a Mining (without offshore industries) SU14 Manufacture of basic metals, including alloys SU15 Manufacture of fabricated metal products, except machinery and equipment SU16 Manufacture of computer, electronic and optical products, electrical equipment

#### Environment

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

## Use in surface treatments, purification and etching

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

#### Amounts used

Annual amount per site: 50 - 200 tonnes

#### Frequency and duration of use

Continuous use/release.

#### Risk management measures

<b>Technical measures</b>	Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).
---------------------------	--

#### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

<b>Air</b>	Negligible air emissions as process operates in a contained system. Exhaust air scrubber.
<b>Water</b>	Onsite wastewater treatment required. pH adjustment

#### Conditions and measures related to external treatment of waste for disposal

<b>Sludge treatment</b>	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
<b>Waste treatment</b>	Ensure all waste water is collected and treated via a WWTP.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### Control of workers exposure

## Use in surface treatments, purification and etching

<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
-------------------------	---

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual amount per site: 200 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor. Unless otherwise stated. PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Outdoor.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

## Use in surface treatments, purification and etching

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure  $5.9e-7$  mg/l, PNEC 0.0025 mg/l, RCR  $2.3e-4$   
 freshwater sediment: Exposure  $4.75e-7$  mg/l, PNEC 0.002 mg/l, RCR  $2.35e-4$   
 Marine water: Exposure  $8.56e-8$  mg/l, PNEC 0.00025 mg/l, RCR  $3.4e-5$   
 marine sediment: Exposure  $6.9e-8$  mg/l, PNEC 0.002 mg/l, RCR  $3.4e-5$

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

## Use in surface treatments, purification and etching

### Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.3e-9$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.3e-8$

Worker - inhalation, long-term - local: Exposure  $3.6e-9$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.9e-7$

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.2e-7$

Worker - inhalation, long-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.8e-6$

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - inhalation, short-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $4.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $8.4e-3$

PROC4 Chemical production where opportunity for exposure arises

Worker - inhalation, short-term - local: Exposure  $1.4e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.4e-1$

Worker - inhalation, long-term - local: Exposure  $1.4e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $2.8e-1$

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - inhalation, short-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $2.3e-1$

Worker - inhalation, long-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $4.6e-1$

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure  $1.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.8e-6$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $9.6e-5$

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure  $3.2e-3$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $3.2e-2$

Worker - inhalation, long-term - local: Exposure  $2.8e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $5.6e-2$

PROC13 Treatment of articles by dipping and pouring.

Worker - inhalation, short-term - local: Exposure  $1.8e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.8e-1$

Worker - inhalation, long-term - local: Exposure  $6.2e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $3.2e-1$



## Exposure scenario Use in electrolytic process

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Use in electrolytic process
<b>Product category</b>	PC14 Metal surface treatment products PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU14 Manufacture of basic metals, including alloys SU15 Manufacture of fabricated metal products, except machinery and equipment SU17 General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment

#### Environment

<b>Environmental release category</b>	ERC5 Use at industrial site leading to inclusion into/onto article ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC13 Treatment of articles by dipping and pouring.
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

## Use in electrolytic process

**Environmental release category** ERC5 Use at industrial site leading to inclusion into/onto article  
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)

### Product characteristics

**Physical state** Liquid

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 50 - 200 tonnes

### Frequency and duration of use

Continuous use/release.

### Risk management measures

**Technical measures** Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

**Sludge treatment** Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

**Waste treatment** Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
PROC13 Treatment of articles by dipping and pouring.

### Product characteristics

**Physical state** Liquid

**Vapour pressure** Vapour pressure < 0.5 kPa at STP.

**Concentration details** Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

## Use in electrolytic process

<b>Setting</b>	Indoor. Unless otherwise stated.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently). PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions Assumes activities reflect a hot process.
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

<b>Environmental release category</b>	ERC5 Use at industrial site leading to inclusion into/onto article ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
<b>Assessment method</b>	Used EUSES model.
<b>Environmental exposure</b>	ERC5 Use at industrial site leading to inclusion into/onto article Fresh water: Exposure 6.81e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.039 freshwater sediment: Exposure 4.48e-5 mg/l, PNEC 0.002 mg/l, RCR 0.022 Marine water: Exposure 9.87e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.039 marine sediment: Exposure 7.94e-6 mg/l, PNEC 0.002 mg/l, RCR 3.9e-3 ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article) Fresh water: Exposure 1.36e-7 mg/l, PNEC 0.0025 mg/l, RCR 5.2e-5 freshwater sediment: Exposure 1.17e-7 mg/l, PNEC 0.002 mg/l, RCR 5.5e-5 Marine water: Exposure 1.97e-8 mg/l, PNEC 0.00025 mg/l, RCR 3.8e-4 marine sediment: Exposure 1.59e-8 mg/l, PNEC 0.002 mg/l, RCR 7.9e-6  The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

## Use in electrolytic process

### Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.3e-9$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.3e-8$

Worker - dermal, long-term - local: Exposure  $3.6e-9$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.9e-7$

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.2e-7$

Worker - inhalation, long-term - local: Exposure  $9.2e-8$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.8e-6$

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure  $1.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.8e-6$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $9.6e-5$

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure  $3.2e-3$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $3.2e-2$

Worker - inhalation, long-term - local: Exposure  $2.8e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $5.6e-2$

PROC13 Treatment of articles by dipping and pouring.

Worker - inhalation, short-term - local: Exposure  $1.8e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.8e-1$

Worker - inhalation, long-term - local: Exposure  $6.2e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $3.2e-1$



## Exposure scenario

### Use in gas purification, scrubbing, flue gas scrubbing

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in gas purification, scrubbing, flue gas scrubbing
<b>Product category</b>	PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products)

#### Environment

<b>Environmental release category</b>	ERC7 Use of functional fluid at industrial site
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Control of environmental exposure

<b>Environmental release category</b>	ERC7 Use of functional fluid at industrial site
---------------------------------------	---

##### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Percentage of risk driving substance contained in product: >90%

## Use in gas purification, scrubbing, flue gas scrubbing

### Amounts used

Annual site tonnage: 30000 tonnes

### Frequency and duration of use

Continuous use/release.

### Risk management measures

#### Technical measures

Handle substance within a closed system. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

#### Air

Negligible air emissions as process operates in a contained system. Exhaust air scrubber.

#### Water

Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

#### Sludge treatment

Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.

#### Waste treatment

Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

#### Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

### Product characteristics

#### Physical state

Liquid

#### Vapour pressure

Vapour pressure < 0.5 kPa at STP.

#### Concentration details

Percentage of risk driving substance contained in product: >90%

### Amounts used

Daily amount per site: 500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

#### Setting

Indoor. Unless otherwise stated.

#### Temperature

Assumes activities reflect a hot process.

#### Ventilation rate

Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

## Use in gas purification, scrubbing, flue gas scrubbing

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Transfer via enclosed lines. Provide extract ventilation to points where emissions occur. Use a sampling system designed to control exposure.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC7 Use of functional fluid at industrial site

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 8.86e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.0352  
freshwater sediment: Exposure 7.13e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0355  
Marine water: Exposure 1.28e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.048  
marine sediment: Exposure 1.03e-5 mg/l, PNEC 0.002 mg/l, RCR 0.005

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.3e-9 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.3e-8  
Worker - dermal, long-term - local: Exposure 3.6e-9 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.9e-7  
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 9.2e-7  
Worker - inhalation, long-term - local: Exposure 9.2e-8 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.8e-6  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure 1.2e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.2e-3  
Worker - inhalation, long-term - local: Exposure 4.8e-6 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-5



## Exposure scenario

### Use in production of lead acid batteries containing sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in production of lead acid batteries containing sulphuric acid
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU2a Mining (without offshore industries) SU14 Manufacture of basic metals, including alloys SU15 Manufacture of fabricated metal products, except machinery and equipment SU16 Manufacture of computer, electronic and optical products, electrical equipment

#### Environment

<b>Environmental release category</b>	ERC2 Formulation into mixture ERC5 Use at industrial site leading to inclusion into/onto article
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Control of environmental exposure

<b>Environmental release category</b>	ERC2 Formulation into mixture ERC5 Use at industrial site leading to inclusion into/onto article
---------------------------------------	---

##### Product characteristics

## Use in production of lead acid batteries containing sulphuric acid

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 90 %. Maximum concentration after dilution for use: 40 %

### Amounts used

Annual amount per site: 2500 tonnes

### Frequency and duration of use

Continuous use/release.

### Risk management measures

<b>Good practice</b>	Carefully handle the substance to minimise releases.
<b>Technical measures</b>	Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

<b>Air</b>	Exhaust air scrubber.
<b>Water</b>	Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

<b>Sludge treatment</b>	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
<b>Waste treatment</b>	Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
-------------------------	--

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Covers concentrations up to 90 %. Maximum concentration after dilution for use: 40 %

### Amounts used

Annual site tonnage: 2500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor. Unless otherwise stated.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently).

## Use in production of lead acid batteries containing sulphuric acid

**Ventilation rate** Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

<b>Environmental release category</b>	ERC2 Formulation into mixture ERC5 Use at industrial site leading to inclusion into/onto article
<b>Assessment method</b>	Used EUSES model.
<b>Environmental exposure</b>	ERC2 Formulation into mixture Fresh water: Exposure 3.69e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.0147 freshwater sediment: Exposure 2.97e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0148 Marine water: Exposure 5.35e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0212 marine sediment: Exposure 4.3e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0021 ERC5 Use at industrial site leading to inclusion into/onto article Fresh water: Exposure 7.38e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.0295 freshwater sediment: Exposure 5.94e-5 mg/l, PNEC 0.002 mg/l, RCR 0.029 Marine water: Exposure 1.07e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.042 marine sediment: Exposure 8.8e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0044  The use is assessed to be safe.

## 3. Exposure estimation (Health 1)

<b>Assessment method</b>	Used ART model.
--------------------------	-----------------

## Use in production of lead acid batteries containing sulphuric acid

### Exposure

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure 1.6e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.6e-2

Worker - inhalation, long-term - local: Exposure 1.4e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-2

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - inhalation, short-term - local: Exposure 1.6e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.6e-1

Worker - inhalation, long-term - local: Exposure 1.4e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.8e-1

PROC4 Chemical production where opportunity for exposure arises

Worker - inhalation, short-term - local: Exposure 1.4e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-2

Worker - inhalation, long-term - local: Exposure 1.2e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.4e-2

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure 1.4e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-2

Worker - inhalation, long-term - local: Exposure 1.2e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.4e-2



## Exposure scenario

### Use in maintenance of sulphuric acid contained batteries

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in maintenance of sulphuric acid contained batteries
<b>Main sector</b>	SU22 Professional uses

#### Environment

<b>Environmental release category</b>	ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC9b Widespread use of functional fluid (outdoor)
---------------------------------------	---

#### Worker

<b>Process category</b>	PROC19 Manual activities involving hand contact
-------------------------	---

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC9b Widespread use of functional fluid (outdoor)
---------------------------------------	---

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 90 %.

#### Amounts used

Annual site tonnage: 2500 tonnes  
Worst case assumption

#### Frequency and duration of use

Continuous use/release.

## Use in maintenance of sulphuric acid contained batteries

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC19 Manual activities involving hand contact

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers concentrations up to 90 %.

### Amounts used

Annual site tonnage: 2500 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** Assumes activities are at room temperature.

**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

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

**Organisational measures** Avoid carrying out activities involving exposure for more than 4 hours.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

**Environmental release category** ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
ERC9b Widespread use of functional fluid (outdoor)

**Assessment method** Used EUSES model.

**Environmental exposure** ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
Fresh water: Exposure 2.26e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.009  
freshwater sediment: Exposure 2.67e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0133  
marine sediment: Exposure 1.84e-5 mg/l, PNEC 0.002 mg/l, RCR 0.009  
Marine water: Exposure 2.26e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.09  
ERC9b Widespread use of functional fluid (outdoor)  
Fresh water: Exposure 5.64e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.02  
freshwater sediment: Exposure 1.84e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0092  
marine sediment: Exposure 4.69e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0023  
Marine water: Exposure 5.64e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.22

## 3. Exposure estimation (Health 1)

## Use in maintenance of sulphuric acid contained batteries

<b>Process category</b>	PROC19 Manual activities involving hand contact
<b>Assessment method</b>	Used ART model.
<b>Exposure</b>	Worker - inhalation, short-term - local: Exposure $2.3e-3$ mg/m <sup>3</sup> , DNEL 0.1 mg/m <sup>3</sup> , RCR $2.3e-2$ Worker - inhalation, long-term - local: Exposure $2.0e-3$ mg/m <sup>3</sup> , DNEL 0.1 mg/m <sup>3</sup> , RCR $2.0e-2$



## Exposure scenario

### Recycling of lead acid batteries containing sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Recycling of lead acid batteries containing sulphuric acid
<b>Main sector</b>	SU3 Industrial uses

#### Environment

<b>Environmental release category</b>	ERC1 Manufacture of the substance
---------------------------------------	-----------------------------------

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC1 Manufacture of the substance
---------------------------------------	-----------------------------------

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 40 %.

#### Amounts used

Annual amount per site: 2500 tonnes

## Recycling of lead acid batteries containing sulphuric acid

### Frequency and duration of use

Continuous use/release.

### Risk management measures

<b>Good practice</b>	Carefully handle the substance to minimise releases.
<b>Technical measures</b>	Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

<b>Air</b>	Exhaust air scrubber.
<b>Water</b>	Onsite wastewater treatment required. pH adjustment

### Conditions and measures related to external treatment of waste for disposal

<b>Sludge treatment</b>	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
<b>Waste treatment</b>	Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
-------------------------	--

### Product characteristics

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Covers concentrations up to 40 %.

### Amounts used

Annual site tonnage: 2500 tonnes

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor. Unless otherwise stated.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently).
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Technical conditions and measures at process level (source) to prevent release

## Recycling of lead acid batteries containing sulphuric acid

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Use in contained systems Use dedicated equipment. Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Environmental release category** ERC1 Manufacture of the substance

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 7.38e-6 mg/l, PNEC 0.0025 mg/l, RCR 0.00292  
freshwater sediment: Exposure 5.94e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0029  
Marine water: Exposure 1.07e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0042  
marine sediment: Exposure 8.6e-7 mg/l, PNEC 0.002 mg/l, RCR 4.3e-4

The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

**Assessment method** Used ART model.

**Exposure** PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
Worker - inhalation, short-term - local: Exposure 1.4e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 1.4e-2  
Worker - inhalation, long-term - local: Exposure 1.2e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 2.4e-2  
PROC4 Chemical production where opportunity for exposure arises  
Worker - inhalation, short-term - local: Exposure 4.6e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 4.6e-2  
Worker - inhalation, long-term - local: Exposure 4.0e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 8.0e-2  
PROC5 Mixing or blending in batch processes  
Worker - inhalation, short-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR  
Worker - inhalation, long-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR  
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities  
Worker - inhalation, short-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR  
Worker - inhalation, long-term - local: Exposure mg/m<sup>3</sup>, DNEL mg/m<sup>3</sup>, RCR



## Exposure scenario

### Use of lead acid batteries containing sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use of lead acid batteries containing sulphuric acid
<b>Article category</b>	AC3 Electrical batteries and accumulators
<b>Main sector</b>	SU21 Consumer uses
<b><u>Environment</u></b>	
<b>Environmental release category</b>	ERC9b Widespread use of functional fluid (outdoor)
<b><u>Worker</u></b>	
<b>Process category</b>	PROC19 Manual activities involving hand contact

#### 2. Conditions of use affecting exposure (Non-industrial - Environment 1)

##### **Control of environmental exposure (Non-industrial)**

<b>Environmental release category</b>	ERC9b Widespread use of functional fluid (outdoor)
---------------------------------------	--

##### **Product characteristics**

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 40 %.

##### **Amounts used**

Annual amount per site: 2500 tonnes  
Worst case assumption

##### **Frequency and duration of use**

## Use of lead acid batteries containing sulphuric acid

Intermittent.

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

## 2. Conditions of use affecting exposure (Non-industrial - Health 1)

### Control of Non-industrial exposure

**Process category** PROC19 Manual activities involving hand contact

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers concentrations up to 40 %.

### Amounts used

Annual amount per site: 2500 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).  
Worst case assumption

Avoid carrying out activities involving exposure for more than 4 hours.

### Other given operational conditions affecting Non-industrial exposure

**Setting** Indoor.

**Temperature** Assumes activities are at room temperature.

**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Other given operational conditions affecting Non-industrial exposure

**Exposure route** Inhalation Dermal

**Consumer information** Avoid using without gloves.

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. No specific risk management measure identified beyond those operational conditions stated.

## 3. Exposure estimation (Environment 1)

**Environmental release category** ERC9b Widespread use of functional fluid (outdoor)

**Assessment method** Used EUSES model.

**Environmental exposure** Fresh water: Exposure 5.64e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.02  
freshwater sediment: Exposure 1.84e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0092  
marine sediment: Exposure 4.69e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0023  
Marine water: Exposure 5.64e-5 mg/l, PNEC 0.00025 mg/l, RCR 0.22

## 3. Exposure estimation (Health 1)

**Process category** PROC19 Manual activities involving hand contact

**Assessment method** Used ART model.

**Exposure** Worker - inhalation, short-term - local: Exposure 2.3e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.3e-2  
Worker - inhalation, long-term - local: Exposure 2.0e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 2.0e-2



## Exposure scenario Use as a laboratory chemical

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Use as a laboratory chemical
<b>Process scope</b>	Use of small quantities within laboratory settings, including material transfers and equipment cleaning.
<b>Product category</b>	PC21 Laboratory chemicals.
<b>Main sector</b>	SU22 Professional uses

#### Environment

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
---------------------------------------	--

#### Worker

<b>Process category</b>	PROC15 Use as laboratory reagent.
-------------------------	-----------------------------------

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
---------------------------------------	--

#### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 90 %.

#### Amounts used

## Use as a laboratory chemical

Annual site tonnage: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Continuous use/release.

### Risk management measures

**Good practice** Carefully handle the substance to minimise releases.

**STP type** Onsite STP.

### Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

**Air** Exhaust air scrubber.

**Water** Onsite wastewater treatment required. pH adjustment

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

**Process category** PROC15 Use as laboratory reagent.

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers concentrations up to 90 %.

### Amounts used

Annual site tonnage: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** Assumes activities are at room temperature.

**Ventilation rate** Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Handle in a fume cupboard or under extract ventilation.

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

**Organisational measures** Avoid carrying out activities involving exposure for more than 4 hours.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

**Environmental release category** ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
ERC9b Widespread use of functional fluid (outdoor)

**Assessment method** Used EUSES model.

## Use as a laboratory chemical

<b>Environmental exposure</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 1.34e-4 mg/l, PNEC 0.0025 mg/l, RCR 0.0536 freshwater sediment: Exposure 2.67e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0133 marine sediment: Exposure 6.04e-6 mg/l, PNEC 0.002 mg/l, RCR 0.003 Marine water: Exposure 1.08e-4 mg/l, PNEC 0.00025 mg/l, RCR 0.43 ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 2.21e-6 mg/l, PNEC 0.0025 mg/l, RCR 8.8e-4 freshwater sediment: Exposure 1.7e-6 mg/l, PNEC 0.002 mg/l, RCR 8.5e-4 marine sediment: Exposure 5.54e-8 mg/l, PNEC 0.002 mg/l, RCR 2.7e-5 Marine water: Exposure 5.54e-8 mg/l, PNEC 0.00025 mg/l, RCR 2.1e-4
-------------------------------	--

### 3. Exposure estimation (Health 1)

<b>Process category</b>	PROC15 Use as laboratory reagent.
<b>Assessment method</b>	Used ART model.
<b>Exposure</b>	Worker - inhalation, short-term - local: Exposure 2.7e-4 mg/m <sup>3</sup> , DNEL 0.1 mg/m <sup>3</sup> , RCR 2.7e-3 Worker - inhalation, long-term - local: Exposure 2.3e-4 mg/m <sup>3</sup> , DNEL 0.05 mg/m <sup>3</sup> , RCR 4.6e-3



## Exposure scenario Use in industrial cleaning

### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

### 1. Title of exposure scenario

<b>Main title</b>	Use in industrial cleaning
<b>Product category</b>	PC35 Washing and cleaning products
<b>Main sector</b>	SU3 Industrial uses

#### Environment

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
---------------------------------------	--

#### Worker

<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring.
-------------------------	---

### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
---------------------------------------	--

## Use in industrial cleaning

### Product characteristics

Physical state	Liquid
Concentration details	Covers concentrations up to 10 %.

### Amounts used

Annual amount per site: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Intermittent.

### Risk management measures

Good practice	Ensure operatives are trained to minimise exposures. Carefully handle the substance to minimise releases.
Technical measures	Provide extract ventilation to points where emissions occur.
STP type	Onsite STP.

### Conditions and measures related to external treatment of waste for disposal

Sludge treatment	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
Waste treatment	Ensure all waste water is collected and treated via a WWTP.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Control of workers exposure

Process category	<p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC10 Roller application or brushing</p> <p>PROC13 Treatment of articles by dipping and pouring.</p>
------------------	--

### Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure < 0.5 kPa at STP.
Concentration details	Percentage of risk driving substance contained in product: >90%

### Amounts used

Annual amount per site: 5000 tonnes  
Worst case assumption

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

### Other given operational conditions affecting workers exposure

## Use in industrial cleaning

<b>Setting</b>	Indoor.
<b>Temperature</b>	Assumes activities are at room temperature.
<b>Ventilation rate</b>	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

## 3. Exposure estimation (Environment 1)

<b>Environmental release category</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
<b>Assessment method</b>	Used EUSES model.
<b>Environmental exposure</b>	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 1.34e-4 mg/l, PNEC 0.0025 mg/l, RCR 0.0536 freshwater sediment: Exposure 2.67e-5 mg/l, PNEC 0.002 mg/l, RCR 0.013 Marine water: Exposure 1.08e-4 mg/l, PNEC 0.00025 mg/l, RCR 0.43 marine sediment: Exposure 6.04e-6 mg/l, PNEC 0.002 mg/l, RCR 0.003 ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) Fresh water: Exposure 2.21e-6 mg/l, PNEC 0.0025 mg/l, RCR 8.8e-4 freshwater sediment: Exposure 1.7e-6 mg/l, PNEC 0.002 mg/l, RCR 8.5e-4 marine sediment: Exposure 5.54e-8 mg/l, PNEC 0.002 mg/l, RCR 2.7e-5 Marine water: Exposure 5.54e-8 mg/l, PNEC 0.00025 mg/l, RCR 2.1e-4  The use is assessed to be safe.

## 3. Exposure estimation (Health 1)

<b>Assessment method</b>	Used ART model.
--------------------------	-----------------

## Use in industrial cleaning

### Exposure

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure 5.5e-4 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-3

Worker - inhalation, long-term - local: Exposure 4.8e-4 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-3

PROC5 Mixing or blending in batch processes

Worker - inhalation, short-term - local: Exposure 6.1e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 6.1e-1

Worker - inhalation, long-term - local: Exposure 2.7e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 5.3e-2

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - inhalation, short-term - local: Exposure 5.5e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-2

Worker - inhalation, long-term - local: Exposure 4.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-2

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure 5.5e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-2

Worker - inhalation, long-term - local: Exposure 4.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-2

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure 5.5e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 5.5e-2

Worker - inhalation, long-term - local: Exposure 4.8e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 9.6e-2

PROC10 Roller application or brushing

Worker - inhalation, short-term - local: Exposure 3.0e-2 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 3.0e-1

Worker - inhalation, long-term - local: Exposure 2.7e-2 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 0.54

PROC13 Treatment of articles by dipping and pouring.

Worker - inhalation, short-term - local: Exposure 6.1e-3 mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR 6.1e-2

Worker - inhalation, long-term - local: Exposure 5.3e-3 mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR 1.1e-1



## Exposure scenario

### Use in the mixing, preparation and repackaging of sulphuric acid

#### Identification

<b>Product name</b>	Sulphuric Acid
<b>REACH registration number</b>	01-2119458838-20-XXXX
<b>CAS number</b>	7664-93-9
<b>EC number</b>	231-639-5
<b>Supplier</b>	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

#### 1. Title of exposure scenario

<b>Main title</b>	Use in the mixing, preparation and repackaging of sulphuric acid
<b>Main sector</b>	SU3 Industrial uses
<b>Sector of use</b>	SU10 Formulation [mixing] of preparations and/or re-packaging

#### Environment

<b>Environmental release category</b>	ERC2 Formulation into mixture
---------------------------------------	-------------------------------

#### Worker

<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
-------------------------	--

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

#### Control of environmental exposure

<b>Environmental release category</b>	ERC2 Formulation into mixture
---------------------------------------	-------------------------------

#### Product characteristics

## Use in the mixing, preparation and repackaging of sulphuric acid

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers concentrations up to 90 %.
<b><u>Amounts used</u></b>	
	Annual amount per site: 300000 tonnes Worst case assumption
<b><u>Frequency and duration of use</u></b>	
	Continuous use/release.
<b><u>Risk management measures</u></b>	
<b>Good practice</b>	Carefully handle the substance to minimise releases.
<b>Technical measures</b>	Use in contained systems Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions).
<b><u>Technical onsite conditions and measures to reduce or limit discharges to air, water and soil</u></b>	
<b>Air</b>	Exhaust air scrubber.
<b>Water</b>	Onsite wastewater treatment required. pH adjustment
<b><u>Conditions and measures related to external treatment of waste for disposal</u></b>	
<b>Sludge treatment</b>	Incineration, disposal or recycling at specific offsite provider. No application of sludge to soil.
<b>Waste treatment</b>	Ensure all waste water is collected and treated via a WWTP.

### 2. Conditions of use affecting exposure (Workers - Health 1)

#### **Control of workers exposure**

<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
-------------------------	--

#### **Product characteristics**

<b>Physical state</b>	Liquid
<b>Vapour pressure</b>	Vapour pressure < 0.5 kPa at STP.
<b>Concentration details</b>	Covers concentrations up to 90 %.

#### **Amounts used**

Annual site tonnage: 2500 tonnes

#### **Frequency and duration of use**

Covers daily exposures up to 8 hours (unless stated differently).

#### **Human factors not influenced by risk management**

Respiration volume under conditions of use: 10 m<sup>3</sup> (Default)

#### **Other given operational conditions affecting workers exposure**

## Use in the mixing, preparation and repackaging of sulphuric acid

<b>Setting</b>	Indoor. Unless otherwise stated.
<b>Temperature</b>	Assumes activities are at ambient temperature (unless stated differently).
<b>Ventilation rate</b>	Handle substance within a predominantly closed system provided with extract ventilation.

### Technical conditions and measures at process level (source) to prevent release

**Technical protective measures** Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Provide extract ventilation to points where emissions occur.

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

**Organisational measures** Ensure operatives are trained to minimise exposures. Ensure control measures are regularly inspected and maintained. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

### Risk management measures

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

<b>Environmental release category</b>	ERC2 Formulation into mixture
<b>Assessment method</b>	Used EUSES model.
<b>Environmental exposure</b>	Fresh water: Exposure 4.43e-5 mg/l, PNEC 0.0025 mg/l, RCR 0.01 freshwater sediment: Exposure 3.56e-5 mg/l, PNEC 0.002 mg/l, RCR 0.0178 Marine water: Exposure 6.42e-6 mg/l, PNEC 0.00025 mg/l, RCR 0.0256 marine sediment: Exposure 5.16e-6 mg/l, PNEC 0.002 mg/l, RCR 0.0025  The use is assessed to be safe.

### 3. Exposure estimation (Health 1)

<b>Assessment method</b>	Used ART model.
--------------------------	-----------------

## Use in the mixing, preparation and repackaging of sulphuric acid

### Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - inhalation, short-term - local: Exposure  $9.3e-9$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $9.3e-8$

Worker - inhalation, long-term - local: Exposure  $9.4e-9$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $1.9e-7$

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - inhalation, short-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $4.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.2e-4$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $8.4e-3$

PROC5 Mixing or blending in batch processes

Worker - inhalation, short-term - local: Exposure  $1.8e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.8e-1$

Worker - inhalation, long-term - local: Exposure  $1.6e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $3.2e-1$

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - inhalation, short-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $2.3e-1$

Worker - inhalation, long-term - local: Exposure  $2.3e-2$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $4.6e-1$

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - inhalation, short-term - local: Exposure  $1.2e-4$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $1.2e-3$

Worker - inhalation, long-term - local: Exposure  $4.8e-6$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $9.6e-5$

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Worker - inhalation, short-term - local: Exposure  $3.2e-3$  mg/m<sup>3</sup>, DNEL 0.1 mg/m<sup>3</sup>, RCR  $3.2e-2$

Worker - inhalation, long-term - local: Exposure  $2.8e-3$  mg/m<sup>3</sup>, DNEL 0.05 mg/m<sup>3</sup>, RCR  $5.6e-2$