



# MATERIAL SAFETY DATA SHEET

In accordance with Regulation (EU) 830/2015

(MILLED OILED SULPHUR)

Developed: 15.12.2005

Revision: 01.02.2016

Version: 1.4CLP

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## SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

### 1.1. Identification of the product

Trade name: **MILLED OILED SULPHUR**

### 1.2. Identification of significant applications of the substance or preparation and applications that are not recommended

The product is used as a raw material in the organic and inorganic chemical industry, including the production of sulphuric acid, fertilizers, crop protection chemicals, disinfection of tools and rooms used for agricultural manufacturing processes.

### 1.3. Manufacturer information

Supplier: "Siarkopol" TARNOBRZEG Chemical Plants Ltd.

adres: ul. Chemiczna 3, 39-400 Tarnobrzeg

Tel./Fax: (00-48-15) 856 58 01 / (00-48-15) 822 97 97

E-mail: sekretariat@zchsiarkopol.pl

### 1.4. Emergency telephone:

(00-48-15) 855 41 14; 856 55 55

## SECTION 2. HAZARDS IDENTIFICATION

### 2.1. Classification of the substance or preparation

Hazards	Classification	Acc to Regulation (EC) No. 1272/2008 (CLP):
effects of physical and chemical properties		Not classified. No hazard.
for humans		Irritating effects on skin: Skin Irritant. 2 ( <b>H315</b> Causes skin irritation).
for environment		Not classified. No hazard.

### 2.2. Labeling



GHS Pictograms: GHS07

Signal Word: **Warning**

Hazard Statement:

**H315** Causes skin irritation

Precautionary Statement

**P280** Wear protective gloves/protective clothing/eye protection/ face protection.

**P302 + P352** IF ON SKIN: Wash with plenty of soap and water.

**P332 + P313** If skin irritation occurs: Get medical advice/attention.

### 2.3. Other hazards



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Both components of milled oiled sulphur, i.e. solid sulphur and oil are combustible. Hazards related to the mixture result mainly from the presence of sulphur. As the result of combustion, toxic and irritant gases, steams and smokes are emitted, which may cause irritation to mucous membranes, eyes and, upon longer exposure, also skin. The chemical combustion of sulphur may result from its contact with antioxidants and in mixture with coal, carbon black, fats and oils.

Sulphur dusts and air make an explosive mixture. Danger of explosions exists also in the case of exceeding the ignition temperature through a layer of accumulated sulphur dust, e.g. by contact with hot surfaces of an installation or abnormal operation of devices resulting in heating of components (in particular movable ones). Such situation may lead to the ignition of settled dust and then the ignition of dust-air mixture.

Sulphur indicates very high proneness to staticity - static electricity may initiate an explosion of sulphur dust.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

### 3.2. Mixtures

<u>Substance name</u>	<u>% by weight</u>	<u>CAS No.</u>	<u>EC No.</u>	<u>Index No.</u>	<u>CLP Classification</u>	<u>Registration No.</u>
Sulphur	> 95	7704-34-9	231-722-6	016-09400-1	Skin Irritant 2, H315	01-2119487295-27-XXXX
Machine oil	≤ 5	N/A	N/A	N/A	N/A	N/A

The mixture does not contain other substances hazardous to human health or the environment (according to the Regulation (EC) 1272/2008) or PBT/vPvB substances at concentration levels above the regulatory limits.

## SECTION 4. FIRST-AID MEASURES

### 4.1. Description of the first-aid measures

#### Inhalation:

Getting the victim into fresh air should be sufficient. Seek medical advice if symptoms persist or when feeling unwell.

#### Skin contact:

Change contaminated clothing. Carefully wash the contaminated skin with soap and water, then rinse with plenty of water. Seek medical advice if symptoms persist or in the case of irritation.

#### Eye contact:

Immediately rinse the eyes with plenty of cool water, under the lids as well. If irritation persists, continue rinsing for 15 minutes, occasionally lifting the eyelids. Seek medical advice if symptoms persist or when feeling unwell.

#### Indigestion:

Immediately rinse the mouth out with water, then drink a large amount of water. Seek medical advice if symptoms persist or when feeling unwell.

### 4.2. Main acute and delayed symptoms and effects of exposure

Not likely to occur.

### 4.3. Recommendations related to emergency medical aid and specific handling of the affected person

If SO<sub>2</sub> is released, use respiratory protection.

Show the safety data sheet, label or packaging to the medical personnel providing aid.

Recommendations for doctors: symptomatic treatment.

## SECTION 5. FIRE-FIGHTING MEASURES

### 5.1. Extinguishing media

**Suitable extinguishing media:** Sprayed water, foam, CO<sub>2</sub> and other available extinguishing media.

**Extinguishing media to avoid:** Direct focused water jets on the product.

### 5.2. Specific hazards related to the substance or preparation

Combustible mixture. While burning, sulphur emits toxic (in contact with respiratory tracts), irritating gas – sulphur dioxide. People should be immediately evacuated from zones under the hazard of explosion and contamination from poisonous gases generated during fire.

Containers exposed to the effect of fire or high temperature are to be cooled with water currents and, to possible



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extent, safely removed from danger zone and continuously cooled.  
Dusts and steams of sulphur combined with air make explosive mixtures, which may cause transfer of explosions and fires.

### 5.3. Information for fire-fighters

Use spray, droplet and mist water for extinguishing a large fire. Water mist is efficient in rooms.  
Use body protection equipment and a self-contained breathing apparatus.

Stosować pełną ognioodporną odzież i aparaty oddechowe z niezależnym dopływem powietrza.

## SECTION 6. ACCIDENTAL RELEASE MEASURES

### 6.1. Individual precautions, personal protective equipment and emergency procedures

Remove from the danger zone all persons that do not take part in emergency action. Call rescue forces. Do not let people without proper protection enter the danger zone. Use personal protection measures – see section 8 safety data sheets. Do not cause dust rise. Eliminate potential ignition sources/ Avoid inhaling dusts and vapours. In the case of releasing dusts in confined space, provide sufficient ventilation.

### 6.2. Environmental precautions:

Secure drains.

### 6.3. Methods and materials to avoid contamination expansion and cleaning

Collect scattered material. If the collected material is not suitable for intended use and is classified as waste, proceed in accordance with the provisions of section 13 of this safety data sheet.

### 6.4. References to other sections

Refer also to sections 8 and 13 of this safety data sheet.

## SECTION 7. HANDLING AND STORAGE

### 7.1. Conditions for safe handling

Due to the high tendency of sulphur dust and air mixture to explosions, during the process of filling/removing sulphur to/from uni packages (bags, big-bags), it is necessary to prevent the conditions for such explosions, by:

- preventing the creation of dust-air mixture, in which the content of dusts exceeds lower explosion limit,
- eliminating explosion initiators (open fire, mechanical sparks, short-circuits, static electricity, etc.).

In order to prevent the creation of explosive mixture, one must restrict the possibility of generating sulphur dusts during each stage of processing (storage, transportation and use of solid sulphur), and never allow sulphur dusts to accumulate, use appropriate extractors in places where, due to performed technological processes, sulphur dusts may be released.

In order to eliminate the initiators of ignition or explosion, it is necessary to implement protection against:

- electrifying of sulphur, i.e. implementing an effective method of protection against static electricity, e.g. through proper earthing of installation component that require it (to carry away electrostatic charges), proper materials used in installation components having contact with sulphur,
- using electrical devices that satisfy safety requirements of European and national standards in the area of electrical installations and devices operating in zones under the hazard of explosion (according to ATEX directive),
- not using open fire in the presence of sulphur,
- preventing temperature growth to ignition hazard level.

Detailed technical solutions should result from the specific nature of a given process.

Do not eat, drink, smoke or take drugs, avoid inhaling vapors, dust, smoke or spray and adhere to personal hygiene requirements when handling sulphur. Use PPE in accordance with the provisions of section 8 of this safety data



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sheet.

## 7.2. Conditions for safe storage, including information on any non-compatible products

All storage rooms must be ventilated due to the risk of the formation of explosive mixtures with the air. Electrical systems should be explosion-proof. Keep away from naked flame, heat sources and reactive products (strong bases, oxidants).

Large amounts of sulphur are kept in bulk, preferably under cover. Smaller amounts are stored in bags, jars or drums. Avoid contact with pyrophoric iron, copper components, ammonia, nitric acid, metallic dust, chlorates, nitrates, perchlorates, permanganates, anhydrides. Molten sulphur reacts with most oxidants.

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

See section 1.2 or appendix to safety data sheet – exposure scenarios.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Exposure control parameters

Mineral oil (highly refined) with the exception of processing liquids – respirable fraction OEL: 5 mg/m<sup>3</sup>, STEL: -, CEIL: – (not applicable if no mist or vapor is formed)

Sulphur particulates (other non-toxic industrial particulates, also with free (crystalline) silica < 2% of respirable fraction) OEL: 10 mg/m<sup>3</sup>

Sulphur dioxide OEL: 1.3 mg/m<sup>3</sup>, STEL: 2.7 mg/m<sup>3</sup>, TLV-C: – (fire and sulphur inflammation)

*Regulation of the Polish Ministry of Labour and Social Policy of 6 June 2014 on the maximum occupational exposure limits for the concentration and intensity levels of harmful factors (Polish Journal of Laws Year 2014, item. 817).*

Product DNEL: no data

Sulphur DNEL: not applicable (non-toxic substance)

PNEC: no data

PNEC: not applicable (non-toxic substance)

### 8.2. Exposure controls

#### Technical measures to prevent exposure:

Provide general and local ventilation to ensure that the concentration of air contaminants is below the allowable maximum limits. When substance concentration is known and stable, select PPE with consideration of the substance concentration in the workplace, exposure time and operations performed by the personnel. Where explosive or toxic concentrations of gas, dust and vapor may exist, apply water spraying.

#### Eye and face protection:

Use hermetic safety goggles in the case of excessive dust concentration.

#### Skin protection:

Wear fabric gloves, preferably made of cotton, with leather protective sections. Use clothing made of close-weave fabric and safety shoes.

#### Respiratory protection:

Under normal conditions, with proper ventilation, special protection for respiratory tracts is not required.

In the case of excessive dust concentration, use filtering semi-masks.

When working in atmosphere combined with sulphur dusts and steams, emitted from burned sulphur, use masks with appropriate absorber.

When working in atmosphere with insufficient oxide content and in closed spaces with small cubic capacity, use protective equipment that isolates respiratory tracts.

#### Thermal hazards:

N/A

#### Environmental exposure control:

Avoid releasing the substance to soils, sewage drains and waters.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

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

- |                            |                            |
|----------------------------|----------------------------|
| a) Form                    | : Solid, yellow            |
| b) Smell                   | : Characteristic           |
| c) Odor threshold          | : Not applicable           |
| d) pH                      | : 6.8% (100 g/l at 20°C)   |
| e) Melting/freezing points | : 90-100°C / Not specified |



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f) Initial boiling temperature	: 290 °C
g) Ignition temperature (max. temp. of the wall of vessel in which sulphur is stored, must not exceed)	: 193 °C
h) Evaporation rate	: Not specified (no available data)
i) Combustibility (solid, gas)	: Flammable
j) Lower explosion limit <b>LEL</b> of a dust cloud	: 20±1.7 g/m <sup>3</sup>
k) Vapor pressure	: 133,3 Pa (at 183°C)
l) Vapor density	: Not specified (no available data)
m) Relative density	: 2.07 g/cm <sup>3</sup> at 20°C
n) Solubility	: Non-soluble in water. Soluble in carbon disulfide, chloroform, benzene, toluene.
o) N-octanol/water partition coefficient (Pow)	: Not specified (non-organic substance)
p) Self-ignition temperature	: 270°C
q) Decomposition temperature	: Not specified (no available data)
r) Viscosity	: 10-11cP (119°C)
s) Explosive properties	: Sulphur dust forms explosive mixtures with air. Sulphur poses the risk of explosion in reactions with nitrates, chlorates, perchlorates and permanganates.
t) Oxidizing properties	: Molten sulphur reacts with most oxidants.

## 9.2. Other information

Maximum explosion pressure <b><i>p<sub>max</sub></i></b>	: 5.9 ± 0.3 bar
Maximum pressure rise rate <b><i>(dp/dt)<sub>max</sub></i></b>	: 590 ± 71 bar/s
Explosion index <b><i>K<sub>st max</sub></i></b>	: 160 ± 20 m·bar/s
Explosion class	: St1
Dust cloud ignition temperature <b><i>T<sub>cl</sub></i></b>	: 290 ± 3.6 °C
Dust layer ignition temperature <b><i>T<sub>5 mm</sub></i></b>	: melts under the temperature of ca. 122 °C
Minimum energy of dust cloud ignition <b><i>MIE</i></b>	: < 1.8 mJ
Surface tension	: 600-800 kg/m <sup>3</sup>

## SECTION 10. STABILITY AND REACTIVITY

### 10.1. Reactivity

The mixture is reactive.

### 10.2. Chemical stability

The mixture is stable during storage and handling under normal ambient conditions, nominal temperature and pressure.

### 10.3. Dangerous reactions

Avoid contact with pyrophoric iron, copper components, ammonia, nitric acid, metallic dust, chlorates, nitrates, perchlorates, permanganates, anhydrides.

### 10.4. Conditions to avoid

Avoid contact with naked flame and other strong heat sources.

### 10.5. Materials to avoid

Avoid contact with pyrophoric iron, copper components, ammonia, nitric acid, metallic dust, chlorates, nitrates, perchlorates, permanganates, anhydrides. Molten sulphur reacts with most oxidants. Sulphur is corrosive to metals.

### 10.6. Hazardous decomposition products

No hazardous decomposition products identified. Combustion products released under fire conditions. See section 5 of this safety data sheet.

## SECTION 11. TOXICOLOGICAL INFORMATION



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## 11.1 Information on toxicological effects

### Acute toxicity:

Product:	Sulphur:
LD50: >2000 mg/kg BM (oral, rat)	LD50: >2000 mg/kg BM (oral, rat)
LD50: >2000 mg/kg BM (skin, rabbit)	LD50: >2000 mg/kg BM (skin, rabbit)
May result in stomach disorders.	LC50: >5430 mg/m <sup>3</sup> (inhalation, rat, 4h)

### Caustic/irritating effects on skin:

Based on the available information, classification criteria are not met. Sulphur dust irritates the skin.

### Severe disturbances to eyes/irritating effects on eyes:

Based on the available information, classification criteria are not met. Sulphur dust irritates the skin. The product may be irritating to eyes and results in reddening or even pain.

### Allergic effects on respiratory system or skin:

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

### Mutagenic effects on reproductive cells:

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

### Carcinogenic effects:

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

### Reproductive effects:

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

### Toxic effects on specific organs – one-time exposure:

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

Inhaling vapors results in shortening breath with coughing. Vapors released from molten sulphur may be absorbed by the lungs very quickly. When swallowed, nausea and vomiting occur, or, in more severe cases hand and leg shaking and dizziness may result.

### Toxic effects on specific organs – repeated exposure:

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

Persons under repeated exposure to the inhalation of air containing a large amount of sulphur vapors and dust may suffer from sensitization of mucous membranes, headaches and dizziness, excitement or sedation, digestive disorders, dryness and cracking of the skin.

### Hazards related to aspiration:

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

## SECTION 12. ECOLOGICAL INFORMATION

### 12.1. Toxicity:

#### Aquatic environment:

Examination of acute and chronic toxicity on invertebrates, algae and fish: no data.

#### Sediment:

Examination of toxic effects on species in sediment: no data.

#### Land environment:

Examination of toxic effects on invertebrates: no data.

Examination of toxic effects on plants: no data.

Examination of toxic effects on earthworms: no data.

### 12.2. Persistence and biodegradability

Sulphur: as a result of microbiological decomposition in soil, unbound sulphur is oxidized to sulfate (aerobic conditions) or reduced to sulfide (anaerobic conditions).

### 12.3. Bioaccumulation

No data.

### 12.4. Mobility in soil

No data.

### 12.5. PBT and vPvB assessment results

No data.

### 12.6. Other hazardous effects

A small amount of sulphur left on the ground does not pose a significant threat to the environment, as the



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amount is gradually reduced: it is used on the ground surface both by microorganisms and plants; it is transformed to sulphur dioxide in contact with air or sulphuric acid (IV) in contact with moisture, or, under some conditions, to sulphur trioxide and sulphuric acid (VI) or it is reduced to sulfides.

## SECTION 13. DISPOSAL CONSIDERATIONS

### 13.1. Waste disposal methods

Wastes related to the use of sulphur may include: contaminated sulphur, used sulphur packaging.

Such wastes should be adequately managed each time (recycling or disposal) in accordance with applicable national regulations on wastes (particularly hazardous wastes) and local agreements between the user of sulphur and administration (e.g. decisions by respective Province Governors).

Code of waste: 060699 (other non-mentioned waste).

There are no limitations for reusing contaminated sulphur, provided that the technology allows recovery. The recovery or disposal of product wastes must adhere to applicable regulations.

Contaminated sulphur product packaging may be reused for the same purpose and becomes wastes only when it is not reusable anymore (including damaged packaging). There are no specific recommendations for methods of disposal of used sulphur product packaging.

*The Act of 14 December 2012 on waste (Journal of Laws 2013, item 21 as amended).*

*The Act of 13 June 2013 on packaging and packaged waste management (Journal of Laws 2013, item 888).*

*Regulation of the Minister of Environment of 9 December 2014 on waste catalogue (Journal of Laws 2014, item 1923).*

## SECTION 14. TRANSPORT INFORMATION

Milled oiled sulphur containing 1% and 2.5% of oil is not covered by ADR/RID provisions (it does not meet the classification criteria according to RID and ADR) – pursuant to classification certificate No. 032/IPO-BC/2015 issued by the Institute of Organic Industry in Warsaw on 27.11.2015).

Milled oiled sulphur containing 1% and 2.5% of oil is covered by IMDG (sea transport) and ADN provisions (land or water transport).

<b>14.1. UN number</b>	1350
<b>14.2. Proper shipping name (UN)</b>	Sulphur
<b>14.3. Transportation hazard class</b>	4.1
<b>14.4. Packaging group</b>	III
<b>14.5. Environmental hazards</b>	No hazard to environment
<b>14.6. Special precautions for users</b>	None
<b>14.7. Bulk transport in accordance to MARPOL Annex II 73/78 and IBC Code</b>	No data

## SECTION 15. REGULATORY INFORMATION

### 15.1. Health, safety and environmental protection regulations related specifically to the substance or preparation.

*The Act of 25 February 2011 on chemical substances and their mixtures (Journal of Laws of 2011, No. 63, item 322; as amended);*

*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), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (corrected in Official Journal L 136 of 29.05.2007; including with further amendments);*

*Commission Regulation (UE) No. 2015/830 of 28 May 2015 amending Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH);*

*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, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006 (Official Journal L No. 353 of 31.12.2008; including further amendments);*

*Regulation of the Minister of Health of 10 August 2012 on the criteria and methods of classification of chemical substances and their mixtures (Journal of Laws 2012, item 1018 as amended);*

*Regulation of the Minister of Labour and Social Policy of 26 September 1997 on general occupational health and safety provisions*



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*(consolidated version - Journal of Laws 2003 No. 169 item 1650, as amended);*

*Regulation of the Minister of Economy of 8 July 2010 on minimum requirements, concerning occupational health and safety, related to the possibility of occurrence of explosive atmosphere at the workplace (Journal of Laws 2010 no. 138 item 931);*

*The Act of 24 August 1991 on fire protection (Journal of Laws 2009 No.178, item 1380, as amended);*

*The Act of 19 August 2011 on the transport of hazardous materials (Journal of Laws 2011, No. 227, item 1367, as amended);*

*The Act of 14 December 2012 on waste (Journal of Laws 2013, item 21 as amended).*

## 15.2. Chemical safety assessment

The manufacturer has not performed the assessment of the preparation chemical safety.

## SECTION 16. OTHER INFORMATION

### Modifications introduced in this revision:

Verification of current legislation.

Changes to Sections: 2, 5, 8, 13, 14, 15, 16.

### List of abbreviations used in this safety data sheet:

OEL	Occupational Exposure Limit
STEL	Short-Term Exposure Limit
TLV-C	Threshold Limit Value - Ceiling
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
LD <sub>50</sub>	Median lethal dosage, at which the death of 50% of the tested animals is observed
LC <sub>50</sub>	Median lethal concentration, at which the death of 50% of the tested animals is observed
vPvB	Very Persistent and Very Bioaccumulative (substance)
PBT	Persistent, Bioaccumulative and Toxic (substance)
RID	Regulations concerning the international carriage of dangerous goods by rail
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG	International Maritime Dangerous Goods Code
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Sea

### Literature and resources:

Regulations referred to in sections 2 – 15 of this material safety data sheet.

Information provided by Siarkopol TARNOBRZEG Chemical Plants Ltd.

### The full list of applicable hazard and precautionary phrases, which have not been provided in sections 2 - 15 of this Material Safety Data Sheet.

Not applicable.

### Recommendations related to personnel training:

Personnel handling the product should be trained in safe product handling and first aid in the case of contact with skin, contamination of eyes, indigestion and inhalation of vapors or dust.

**Exposure scenarios:** constitute an attachment to this material safety data sheet. Exposure scenarios no. 1÷8 and no. 10 refer to registered substance and are compliant with chemical safety report. Exposure scenario no. 9 concerns mixture whose main ingredient is sulphur. Based on chemical safety report prepared specifically for sulphur, an exposure scenario for the mixture was developed.

**NOTE:** This material safety data sheet has been developed based on the composition and properties of product ingredients contained in respective safety data sheets, information on product properties, applicable regulations and our current knowledge and experience. This material safety data sheet is not a product quality certificate. Information contained in this data sheet should be only used as guidance for safe handling during transport, distribution, usage and storage. Information contained in this safety data sheet refers only to the specific physical form of the product and its use being compliant with the intended use specified in the data sheet. Users of the product must ensure adherence to all applicable standards and regulations and they are responsible for the effects resulting from improper use of the information contained in this safety data sheet or improper application of the product.





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ENCLOSURES TO MSDS – EXPOSURE SCENARIOS

## Section 1 Exposure scenario (1)

### Title

### Manufacturing of substance – industrial

### Use descriptors

Sector(s) of Use (SoU)	3, 8, 9
Process Categories (PROC)	1, 2, 3, 4, 8a, 8b, 15
Environmental Release Categories (ERC)	1
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 1.1.v1

### Processes, tasks, activities covered

Production of substance or its application as process addition or extractive agent. Applies to recycling/recovery, transporting, storing, sampling, related laboratory work, maintenance and loading of materials (including onto ships/cargo boats, to cars/wagons and material containers for bulk storage).

### Assessment method

Please Section 3

## Section 2 Operational Conditions and Risk Management Measures

### Section 2.1 Control of worker exposure

#### Product characteristics

Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

#### Contributing scenarios

#### Specific Risk Management Measures (RMM) and Operating Conditions (OC)

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 is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems) with sample collection	No other specific measures identified.
General exposures (closed systems), batch process, with sample collection	No other specific measures identified.
Process sampling	No other specific measures identified.
General exposures (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Laboratory activities	Use below extractor or below ventilation extraction.
Bulk transfers, dedicated facility	Perform the process outdoors.
Equipment cleaning and	Dry the system by cleaning or maintenance. Maintain drying under tight closure



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<b>maintenance</b>	until disposal or recycling.
Bulk product storage	Perform the process outdoors. Provide proper ventilation (air exchange at least 3 to 5 times per hour).
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
<b>3.2. Environment</b>	
Not applicable	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>4.1. Health</b>	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.	
Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>4.2. Environment</b>	
Not applicable	

<b>Section 1 Exposure scenario (2)</b>	
<b>Title</b>	
<b>Use of Substance as intermediate – industrial</b>	
<b>Use descriptors</b>	
Sector(s) of Use (SoU)	3, 8, 9
Process Categories (PROC)	1, 2, 3, 4, 8a, 8b, 15, 22, 23
Environmental Release Categories (ERC)	6a
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 6.1a.v1
<b>Processes, tasks, activities covered</b>	
Use of substance as semi-product. Applies to recycling/recovery, transporting, storing, sampling, related laboratory work, maintenance and loading of materials (including onto ships/cargo boats, to cars/wagons and material containers for bulk storage).	
<b>Assessment method</b>	
Please Section 3	
<b>Section 2 Operational Conditions and Risk Management Measures</b>	
<b>Section 2.1 Control of worker exposure</b>	
<b>Product characteristics</b>	
Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.
<b>Contributing scenarios</b>	<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin



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	contact. Wear gloves (tested to EN374) if hand contact with substance is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems) with sample collection	No other specific measures identified.
General exposures (closed systems), batch process, with sample collection	No other specific measures identified.
Process sampling	No other specific measures identified.
General exposures (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Laboratory activities	Use below extractor or below ventilation extraction.
Bulk transfers, dedicated facility	Perform the process outdoors.
Equipment cleaning and maintenance	Dry the system by cleaning or maintenance. Maintain drying under tight closure until disposal or recycling.
Bulk product storage	No other specific measures identified.
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
<b>3.2. Environment</b>	
Not applicable	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>4.1. Health</b>	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.	
Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>4.2. Environment</b>	
Not applicable	

<b>Section 1 Exposure scenario (3)</b>	
<b>Title</b>	
<b>Distribution of substance – industrial</b>	
<b>Use descriptors</b>	
Sector(s) of Use (SoU)	3
Process Categories (PROC)	1, 2, 3, 4, 8a, 8b, 9, 15
Environmental Release Categories (ERC)	4, 5, 6a, 6b, 6c, 6d, 7
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 1.1b.v1
<b>Processes, tasks, activities covered</b>	
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, maintenance and associated laboratory activities.	
<b>Assessment method</b>	
Please Section 3	
<b>Section 2 Operational Conditions and Risk Management Measures</b>	
<b>Section 2.1 Control of worker exposure</b>	



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<b>Product characteristics</b>	
Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.
<b>Contributing scenarios</b>	<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>
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 is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems) with sample collection	No other specific measures identified.
General exposures (closed systems), batch process, with sample collection	No other specific measures identified.
Process sampling	No other specific measures identified.
General exposures (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Laboratory activities	Use below extractor or below ventilation extraction.
Bulk transfers, dedicated facility	Perform the process outdoors.
Small package filling	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Equipment cleaning and maintenance	Dry the system by cleaning or maintenance. Maintain drying under tight closure until disposal or recycling.
Bulk product storage	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
<b>3.2. Environment</b>	
Not applicable	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>4.1. Health</b>	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.	
Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>4.2. Environment</b>	
Not applicable	



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<b>Section 1 Exposure scenario (4)</b>	
<b>Title</b>	
<b>Formulation (mixing) and (re)packing of substances and mixtures – industrial</b>	
<b>Use descriptors</b>	
Sector(s) of Use (SoU)	3, 10
Process Categories (PROC)	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15, 23, 24
Environmental Release Categories (ERC)	2
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 2.2.v1
<b>Processes, tasks, activities covered</b>	
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, maintenance and associated laboratory activities.	
<b>Assessment method</b>	
Please Section 3	
<b>Section 2 Operational Conditions and Risk Management Measures</b>	
<b>Section 2.1 Control of worker exposure</b>	
<b>Product characteristics</b>	
Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.
<b>Contributing scenarios</b>	<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>
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 is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems) with sample collection	No other specific measures identified.
General exposures (closed systems), batch process, with sample collection	No other specific measures identified.
Process sampling	No other specific measures identified.
General exposures (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Mixing operations (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Milling, grinding and similar activities.	Provide ventilation extraction in emission spots.
Small package filling	Provide ventilation extraction in emission spots.
Granulating	No other specific measures identified.
Laboratory activities	Use below extractor or below ventilation extraction.
Bulk transfers, dedicated facility	Perform the process outdoors.
Equipment cleaning and maintenance	Dry the system by cleaning or maintenance. Maintain drying under tight closure until disposal or recycling.
General exposures (open systems)	No other specific measures identified.



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elevated temperature	
Bulk product storage	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
<b>3.2. Environment</b>	
Not applicable	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>4.1. Health</b>	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.	
Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>4.2. Environment</b>	
Not applicable	

<b>Section 1 Exposure scenario (5)</b>	
<b>Title</b>	
<b>Use of Substance as release agents or binders – industrial</b>	
<b>Use descriptors</b>	
Sector(s) of Use (SoU)	3
Process Categories (PROC)	1, 2, 3, 4, 6, 8a, 8b, 10, 13, 14
Environmental Release Categories (ERC)	4
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 4.10a.v1
<b>Processes, tasks, activities covered</b>	
Includes application as binding and parting agent, also during the transportation of materials, mixing, application (including spraying and brush painting), forming and casting materials and handling waste.	
<b>Assessment method</b>	
Please Section 3	
<b>Section 2 Operational Conditions and Risk Management Measures</b>	
<b>Section 2.1 Control of worker exposure</b>	
<b>Product characteristics</b>	
Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.
<b>Contributing scenarios</b>	
<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>	
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 is likely.



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	Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize 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)	No other specific measures identified.
General exposures (closed systems) with sample collection	No other specific measures identified.
General exposures (closed systems), batch process, with sample collection	No other specific measures identified.
General exposures (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Mixing operations (open systems)	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Roller, spreader and flow application	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Dripping, immersion and pouring	No other specific measures identified.
Article formation in mould	No other specific measures identified.
Bulk transfers, dedicated facility	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Equipment cleaning and maintenance	Dry the system by cleaning or maintenance. Maintain drying under tight closure until disposal or recycling.

## Section 2.2 Control of environmental exposure

Not applicable

## Section 3 Exposure estimation

### 3.1. Health

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

### 3.2. Environment

Not applicable

## Section 4 Guidance to check compliance with the Exposure Scenario

### 4.1. Health

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.

Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

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

Not applicable

## Section 1 Exposure scenario (6)

### Title

**Use of Substance as release agents or binders – professional**

### Use descriptors

Sector(s) of Use (SoU)	22
Process Categories (PROC)	1, 2, 3, 4, 6, 8a, 8b, 10, 13, 14
Environmental Release Categories (ERC)	8a, 8d
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 8.10b.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.



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<b>Assessment method</b>	
Please Section 3	
<b>Section 2 Operational Conditions and Risk Management Measures</b>	
<b>Section 2.1 Control of worker exposure</b>	
<b>Product characteristics</b>	
Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.
<b>Contributing scenarios</b>	<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>
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 is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize 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)	No other specific measures identified.
General exposures (closed systems) with sample collection	No other specific measures identified.
General exposures (closed systems), batch process, with sample collection	No other specific measures identified.
General exposures (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Mixing operations (open systems)	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Roller, spreader and flow application	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Dripping, immersion and pouring	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Article formation in mould	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Bulk transfers, dedicated facility	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Equipment cleaning and maintenance	Dry the system by cleaning or maintenance. Maintain drying under tight closure until disposal or recycling.
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
<b>3.2. Environment</b>	
Not applicable	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>4.1. Health</b>	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.	





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Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

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

Not applicable

## Section 1 Exposure scenario (7)

### Title

### Use of Substance in agrochemicals – professional

### Use descriptors

Sector(s) of Use (SoU)	22
Process Categories (PROC)	1, 4, 8a, 8b, 11, 13
Environmental Release Categories (ERC)	8a, 8d
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 8.11a.v1

### Processes, tasks, activities covered

Use as an agrochemical excipient for application by manual or machine spraying, smokes and fogging, including equipment clean-downs and disposal.

### Assessment method

Please Section 3

## Section 2 Operational Conditions and Risk Management Measures

### Section 2.1 Control of worker exposure

#### Product characteristics

Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

#### Contributing scenarios

#### Specific Risk Management Measures (RMM) and Operating Conditions (OC)

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 is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize 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)	No other specific measures identified.
General exposures (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Bulk transfers, dedicated facility	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Spraying	Use mask compliant with EN140 norm with A/P2 filter or better.
Dripping, immersion and pouring	Avoid activities connected with exposure to the substance for more than 4 hour.



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Equipment cleaning and maintenance	Avoid activities connected with exposure to the substance for more than 1 hour.
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
<b>3.2. Environment</b>	
Not applicable	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>4.1. Health</b>	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.	
Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>4.2. Environment</b>	
Not applicable	

<b>Section 1 Exposure scenario (8)</b>		
<b>Title</b>		
Use of Substance in agrochemicals– consumer		
<b>Use descriptors</b>		
Sector(s) of Use (SoU)	21	
Product Categories (PC)	12, 22, 27	
Environmental Release Categories (ERC)	8a, 8d	
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 8.11b.v1	
<b>Processes, tasks, activities covered</b>		
Includes consumer-related application in agrochemical products in liquid and solid state.		
<b>Assessment method</b>		
Please Section 3		
<b>Section 2 Operational Conditions and Risk Management Measures</b>		
<b>Section 2.1 Control of consumer exposure</b>		
<b>Product characteristics</b>		
Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.	
Concentration of substance in product	Unless otherwise stated, covers concentrations up to 100%.	
Amounts used	Unless otherwise stated, covers use amounts up to 37500 g; covers skin contact area up to 6600 cm <sup>2</sup>	
Frequency and duration of use/exposure	Unless otherwise stated, covers use frequency up to 4 times per day; covers exposure up to 8 hours per event.	
Other operational conditions affecting exposure	Unless otherwise stated assumes use at ambient temperatures; assumes use in a 20 m <sup>3</sup> room; assumes use with typical ventilation.	
<b>Contributing scenarios</b>		
<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>		
PC12: Fertilizers	OC	Unless otherwise stated, covers concentrations up to 90%; covers use up to 1 day of the year; covers use up to 1 time/on day of use; covers skin contact area up to 857.50 cm <sup>2</sup> ; for each use event, assumes swallowed amount of 0.3 g; for each use event, covers use amounts up to 2500 g; covers outdoor use.
	RMM	No specific RMMs identified beyond those OCs stated.
PC22: Lawn and garden	OC	Products containing Sulphur in high percentages (assume 90%) are



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preparations, including fertilizers		sold for acidification of soil, to treat certain plant diseases (e.g. scab on potatoes) and as worm-deterrent ( <a href="http://www.progreen.co.uk/index.php?c=61&amp;p=132">http://www.progreen.co.uk/index.php?c=61&amp;p=132</a> ). The products are provided as prill (pellets) in bags of 1 kg. Recommended application frequency: 1 per year.
	RMM	No specific RMMs identified beyond those OCs stated.
PC27: Plant protection products	OC	Unless otherwise stated, covers concentrations up to 90%; covers use up to 1 day of the year; covers use up to 1 time/on day of use; covers skin contact area up to 857.50 cm <sup>2</sup> ; for each use event, assumes swallowed amount of 0.3 g; for each use event, covers use amounts up to 2500 g; covers outdoor use.
	RMM	No specific RMMs identified beyond those OCs stated.

## Section 2.2 Control of environmental exposure

Not applicable

## Section 3 Exposure estimation

### 3.1. Health

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 sources, then they are indicated.

### 3.2. Environment

Not applicable

## Section 4 Guidance to check compliance with the Exposure Scenario

### 4.1. Health

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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

Not applicable

## Section 1 Exposure scenario (9)

### Title

Use of Substance in rubber production and processing – industrial

### Use descriptors

Sector(s) of Use (SoU)	3, 10, 11
Process Categories (PROC)	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 13, 14, 15, 21
Environmental Release Categories (ERC)	4, 6d
Specific Environmental Release Categories (SPERC)	ESVOC SpERC 4.19.v1

### Processes, tasks, activities covered

Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing.

### Assessment method

Please Section 3

## Section 2 Operational Conditions and Risk Management Measures

### Section 2.1 Control of worker exposure

#### Product characteristics

Physical form of product	Milled oiled sulphur - solid mixture, dust, solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).



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Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.
<b>Contributing scenarios</b>	<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>
General measures (skin irritants, explosion-hazardous dusts)	<p>Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize exposures and to report any skin problems that may develop.</p> <p>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.</p> <p>It is recommended that the user of milled oiled sulphur perform analysis of risk resulting from explosive atmosphere for their installation, identify danger zones and prepare document for protection against explosion (pursuant to directive ATEX 94/9/EC and the Ordinance of the Minister of Economy of 22 December 2005 on the basic requirements for protective devices and systems for use in areas the danger of explosion, as amended).</p> <p>Personal protection measures for use in explosive atmosphere must not be sources of electrical, electrostatic or mechanical arcs or sparks that might cause ignition of the explosive mixture.</p> <p>Observe parameters specified by physical and chemical properties listed in section 9 of the safety data sheet (such as lower explosion limit, ignition temperature, minimum ignition energy, pressure conditions, explosion index, etc.).</p>
General exposures (closed systems)	No other specific measures identified than the ones listed above.
General exposures (closed systems) with sample collection	No other specific measures identified than the ones listed above.
General exposures (closed systems), batch process, with sample collection	No other specific measures identified than the ones listed above.
General exposures (open systems)	Perform the process outdoors. Provide proper ventilation (air exchange at least 3 to 5 times per hour). And the above-mentioned measures.
Mixing operations (open systems)	Provide proper ventilation (air exchange at least 3 to 5 times per hour). And the above-mentioned measures.
Calendering (including Banburys); vulcanisation; cooling cured articles	Provide proper ventilation (air exchange at least 3 to 5 times per hour). And the above-mentioned measures.
Spraying	Perform the process below extractor. And the above-mentioned measures.
Small scale weighing	Provide proper ventilation (air exchange at least 3 to 5 times per hour). And the above-mentioned measures.
Dripping, immersion and pouring	No other specific measures identified, than the ones listed above.
Pressing uncured rubber blanks	No other specific measures identified, than the ones listed above.
Finishing operations	No other specific measures identified, than the ones listed above.
Laboratory activities	No other specific measures identified, than the ones listed above.
Bulk transfers, dedicated facility	Perform the process outdoors. Provide proper ventilation (air exchange at least 3 to 5 times per hour). Use electrostatic earthing limiting the explosion risk. Use explosion-proof devices. And the above-mentioned measures.
Equipment cleaning and maintenance	Dry the system by cleaning or maintenance. Maintain drying under tight closure until disposal or recycling. And the above-mentioned measures.
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	



# MATERIAL SAFETY DATA SHEET

In accordance with Regulation (EU) 830/2015

(MILLED OILED SULPHUR)

Developed: 15.12.2005

Revision: 01.02.2016

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The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
<b>3.2. Environment</b>
Not applicable
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>
<b>4.1. Health</b>
Available hazard data for sulphur do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.
Available hazard data for sulphur do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
<b>4.2. Environment</b>
Not applicable

<b>Section 1 Exposure scenario (10)</b>	
<b>Title</b>	
Use of Substance in explosives manufacture and use – professional	
<b>Use descriptors</b>	
Sector(s) of Use (SoU)	22
Process Categories (PROC)	1, 3, 5, 8a, 8b
Environmental Release Categories (ERC)	8e
Specific Environmental Release Categories (SPERC)	Not applicable
<b>Processes, tasks, activities covered</b>	
Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer and equipment cleaning).	
<b>Assessment method</b>	
Please Section 3	
<b>Section 2 Operational Conditions and Risk Management Measures</b>	
<b>Section 2.1 Control of worker exposure</b>	
<b>Product characteristics</b>	
Physical form of product	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated otherwise).
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.
<b>Contributing scenarios</b>	<b>Specific Risk Management Measures (RMM) and Operating Conditions (OC)</b>
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 is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimize exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems), batch process, with	No other specific measures identified.



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sample collection	
Mixing operations (open systems)	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Bulk transfers, dedicated facility	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
Equipment cleaning and maintenance	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
<b>Section 2.2 Control of environmental exposure</b>	
Not applicable	
<b>Section 3 Exposure estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
<b>3.2. Environment</b>	
Not applicable	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>4.1. Health</b>	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterization.	
Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>4.2. Environment</b>	
Not applicable	

ACCEPTANCE: