



MATERIAL SAFETY DATA SHEET

In accordance with Regulation (EU) 830/2015
(Milled sulphur, granulated 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 preparation

Name: **SULPHUR**
Trade name: Milled sulphur, granulated sulphur
CAS No.: 7704-34-9
EC No.: 231-722-6
Index No.: 016-09400-1
Reg. No.: 01-2119487295-27-XXXX

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 sulfuric acid, fertilizers, crop protection chemicals, paper, paper and plastic packaging, explosive materials, carbon electrodes, cutting fluids, rubber vulcanizing, crude oil refining, steel melting, pH control in food industry, disinfection of tools and rooms used for agricultural manufacturing processes.

1.3. Manufacturer information

Manufacturer: "Siarkopol" TARNOBRZEG Chemical Plants Ltd.
Address: 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. HAZARD IDENTIFICATION

2.1. Classification of the substance or preparation

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



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2.3. Other hazards

Solid sulphur is a combustible substance. 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.

Combined sulphur dusts and air form 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 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 ABOUT INGREDIENTS

3.1. Substances

<u>Substance name</u>	<u>Symbol</u>	<u>% by weight</u>	<u>CAS No.</u>	<u>EC No.</u>	<u>Index No.</u>
Sulphur	S	>99	7704-34-9	231-722-6	016-09400-1

SECTION 4. FIRST-AID MEASURES

4.1. Description of 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 large amounts 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 the specific handling of the affected person

If SO₂ 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, CO₂ 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

Flammable substance. 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 extent, safely removed from danger zone and continuously cooled.

Dusts and steams of sulphur combined with air form explosive mixtures, which may cause transfer of explosions and fires.



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5.3. Information for fire-fighters

Use spray, droplet and mist water for extinguishing a large fire. Water mist is efficient in rooms.
Use full, fireproof clothing and respiratory apparatus with independent air supply.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1. Individual precautions, personal protective equipment and emergency procedures

Remove from the danger zone all persons not participating in emergency action. Call rescue forces.
Do not let people without proper protection enter the danger zone. Use personal protection means – 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 the mixture of sulphur dust and air to explosions, during the process of filling/removing sulphur to/from unit 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 components that require it (to carry away electrostatic charges), proper materials used in installation components having contact with sulphur,
- using electrical devices that meet 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.

When performing any actions related to sulphur, it is prohibited to eat, drink, smoke, use medicines, one should also avoid inhaling steams, dusts, smokes and aerosols, as well as observe personal hygiene. Use PPE in accordance with the provisions of section 8 of this safety data 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 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



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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

Sulphur particulates (other non-toxic industrial particulates, also with free (crystalline) silica < 2% of respirable fraction) OEL: 10 mg/m³

Sulphur dioxide OEL: 1.3 mg/m³, STEL: 2.7 mg/m³, 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).

DNEL: not applicable (non-toxic substance)

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 below the allowable maximum limits. When substance concentration is known and stable, select PPE with consideration of the substance concentration at 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 oxygen 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	: 6.5% (100 g/l at 20°C)
e) Melting/freezing points	: 112,8°C / Not specified
f) Initial boiling temperature	: 444,6°C
g) Ignition temperature (max. temp. of the wall of vessel in which sulphur is stored, must not exceed)	: 180°C
h) Evaporation rate	: Not specified (no available data)
i) Combustibility (solid, gas)	: Flammable
j) Lower explosion limit LEL of a dust cloud	: 20+/-1.2 g/m ³ *
k) Vapor pressure	: 133,3 Pa (at 183°C)
l) Vapor density	: Not specified (no available data)



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m) Relative density	: 2.07 g/cm ³ 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	: 215°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 p_{max}	: 7,1 ± 0.4 bar *
Maximum pressure rise rate $(dp/dt)_{max}$: 794 ± 78 bar/s *
Explosion index $K_{st max}$: 216 ± 22 m·bar/s *
Explosion class	: St2 *
Dust cloud ignition temperature T_{cl}	: 270 ± 3.6 °C *
Dust layer ignition temperature $T_{s mm}$: melts under the temperature of ca. 123 °C *
Minimum energy of dust cloud ignition MIE	: < 1.8 mJ *
Surface tension	: 1200-1350 kg/m ³ (granulated sulphur) : 550-750 kg/m ³ (milled sulphur)

* - parameters apply to milled sulphur

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

The product is reactive.

10.2. Chemical stability

The substance 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

11.1 Information on toxicological effects

Acute toxicity:

- LD50: >2000 mg/kg BM (oral, rat)
- LD50: >2000 mg/kg BM (skin, rabbit)
- LC50: >5430 mg/m³ (inhalation, rat, 4h)

Caustic/irritating effects on skin:



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Sulphur dust irritates the skin.

Severe disturbances to eyes/irritating effects on eyes:

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 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.



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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).

Waste codes: 060699 (wastes not otherwise specified).

There are no limitations for reusing contaminated sulphur, provided that the technology allows recovery. 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 sulphur is not covered by ADR/RID provisions (it does not meet the classification criteria according to RID and ADR) – pursuant to classification certificate No. 031/IPO-BC/2015 issued by the Institute of Organic Industry in Warsaw on 27.11.2015).

Granulated sulphur is not covered by ADR/RID/IMDG/ADN provisions based on the specific/special regulation No. 242.

Milled sulphur is covered by IMDG (sea transport) and ADN provisions (land or water transport).

14.1. UN number	1350
14.2. Proper shipping name (UN)	Sulphur
14.3. Transportation hazard class	4.1
14.4. Packaging group	III
14.5. Environmental hazards	No hazard to environment
14.6. Special precautions for users	None
14.7. Bulk transport in accordance to MARPOL Annex II 73/78 and IBC Code	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 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 (OJ EU No. 353 of 31.12.2008, as amended);

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 (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



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*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 (consolidated version - 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 performed the assessment of the substance 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 ₅₀	Median lethal dosage, at which the death of 50% of the tested animals is observed
LC ₅₀	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 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 sulphur should be trained in safe substance handling and first aid in case of contact with the skin, contamination of the eyes, indigestion and inhalation of vapors or dust.

Exposure scenarios: refer to registered substance, are compliant with chemical safety report and constitute an appendix to this data sheet.

Disclaimer: Product users are responsible for implementing all measures to comply with the requirements of national laws. Information contained in this safety data sheet describes requirements for the safe use of the product. Product users are fully responsible for determining if the product is suitable for particular applications. Information contained in this safety data sheet should not be considered as an assessment of safety at the user's workplace. This material safety data sheet may not be treated a guarantee of substance performance and quality.



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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 maintenance	Dry the system by cleaning or maintenance. Maintain drying under tight closure until disposal or recycling.



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Bulk product storage	Perform the process outdoors. Provide proper ventilation (air exchange at least 3 to 5 times per hour).
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 (2)	
Title	
Use of Substance as intermediate – industrial	
Use descriptors	
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
Processes, tasks, activities covered	
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).	
Assessment method	
Please Section 3	
Section 2 Operational Conditions and Risk Management Measures	
Section 2.1 Control of worker exposure	
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Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated otherwise).
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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



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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.
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 (3)	
Title	
Distribution of substance – industrial	
Use descriptors	
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
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, maintenance and associated laboratory activities.	
Assessment method	
Please Section 3	
Section 2 Operational Conditions and Risk Management Measures	



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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.
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).
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	



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Section 1 Exposure scenario (4)	
Title	
Formulation (mixing) and (re)packing of substances and mixtures – industrial	
Use descriptors	
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
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, maintenance and associated laboratory activities.	
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).
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	Dry the system by cleaning or maintenance. Maintain drying under tight closure



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maintenance	until disposal or recycling.
General exposures (open systems) elevated temperature	No other specific measures identified.
Bulk product storage	Perform the process outdoors or provide proper ventilation (air exchange at least 3 to 5 times per hour).
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 (5)	
Title	
Use of Substance as release agents or binders – industrial	
Use descriptors	
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
Processes, tasks, activities covered	
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.	
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



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	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 (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



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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.	
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 (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.
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	



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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 (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



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	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 hours.
Equipment cleaning and maintenance	Avoid activities connected with exposure to the substance for more than 1 hour.
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 (8)	
Title	
Use of Substance in agrochemicals– consumer	
Use descriptors	
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
Processes, tasks, activities covered	
Includes consumer-related application in agrochemical products in liquid and solid state.	
Assessment method	
Please Section 3	
Section 2 Operational Conditions and Risk Management Measures	
Section 2.1 Control of consumer 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	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 ²
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 ³ room; assumes use with typical ventilation.
Contributing scenarios	
Specific Risk Management Measures (RMM) and Operating Conditions (OC)	
PC12: Fertilizers	OC Unless otherwise stated, covers concentrations up to 90%; covers use



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		up to 1 days/year; covers use up to 1 time/on day of use; covers skin contact area up to 857.50 cm ² ; 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 preparations, including fertilizers	OC	Products containing Sulphur in high percentages (assume 90%) are sold for acidification of soil, to treat certain plant diseases (e.g. scab on potatoes) and as worm-deterrent (http://www.progreen.co.uk/index.php?c=61&p=132). 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/year; covers use up to 1 time/on day of use; covers skin contact area up to 857.50 cm ² ; 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 Solid at STP, liquid at elevated operating temperature, vapour pressure < 0,5 kPa.



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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 (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).
Calendering (including Banburys); vulcanisation; cooling cured articles	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Spraying	Perform the process below extractor.
Small scale weighing	Provide proper ventilation (air exchange at least 3 to 5 times per hour).
Dripping, immersion and pouring	No other specific measures identified.
Pressing uncured rubber blanks	No other specific measures identified.
Finishing operations	No other specific measures identified.
Laboratory activities	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	



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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 (10)

Title

Use of Substance in explosives manufacture and use – professional

Use descriptors

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

Processes, tasks, activities covered

Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer and equipment cleaning).

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), batch process, with sample collection	No other specific measures identified.
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).

Section 2.2 Control of environmental exposure

Not applicable



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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

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