



Chemical Safety Report SULFUR

Revision:
3. October 2014

according to 1907/2006/EC, Article 31

Identification of the substance/mixture and of the company

Product identifier

Identification on the label / trade name:

Sulfur

EC: 231-722-6

CAS: 7704-34-9

Additional identification:

sulfur, liquid sulfur, sulphur

REACH registration number:

01-2119487295-27-0125

Manufacturer/Supplier: ISD Kokszołó Kft.

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Information: see Section 16 (Contact)

Emergency telephone number: see: Manufacturer/Supplier

EXPOSURE ASSESSMENT

Identified Use Description and Exposure

Most common technical function of substance (what it does):

Intermediates

IU	Category	Identified Use Name	Sector	ES Number	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (SpERC)
1	Sulfur	01 – Manufacture of Substance	Industrial	ES 9.1.1	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 15	1, 4	ESVOC SpERC 1.1.v1
2	Sulfur	01b – Use of Substance as Intermediate	Industrial	ES 9.2.1	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 15, 22, 23	6a	ESVOC SpERC 6.1a.v1
3	Sulfur	01a – Distribution of Substance	Industrial	ES 9.3.1	3	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
4	Sulfur	02 – Formulation & (Re)packing of Substances and Mixtures	Industrial	ES 9.4.1	3, 10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15, 23, 24	2	ESVOC SpERC 2.2.v1
5	Sulfur	10a – Use as Release Agents or Binders: Industrial	Industrial	ES 9.5.1	3	NA	1, 2, 3, 4, 6, 8a, 8b, 10, 13, 14	4	ESVOC SpERC 4.10a.v1
6	Sulfur	10b – Use as Release Agents or Binders: Professional	Professional	ES 9.6.1	22	NA	1, 2, 3, 4, 6, 8a, 8b, 10, 13, 14	8a, 8d	ESVOC SpERC 8.10b.v1
7	Sulfur	11a – Use in Agrochemicals: Professional	Professional	ES 9.7.1	22	NA	1, 4, 8a, 8b, 11, 13	8a, 8d	ESVOC SpERC 8.11a.v1
8	Sulfur	11b – Use in Agrochemicals: Consumer	Consumer	ES 9.8.1	21	12, 22, 27	NA	8a, 8d	ESVOC SpERC 8.11b.v1
9	Sulfur	15 – Use in Road and Construction Applications: Professional	Professional	ES 9.9.1	22	NA	8a, 8b, 9, 10, 11, 13	8d, 8f	ESVOC SpERC 8.15.v1
10	Sulfur	19 – Rubber Production and Processing: Industrial	Industrial	ES 9.10.1	3, 10, 11	NA	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 13, 14, 15, 21	1, 4, 6d	ESVOC SpERC 4.19.v1
11	Sulfur	12a – Use as a Fuel: Industrial	Industrial	ES 9.11.1	3	NA	1, 2, 3, 4, 8a, 8b, 16	7	ESVOC SpERC 7.12a.v1
12	Sulfur	18b – Explosives Manufacture & Use: Professional	Professional	ES 9.12.1	22	NA	1, 3, 5, 8a, 8b	8e	ERC DEFINED RELEASE FRACTIONS
13	Sulfur	Use in Matches	Consumer	ES 9.13.1	21	11	NA	8e	ERC DEFINED RELEASE FRACTIONS
14	Sulfur	Use in Fireworks	Consumer	ES 9.14.1	21	11	NA	8e	ERC DEFINED RELEASE FRACTIONS

Exposure Scenarios and Risk Characterisation Introduction

Most sulfur is produced in de-sulphurization processes of oil refinery streams and natural gas. In a refinery sulfur-containing petroleum streams are passed through a de-sulphurization unit where the sulfur is extracted in the form of hydrogen-sulphide which is subsequently converted to elemental sulfur. The sulfur in oil refineries is produced, stored and shipped to customers in its molten state as a liquid (at approximately 130°C) or in solid form. Sulfur (as H₂S) content of coke oven gas forming during coke making is removed as elementary sulfur using the well-known Claus process.

The process of mapping uses and characterizing risks has often identified a series of supporting measures that may further contribute to the management of exposure. These measures are not contained within the Exposure Scenarios (ES) as they do not need to be implemented in order to achieve satisfactory exposure control. However, they are identified within the CSA in order that stakeholders are able to benefit from access to other exposure control information that has been obtained during the process of CSA/ES development.

Sulfur is a solid at ambient temperature and hence inhalation exposures of workers and consumers to airborne dust require consideration. Although molten sulfur is a hot liquid, any airborne fraction at ambient temperatures is likely to be an aerosol and not a vapour, therefore inhalation exposures to airborne fraction at ambient temperature are assessed as dust. The assigned dustiness for the ECETOC TRA model is moderate. An inhalation DNEL¹ is not appropriate to derive, but reference values for 'nuisance dust' or 'non-specific' dust are appropriate and available in several countries to assess occupational exposures to substances in the form of dusts without substance-specific Occupational Exposure Limits. These values range from 4mg/m³ in Germany to 15mg/m³ in the USA. In view of the possible health impact of sulfur dust in general, the lower value of this range has been selected in order to identify a set of recommended (non-mandatory) risk management measures to minimize exposure to dust.

Sulfur is classified as a skin irritant (R38), which requires a qualitative risk characterization of any dermal exposures according to REACH guidance Chapter E. A quantitative assessment of dermal exposures has not been conducted.

Sulfur is **not classified as hazardous** for environmental endpoints. A quantitative exposure assessment for the environment has not been conducted.

Impurities of concern potentially present in sulfur, e.g. in the headspace of a storage tank include hydrogen-sulphide (H₂S), a highly toxic gas, and sulfur dioxide (SO₂), an irritant gas. Risk Management Measures fall outside the scope of the Exposure Scenarios but can be addressed in the main body of the Safety Data Sheet. Proposed language for the SDS to deal with the H₂S hazard is as follows:

- Product may release hydrogen-sulphide: a specific assessment of inhalation risks from the presence of hydrogen-sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances (E500)
- These controls may include: Segregation of areas, Access only to authorized persons, Permit to work systems, Confined space working procedures, Area H₂S alarms, Personal H₂S alarms, Personal escape sets, H₂S awareness training (E501)

¹ DNEL: Derived No Effect Level

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Manufacture of Sulphur – Industrial

Section 1 Exposure Scenario Title: Sulfur	
Title	
Manufacture of Substance	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 4, 8a, 8b, 15 <i>Further information on the mapping and allocation of PROC codes is contained in Table 9.1</i>
Environmental Release Categories	1, 4
Specific Environmental Release Category	ESVOC SpERC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling / recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See 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 OC29
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
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). OC7 . Assumes a good basic standard of occupational hygiene is implemented G1 .

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CS16 General exposures (open systems)	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20
CS14 Bulk transfers CS81 Dedicated facility	No other specific measures identified. EI20
CS39 Equipment Cleaning and Maintenance	No other specific measures identified. EI20
CS85 Bulk product storage	No other specific measures identified. EI20
<i>Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 2</i>	
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. G21.	
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. G32. Risk Management Measures are based on qualitative risk characterisation. G37.	
Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38.	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
4.2. Environment	
Not applicable	

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Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS15 General exposures (closed systems) CS56 With sample collection	No other specific measures identified. EI20
CS15 General exposures (closed systems) CS55 Batch process CS56 With sample collection	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20



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Use Descriptor	
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Process Categories	1, 2, 3, 4, 8a, 8b, 15, 22, 23 <i>Further information on the mapping and allocation of PROC codes is contained in Table 9.1</i>
Environmental Release Categories	6a
Specific Environmental Release Category	ESVOC SpERC 6.1a.v1
Processes, tasks, activities covered	
Use of substance as an intermediate. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/ barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
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Statement

The information is based on present level of our knowledge. It does not, however, give assurances of product properties and establishes no contract legal rights.

The product is to be used exclusively for the applications named in the technical leaflet or in the processing instructions. The receiver of our product is singularly responsible for adhering to existing laws and regulations.

This document was prepared by: CONCAWE (as Lead Registrant)