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

1.1. Product identifier

Product form : Substance
Trade name/designation : MOLTEN SULFUR
EC-No. : 231-722-6
CAS-No. : 7704-34-9
REACH registration No : 01-2119487295-27-0120
Product group : Trade product

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

1.2.1. Relevant identified uses

Main use category : Industrial use, Professional use, Consumer use
Use of the substance/mixture : see attached exposure scenario.

Title	Use descriptors
Manufacture of substance (ES Ref.: 01)	SU3, SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, ERC1, ERC4, ESVOC SPERC 1.1.v1
Use as an intermediate (ES Ref.: 02)	SU3, SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, PROC22, PROC23, ERC6a, ESVOC SPERC 6.1a.v1
Distribution (ES Ref.: 03)	SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1
Formulation & (re)packing of substances and mixtures (ES Ref.: 04)	SU3, SU10, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC23, PROC24, ERC2, ESVOC SPERC 2.2.v1
Use as binders and release agents (ES Ref.: 05)	SU3, PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC13, PROC14, ERC4, ESVOC SPERC 4.10a.v1
Use in rubber production and processing (ES Ref.: 10)	SU3, SU10, SU11, PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15, PROC21, ERC1, ERC4, ERC6d, ESVOC SPERC 4.19.v1
Use as a fuel (ES Ref.: 11)	SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16, ERC7, ESVOC SPERC 7.12a.v1
Use as binders and release agents (ES Ref.: 06)	SU22, PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC13, PROC14, ERC8a, ERC8d, ESVOC SPERC 8.10b.v1
Use in agrochemicals (ES Ref.: 07)	SU22, PROC1, PROC4, PROC8a, PROC8b, PROC11, PROC13, ERC8a, ERC8d, ESVOC SPERC 8.11a.v1
Road and construction applications (ES Ref.: 09)	SU22, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, ERC8d, ERC8f, ESVOC SPERC 8.15.v1
Explosives manufacture & use (ES Ref.: 12)	SU22, PROC1, PROC3, PROC5, PROC8a, PROC8b, ERC8e
Use in agrochemicals (ES Ref.: 08)	SU21, PC12, PC22, PC27, ERC8a, ERC8d, ESVOC SPERC 8.11b.v1
Use in matches (ES Ref.: 13)	SU21, PC11, ERC8e
Use in fireworks (ES Ref.: 14)	SU21, PC11, ERC8e

Full text of use descriptors: see section 16


1.2.2. Uses advised against

No data available

1.3. Details of the supplier of the safety data sheet

Supplier
NIS a.d. Novi Sad
Narodnog Fronta 12

Only Representative
REACH Law Ltd.
Vänrikinkuja 3 JK 21

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Manufacturer

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Dragana.Cvetkov@nis.eu (REACH)

1.4. Emergency telephone number

Emergency number : + 381 (0) 21 481 1111
Only available during office hours.

Country	Official advisory body	Address	Emergency number
Ireland	National Poisons Information Centre Beaumont Hospital	Beaumont Hospital Beaumont Road 9 Dublin	+353 1 809 21 66 (public, 8am - 10pm, 7/7) +353 01 809 2566 (Professionals, 24/7)
United Kingdom	National Poisons Information Service (Newcastle Centre) Regional Drugs and Therapeutics Centre, Wolfson Unit	Claremont Place Newcastle-upon-Tyne NE1 4LP Newcastle	0844 892 0111 (UK only, 24/7, healthcare professionals only)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Skin Irrit. 2 H315

Full text of H statements : see section 16

2.2. Label elements

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

Hazard pictograms (CLP) :



GHS07

Signal word : Warning

Hazard statements (CLP) : H315 - Causes skin irritation.

Precautionary statements (CLP) : P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 - IF ON SKIN: Wash with plenty of water/...
P332+P313 - If skin irritation occurs: Get medical advice/attention.

2.3. Other hazards


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

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

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance name : SULFUR

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CAS-No. : 7704-34-9

EC-No. : 231-722-6

Substance name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
sulfur	(CAS-No.) 7704-34-9 (EC-No.) 231-722-6 (EC Index) 016-094-00-1 (REACH-no) 01-2119487295-27-0120	<= 100	Skin Irrit. 2, H315
Hydrogen sulphide (H2S)	(CAS-No.) 7783-06-4 (EC-No.) 231-977-3 (EC Index) 016-001-00-4	< 0,001	Flam. Gas 1, H220 Press. Gas Acute Tox. 2 (Inhalation), H330 Aquatic Acute 1, H400

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

Additional advice	: First aider: Pay attention to self-protection. See also section 8 . Treat symptomatically. Never give anything by mouth to an unconscious person. Show this safety data sheet to the doctor in attendance. In case of doubt or persistent symptoms, consult always a physician.
Inhalation	: Keep at rest. Provide fresh air. In case of shortness of breath, give oxygen. Give oxygen or artificial respiration if necessary. Get medical advice/attention.
Skin contact	: Take off immediately all contaminated clothing. Wash with plenty of water/. Get medical advice/attention. Wash contaminated clothing before reuse.
Eyes contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical advice/attention.
Ingestion	: Do NOT induce vomiting. Rinse mouth. Get medical advice/attention.

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

Inhalation	: May cause respiratory irritation.
Skin contact	: Irritating to skin. Hot product (liquid) can cause thermal burns.
Eyes contact	: Hot product (liquid) can cause thermal burns. May cause eye irritation.
Ingestion	: May cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

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

No data available


SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Water spray, Alcohol resistant foam, Carbon dioxide, Dry extinguishing powder.
Unsuitable extinguishing media	: Strong water jet.

5.2. Special hazards arising from the substance or mixture

Specific hazards	: Combustible. Vapours may form explosive mixture with air. Dust may form explosive mixture in air. Hazardous decomposition products. Do not allow run-off from fire-fighting to enter drains or water courses.
Hazardous decomposition products in case of fire	: Sulphur oxides.

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5.3. Advice for firefighters

Firefighting instructions : Special protective equipment for firefighters. . In case of fire: Wear self-contained breathing apparatus. Use water spray or fog for cooling exposed containers. Evacuate personnel to a safe area. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

For non-emergency personnel : Provide adequate ventilation. Use personal protective equipment as required. Concerning personal protective equipment to use, see section 8. Avoid contact with skin, eyes and clothing. Do not breathe vapours/dust. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ensure equipment is adequately earthed.

6.1.2. For emergency responders

For emergency responders : Ensure procedures and training for emergency decontamination and disposal are in place. Concerning personal protective equipment to use, see section 8.

6.2. Environmental precautions

Do not allow to enter into surface water or drains.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Stop leak if safe to do so. Dam up. Collect in closed and suitable containers for disposal. Dispose of contaminated materials in accordance with current regulations. Hose down gases, fumes and/or dust with water.

6.4. Reference to other sections

Concerning personal protective equipment to use, see section 8. Concerning disposal elimination after cleaning, see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Provide adequate ventilation. Use personal protective equipment as required. Concerning personal protective equipment to use, see section 8. Avoid contact with skin, eyes and clothing. Do not breathe vapours/dust. Take precautionary measures against static discharges. Ensure equipment is adequately earthed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take any precaution to avoid mixing with combustibles... See also section 10. Ensure proper process control to avoid excess waste discharge (temperature, concentration, pH, time). Do not allow to enter into surface water or drains.

Hygiene measures

: Keep good industrial hygiene. When using do not eat, drink or smoke. Wash hands and face before breaks and immediately after handling of the product. Take off contaminated clothing. Separate working clothes from town clothes. Keep away from food, drink and animal feedingstuffs.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Protect from sunlight. Store in a dry, cool and well-ventilated place. Recommended storage temperature: 127 - 149 °C. Do not store near or with any of the incompatible materials listed in section 10.

Packaging materials

: Keep only in the original container. Keep in insulated tanks to maintain the product in the liquid state.

7.3. Specific end use(s)

see attached exposure scenario.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters



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sulfur (7704-34-9)		
Latvia	OEL TWA (mg/m ³)	6 mg/m ³
Lithuania	IPRV (mg/m ³)	6 mg/m ³
Romania	OEL STEL (mg/m ³)	15 mg/m ³ (dust)
Hydrogen sulphide (H2S) (7783-06-4)		
EU	IOELV TWA (mg/m ³)	7 mg/m ³
EU	IOELV TWA (ppm)	5 ppm
EU	IOELV STEL (mg/m ³)	14 mg/m ³
EU	IOELV STEL (ppm)	10 ppm
Austria	MAK (mg/m ³)	7 mg/m ³
Austria	MAK (ppm)	5 ppm
Austria	MAK Short time value (mg/m ³)	7 mg/m ³
Austria	MAK Short time value (ppm)	5 ppm
Austria	OEL - Ceilings (mg/m ³)	7 mg/m ³
Austria	OEL - Ceilings (ppm)	5 ppm
Belgium	Limit value (mg/m ³)	7 mg/m ³
Belgium	Limit value (ppm)	5 ppm
Belgium	Short time value (mg/m ³)	14 mg/m ³
Belgium	Short time value	10 ppm
Bulgaria	OEL TWA (mg/m ³)	7 mg/m ³
Bulgaria	OEL TWA (ppm)	5 ppm
Bulgaria	OEL STEL (mg/m ³)	14 mg/m ³
Bulgaria	OEL STEL (ppm)	10 ppm
Croatia	GVI (granična vrijednost izloženosti) (mg/m ³)	7 mg/m ³
Croatia	GVI (granična vrijednost izloženosti) (ppm)	5 ppm
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m ³)	14 mg/m ³
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (ppm)	10 ppm
Cyprus	OEL TWA (mg/m ³)	7 mg/m ³
Cyprus	OEL TWA (ppm)	5 ppm
Cyprus	OEL STEL (mg/m ³)	14 mg/m ³ (vapor)
Cyprus	OEL STEL (ppm)	10 ppm (vapor)
Czech Republic	Expoziční limity (PEL) (mg/m ³)	7 mg/m ³
Denmark	Grænseværdie (langvarig) (mg/m ³)	7 mg/m ³
Denmark	Grænseværdie (langvarig) (ppm)	5 ppm
Estonia	OEL TWA (mg/m ³)	14 mg/m ³
Estonia	OEL TWA (ppm)	10 ppm
Finland	HTP-arvo (8h) (mg/m ³)	7 mg/m ³
Finland	HTP-arvo (8h) (ppm)	5 ppm
Finland	HTP-arvo (15 min)	14 mg/m ³
Finland	HTP-arvo (15 min) (ppm)	10 ppm
France	VME (mg/m ³)	7 mg/m ³ (restrictive limit)
France	VME (ppm)	5 ppm (restrictive limit)
France	VLE (mg/m ³)	14 mg/m ³ (restrictive limit)
France	VLE (ppm)	10 ppm (restrictive limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m ³)	2(l) 7,1 mg/m ³ peak limitation : 2(l)



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Hydrogen sulphide (H2S) (7783-06-4)		
Germany	TRGS 900 Occupational exposure limit value (ppm)	5 ppm Y= There is no fertility risk if the threshold limit as well as the biological threshold limit (BGW) is met
Gibraltar	8h mg/m ³	7 mg/m ³
Gibraltar	8h ppm	5 ppm
Gibraltar	Short-term mg/m ³	14 mg/m ³
Gibraltar	Short-term ppm	10 ppm
Greece	OEL TWA (mg/m ³)	7 mg/m ³
Greece	OEL TWA (ppm)	5 ppm
Greece	OEL STEL (mg/m ³)	14 mg/m ³
Greece	OEL STEL (ppm)	10 ppm
Hungary	AK-érték	7 mg/m ³
Hungary	CK-érték	14 mg/m ³
Ireland	OEL (8 hours ref) (mg/m ³)	7 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	5 ppm
Ireland	OEL (15 min ref) (mg/m ³)	14 mg/m ³
Ireland	OEL (15 min ref) (ppm)	10 ppm
Italy	OEL TWA (mg/m ³)	7 mg/m ³
Italy	OEL TWA (ppm)	5 ppm
Italy	OEL STEL (mg/m ³)	14 mg/m ³
Italy	OEL STEL (ppm)	10 ppm
Latvia	OEL TWA (mg/m ³)	7 mg/m ³
Latvia	OEL TWA (ppm)	5 ppm
Lithuania	IPRV (mg/m ³)	7 mg/m ³
Lithuania	IPRV (ppm)	5 ppm
Lithuania	TPRV (mg/m ³)	14 mg/m ³
Lithuania	TPRV (ppm)	10 ppm
Lithuania	NRV (mg/m ³)	20 mg/m ³
Lithuania	NRV (ppm)	15 ppm
Luxembourg	OEL TWA (mg/m ³)	7 mg/m ³
Luxembourg	OEL TWA (ppm)	5 ppm
Luxembourg	OEL STEL (mg/m ³)	14 mg/m ³
Luxembourg	OEL STEL (ppm)	10 ppm
Malta	OEL TWA (mg/m ³)	7 mg/m ³
Malta	OEL TWA (ppm)	5 ppm
Malta	OEL STEL (mg/m ³)	14 mg/m ³
Malta	OEL STEL (ppm)	10 ppm
Netherlands	Grenswaarde TGG 8H (mg/m ³)	2,3 mg/m ³
Poland	NDS (mg/m ³)	7 mg/m ³
Poland	NDSch (mg/m ³)	14 mg/m ³
Portugal	OEL TWA (mg/m ³)	7 mg/m ³ (indicative limit value)
Portugal	OEL TWA (ppm)	5 ppm (indicative limit value)
Portugal	OEL STEL (mg/m ³)	14 mg/m ³ (indicative limit value)
Portugal	OEL STEL (ppm)	10 ppm (indicative limit value)



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Hydrogen sulphide (H2S) (7783-06-4)

Romania	OEL TWA (mg/m ³)	7 mg/m ³
Romania	OEL TWA (ppm)	5 ppm
Romania	OEL STEL (mg/m ³)	14 mg/m ³
Romania	OEL STEL (ppm)	10 ppm
Slovakia	NPHV (priemerná) (mg/m ³)	14 mg/m ³
Slovakia	NPHV (priemerná) (ppm)	10 ppm
Slovakia	NPHV (Hraničná) (mg/m ³)	14 mg/m ³
Slovenia	OEL TWA (mg/m ³)	7 mg/m ³
Slovenia	OEL TWA (ppm)	5 ppm
Slovenia	OEL STEL (mg/m ³)	14 mg/m ³
Slovenia	OEL STEL (ppm)	10 ppm
Spain	VLA-ED (mg/m ³)	7 mg/m ³
Spain	VLA-ED (ppm)	5 ppm
Spain	VLA-EC (mg/m ³)	14 mg/m ³
Spain	VLA-EC (ppm)	10 ppm
Sweden	nivågränsvärde (NVG) (mg/m ³)	7 mg/m ³
Sweden	nivågränsvärde (NVG) (ppm)	5 ppm
Sweden	kortidsvärde (KTV) (mg/m ³)	14 mg/m ³
Sweden	kortidsvärde (KTV) (ppm)	10 ppm
United Kingdom	WEL TWA (mg/m ³)	7 mg/m ³
United Kingdom	WEL TWA (ppm)	5 ppm
United Kingdom	WEL STEL (mg/m ³)	14 mg/m ³
United Kingdom	WEL STEL (ppm)	10 ppm
Norway	Grenseverdier (AN) (mg/m ³)	7 mg/m ³
Norway	Grenseverdier (AN) (ppm)	5 ppm
Norway	Grenseverdier (Takverdi) (mg/m ³)	14 mg/m ³
Norway	Grenseverdier (Takverdi) (ppm)	10 ppm
Switzerland	MAK (mg/m ³)	7,1 mg/m ³
Switzerland	MAK (ppm)	5 ppm
Switzerland	KZGW (mg/m ³)	14,2 mg/m ³
Switzerland	KZGW (ppm)	10 ppm
Australia	TWA (mg/m ³)	14 mg/m ³
Australia	TWA (ppm)	10 ppm
Australia	STEL (mg/m ³)	21 mg/m ³
Australia	STEL (ppm)	15 ppm
Canada (Quebec)	VECD (mg/m ³)	21 mg/m ³
Canada (Quebec)	VECD (ppm)	15 ppm
Canada (Quebec)	VEMP (mg/m ³)	14 mg/m ³
Canada (Quebec)	VEMP (ppm)	10 ppm
USA - ACGIH	ACGIH TWA (ppm)	1 ppm
USA - ACGIH	ACGIH STEL (ppm)	5 ppm
USA - IDLH	US IDLH (ppm)	100 ppm
USA - NIOSH	NIOSH REL (ceiling) (mg/m ³)	15 mg/m ³
USA - NIOSH	NIOSH REL (ceiling) (ppm)	10 ppm
USA - OSHA	OSHA PEL (Ceiling) (ppm)	20 ppm

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Additional information : Recommended monitoring procedures : Personal monitoring. Concentration measurement in air

8.2. Exposure controls

Engineering measure(s) : Provide adequate ventilation. Use with local exhaust ventilation. Take precautionary measures against static discharges. Use only explosion-proof equipment. Organisational measures to prevent /limit releases, dispersion and exposure. See also section 7.

Personal protective equipment : The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hand protection : rubber gloves. (EN 374). The selection of specific gloves for a specific application and time of use in a working area, should also take into account other factors on the working space, such as (but not limited to): other chemicals that are possibly used, physical requirements (protection against cutting/drilling, skill, thermal protection), and the instructions/specification of the supplier of gloves. Wear chemically resistant gloves (tested to EN374) . NBR (Nitrile rubber)

Eye protection : face shield. Safety glasses (EN166)

Body protection : Overalls, apron and boots recommended.

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment. Half-face mask (DIN EN 140) (EN140). Full face mask (EN 136) (EN136). Filter type: ABEK/P (EN141). Self-contained open-circuit compressed air breathing apparatus (EN 137)

Thermal hazard protection : Use dedicated equipment. Heat resistant gloves (EN407).

Environmental exposure controls : Do not allow to enter into surface water or drains. Comply with applicable Community environmental protection legislation.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid

Appearance : Solid. (Molten form).

Colour : Yellow.

Odour : Characteristic.

Odour threshold : No data available

pH : Not applicable

Relative evaporation rate (butylacetate=1) : No data available

Melting / freezing point : 112-120 °C

Freezing point : No data available

Initial boiling point and boiling range : 444-447 °C

Flash point : 207 °C Closed cup

Auto-ignition temperature : 232 °C

Decomposition temperature : No data available

Flammability (solid, gas) : Flammable

Vapour pressure : 0,1333 Pa (20°C)

Vapour density : 3,64 (Air=1)


Relative density : 1,811

Solubility : No data available.

Partition coefficient n-octanol/water : No data available

Kinematic viscosity : No data available

Dynamic viscosity : No data available

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Explosive properties : Not applicable. The study does not need to be conducted because there are no chemical groups associated with explosive properties present in the molecule.

Oxidising properties : Not applicable. The classification procedure needs not to be applied because there are no chemical groups present in the molecule which are associated with oxidising properties.

Explosive limits : 35-1400 g sulfur dust/m³ air

9.2. Other information

No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Combustible. Reference to other sections: 10.5.

10.2. Chemical stability

The product is stable under storage at normal ambient temperatures.

10.3. Possibility of hazardous reactions

at high temperatures :H₂S.

10.4. Conditions to avoid

Keep away from sources of heat (e.g. hot surfaces), sparks and open flames. See also section 7.

10.5. Incompatible materials

oxidising substances. Acids. Alkali. See also section 7.

10.6. Hazardous decomposition products

Hydrogen sulfide (H₂S). Reference to other sections: 5.2.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

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

sulfur (7704-34-9)	
LD50/oral/rat	> 2000 mg/kg bodyweight
LD50/dermal/rat	> 2000 mg/kg bodyweight
LC50/inhalation/4h/rat	> 5430 mg/m ³
LC50 inhalation rat (Vapours - mg/l/4h)	5,43 mg/l/4h

Hydrogen sulphide (H₂S) (7783-06-4)	
LC50/inhalation/4h/rat	0,99 mg/l (Exposure time: 1h)

Skin corrosion/irritation : Causes skin irritation.
pH: Not applicable

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

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

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

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


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

STOT-single exposure : Not classified (Based on available data, the classification criteria are not met.)

STOT-repeated exposure : Not classified (Based on available data, the classification criteria are not met.)

sulfur (7704-34-9)	
NOAEL, subchronic, oral, Rat	1000 mg/kg bw/day
NOAEL, subacute, Dermal, Rat	400 mg/kg bw/day

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

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Other information : Symptoms related to the physical, chemical and toxicological characteristics.
Reference to other sections: 4.2.

SECTION 12: Ecological information

12.1. Toxicity

Environmental properties : Ecological injuries are not known or expected under normal use.

Hydrogen sulphide (H ₂ S) (7783-06-4)	
LC50 fish 1	0,0448 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
EC50 Daphnia 1	0,022 mg/l
LC50 fish 2	0,016 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

12.2. Persistence and degradability

MOLTEN SULFUR (7704-34-9)	
Persistence and degradability	Expected to be biodegradable.

12.3. Bioaccumulative potential

MOLTEN SULFUR (7704-34-9)	
Partition coefficient n-octanol/water	No data available
Bioaccumulative potential	Low.
Hydrogen sulphide (H ₂ S) (7783-06-4)	
Partition coefficient n-octanol/water	0,45 (at 25 °C)

12.4. Mobility in soil

MOLTEN SULFUR (7704-34-9)	
Ecology - soil	No data available.

12.5. Results of PBT and vPvB assessment

MOLTEN SULFUR (7704-34-9)	
This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII	
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII	

12.6. Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Handle with care. Safe handling: see section 7. Handling and storage. Refer to manufacturer/supplier for information on recovery/recycling. Collect and dispose of waste product at an authorised disposal facility. Dispose of contaminated materials in accordance with current regulations.


Additional information : Never use pressure to empty container. Do not burn, or use a cutting torch on the empty drum. Do not puncture or incinerate. Delivery to an approved waste disposal company. Dispose of contaminated materials in accordance with current regulations.





European waste catalogue (2001/573/EC, 75/442/EEC, 91/689/EEC) : Classified as hazardous waste according to European Union regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	ADN	RID
14.1. UN number				
2448	2448	2448	2448	2448

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ADR	IMDG	IATA	ADN	RID
14.2. UN proper shipping name				
SULPHUR, MOLTEN	SULPHUR, MOLTEN	Sulphur, molten	SULPHUR, MOLTEN	SULPHUR, MOLTEN
Transport document description				
UN 2448 SULPHUR, MOLTEN, 4.1, III, (E)	UN 2448 SULPHUR, MOLTEN, 4.1, III	UN 2448 Sulphur, molten, 4.1	UN 2448 SULPHUR, MOLTEN, 4.1, III	UN 2448 SULPHUR, MOLTEN, 4.1, III
14.3. Transport hazard class(es)				
4.1	4.1	4.1	4.1	4.1
		Not applicable		
14.4. Packing group				
III	III	Not applicable	III	III
14.5. Environmental hazards				
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No	Dangerous for the environment : No	Dangerous for the environment : No
No supplementary information available				

14.6. Special precautions for user

- Overland transport


Classification code (ADR) : F3
 Special provisions : 538
 Limited quantities (ADR) : 0
 Excepted quantities (ADR) : E0
 Portable tank and bulk container instructions (ADR) : T1
 Portable tank and bulk container special provisions (ADR) : TP3
 Tank code (ADR) : LGBV(+)
 Tank special provisions (ADR) : TU27, TE4, TE6
 Vehicle for tank carriage : AT
 Transport category (ADR) : 3
 Hazard identification number (Kemler No.) : 44
 Orange plates :



Tunnel restriction code : E
 EAC code : 1Y

- Transport by sea

IBC packing instructions (IMDG) : IBC01
 Tank instructions (IMDG) : T1
 Tank special provisions (IMDG) : TP3
 EmS-No. (Fire) : F-A
 EmS-No. (Spillage) : S-H
 Stowage category (IMDG) : C
 Segregation (IMDG) : SG17

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Properties and observations (IMDG) : Melting point: 119°C. Molten sulphur may contain hydrogen sulphide which is highly poisonous in low concentrations. When involved in a fire, evolves toxic, very irritating and suffocating gas. Forms explosive and extremely sensitive mixtures with oxidizing substances. Shipped molten above its melting point.

- Air transport

PCA Limited quantities (IATA) : Forbidden
 PCA limited quantity max net quantity (IATA) : Forbidden
 PCA packing instructions (IATA) : Forbidden
 PCA max net quantity (IATA) : Forbidden
 CAO packing instructions (IATA) : Forbidden
 CAO max net quantity (IATA) : Forbidden
 ERG code (IATA) : 3L

- Inland waterway transport

Classification code (ADN) : F3
 Special provisions (ADN) : 538
 Limited quantities (ADN) : 0
 Excepted quantities (ADN) : E0
 Carriage permitted (ADN) : T
 Equipment required (ADN) : PP
 Number of blue cones/lights (ADN) : 0

- Rail transport

Classification code (RID) : F3
 Special provisions (RID) : 538
 Limited quantities (RID) : 0
 Excepted quantities (RID) : E0
 Portable tank and bulk container instructions (RID) : T1
 Portable tank and bulk container special provisions (RID) : TP3
 Tank codes for RID tanks (RID) : LGBV(+)
 Special provisions for RID tanks (RID) : TU27, TE4, TE6
 Transport category (RID) : 3
 Hazard identification number (RID) : 44

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

IBC product name : Sulphur (molten)
 Ship type : Type 3
 Pollution category : Z


SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006:

40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.	Hydrogen sulphide (H2S)
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MOLTEN SULFUR is not on the REACH Candidate List

MOLTEN SULFUR is not on the REACH Annex XIV List

15.1.2. National regulations

Germany

Reference to AwSV : Water hazard class (WGK) 1, low hazard to waters (Classification according to VwVwS, Annex 1 or 2; ID No. 753)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

Waterbezwaarlijkheid : Weinig schadelijk voor in het water levende organismen B(5)

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

15.2. Chemical safety assessment

For this substance a chemical safety assessment has been carried out


SECTION 16: Other information

Indication of changes:

5			
14			
15			
16			

Abbreviations and acronyms:

	DNEL = Derived No Effect Level
	DMEL = Derived Minimal Effect level
	PNEC = Predicted No Effect Concentration
	OEL-STEL = Occupational Exposure Limits - Short Term Exposure Limits (STELs)
	TWA = time weighted average
	LC50 = Median lethal concentration
	LD50 = Median lethal dose
	LL50 = Median lethal level
	EC50 = Median Effective Concentration
	EL50 = Median effective level
	ErC50 = EC50 in terms of reduction of growth rate
	ErL50 = EL50 in terms of reduction of growth rate
	NOEL = no-observed-effect level
	NOEC = No observed effect concentration
	NOELR = No observed effect loading rate
	NOAEC = No observed adverse effect concentration

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	NOAEL = No observed adverse effect level
	EWC = European waste catalogue
	NA = Not applicable
	N.O.S. = Not Otherwise Specified
	VOC = Volatile organic compounds
	mg/kg BW = mg/kg bodyweight
	QSAR = Quantitative structure-activity relationship (QSAR)
	ADN = Accord Européen relatif au Transport International des Marchandises Dangereuses par voie de Navigation du Rhin ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route CLP = Classification, Labelling and Packaging Regulation according to 1272/2008/EC IATA = International Air Transport Association IMDG = International Maritime Dangerous Goods Code LEL = Lower Explosive Limit/Lower Explosion Limit UEL = Upper Explosion Limit/Upper Explosive Limit REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals
	WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water Management Act)
	ABM = Algemene beoordelingsmethodiek

Sources of key data used to compile the datasheet : European Chemicals Bureau.


Training advice : Training staff on good practice. Manipulations are to be done only by qualified and authorised persons.

Full text of H- and EUH-statements:

Acute Tox. 2 (Inhalation)	Acute toxicity (inhal.), Category 2
Aquatic Acute 1	Hazardous to the aquatic environment - Aquatic Acute 1
Flam. Gas 1	Flammable gases, hazard category 1
Press. Gas	Gases under pressure
Skin Irrit. 2	Skin corrosion/irritation, Category 2
H220	Extremely flammable gas.
H315	Causes skin irritation.
H330	Fatal if inhaled.
H400	Very toxic to aquatic life.

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Classification according to Regulation (EC) No. 1272/2008 [CLP]
Labelling according to Regulation (EC) No. 1272/2008 [CLP]

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Annex to the Safety Data sheet

Annex : Identified uses						
Title	Sector of use	Product category	Process category	Article category	Environmenta l release	SPERC
Manufacture of substance	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15		ERC1, ERC4	ESVOC SPERC 1.1.v1
Use as an intermediate	SU3, SU8, SU9		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, PROC22, PROC23		ERC6a	ESVOC SPERC 6.1a.v1
Distribution	SU3		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15		ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7	ESVOC SPERC 1.1b.v1
Formulation & (re)packing of substances and mixtures	SU3, SU10		PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC23, PROC24		ERC2	ESVOC SPERC 2.2.v1
Use as binders and release agents	SU3		PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC13, PROC14		ERC4	ESVOC SPERC 4.10a.v1
Use as binders and release agents	SU22		PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a,		ERC8a, ERC8d	ESVOC SPERC 8.10b.v1



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			PROC8b, PROC10, PROC13, PROC14			
Use in agrochemicals	SU22		PROC1, PROC4, PROC8a, PROC8b, PROC11, PROC13		ERC8a, ERC8d	ESVOC SPERC 8.11a.v1
Use in agrochemicals	SU21	PC12, PC22, PC27			ERC8a, ERC8d	ESVOC SPERC 8.11b.v1
Road and construction applications	SU22		PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13		ERC8d, ERC8f	ESVOC SPERC 8.15.v1
Use in rubber production and processing	SU3, SU10, SU11		PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15, PROC21		ERC1, ERC4, ERC6d	ESVOC SPERC 4.19.v1
Use as a fuel	SU3		PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16		ERC7	ESVOC SPERC 7.12a.v1
Explosives manufacture & use	SU22		PROC1, PROC3, PROC5, PROC8a, PROC8b		ERC8e	
Use in matches	SU21	PC11			ERC8e	
Use in fireworks	SU21	PC11			ERC8e	


1. Exposure scenario 01

Manufacture of substance

ES Ref.: 01
ES Type: Worker

Use descriptors

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15
SU3, SU8, SU9

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	ERC1, ERC4 ESVOC SPERC 1.1.v1
Processes, tasks activities covered	Manufacture of substance or use as process chemical or extracting agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC15	Use as laboratory reagent

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.


Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems), CS56 - with sample collection	No other specific measures identified.
General exposures (closed systems), CS55 - Batch process, CS56 - with sample collection	No other specific measures identified.
CS2 - Process sampling	No other specific measures identified.
CS16 - General exposures (open systems)	No other specific measures identified.
CS36 - Laboratory activities	No other specific measures identified.
CS14 - Bulk transfers, CS81 - Dedicated facility	No other specific measures identified.
CS39 - Equipment cleaning and maintenance	No other specific measures identified.
CS85 - Bulk product storage	No other specific measures identified.

2.2 Contributing scenario controlling environmental exposure (ERC1, ERC4, ESVOC SPERC 1.1.v1)

Not applicable	
ERC1	Manufacture of substances

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ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ESVOC SPERC 1.1.v1	Manufacture of substance: Industrial (SU3)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario

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

Information for contributing exposure scenario

2.2	Not applicable
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4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects, Risk Management Measures are based on qualitative risk characterisation, 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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 02

Use as an intermediate

ES Ref.: 02
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, PROC22, PROC23 SU3, SU8, SU9 ERC6a ESVOC SPERC 6.1a.v1
Processes, tasks activities covered	Use as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/berth, road/rail car and bulk container). Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, PROC22, PROC23)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC15	Use as laboratory reagent
PROC22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting
PROC23	Open processing and transfer operations with minerals/metals at elevated temperature

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems),CS56 - with sample collection	No other specific measures identified.
General exposures (closed systems),CS55 - Batch	No other specific measures identified.

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process,CS56 - with sample collection		
CS2 - Process sampling	No other specific measures identified.	
CS16 - General exposures (open systems)	No other specific measures identified.	
CS36 - Laboratory activities	No other specific measures identified.	
CS14 - Bulk transfers,CS81 - Dedicated facility	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	No other specific measures identified.	
CS85 - Bulk product storage	No other specific measures identified.	

2.2 Contributing scenario controlling environmental exposure (ERC6a, ESVOC SPERC 6.1a.v1)

Not applicable	
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ESVOC SPERC 6.1a.v1	Manufacture of substances: Industrial (SU8, SU9)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation,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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 03

Distribution

ES Ref.: 03 ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 SU3 ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7 ESVOC SPERC 1.1b.v1
Processes, tasks activities covered	Bulk loading (including marine vessel/barge, rail/road car and IBC loading) Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems), CS56 - with sample collection	No other specific measures identified.
General exposures (closed systems), CS55 - Batch process, CS56 - with sample collection	No other specific measures identified.
CS2 - Process sampling	No other specific measures identified.
CS16 - General exposures (open systems)	No other specific measures identified.
CS36 - Laboratory activities	No other specific measures identified.

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CS14 - Bulk transfers,CS81 - Dedicated facility	No other specific measures identified.	
CS7 - Small package filling	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	No other specific measures identified.	
CS85 - Bulk product storage	No other specific measures identified.	

2.2 Contributing scenario controlling environmental exposure (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1)

Not applicable	
ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC3	Formulation in materials
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC6c	Industrial use of monomers for manufacture of thermo-plastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7	Industrial use of substances in closed systems
ESVOC SPERC 1.1b.v1	Distribution: Industrial (SU3)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation,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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 04

Formulation & (re)packing of substances and mixtures

ES Ref.: 04
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC23, PROC24 SU3, SU10 ERC2 ESVOC SPERC 2.2.v1
Processes, tasks activities covered	Bulk loading (including marine vessel/barge, rail/road car and IBC loading) Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC23, PROC24)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC23	Open processing and transfer operations with minerals/metals at elevated temperature
PROC24	High (mechanical) energy work-up of substances bound in materials and/or articles

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.

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General exposures (closed systems),CS56 - with sample collection	No other specific measures identified.	
General exposures (closed systems),CS55 - Batch process,CS56 - with sample collection	No other specific measures identified.	
CS2 - Process sampling	No other specific measures identified.	
CS16 - General exposures (open systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	No other specific measures identified.	
Milling, grinding and similar activities	No other specific measures identified.	
CS7 - Small package filling	No other specific measures identified.	
CS53 - Pelletizing	No other specific measures identified.	
CS36 - Laboratory activities	No other specific measures identified.	
CS14 - Bulk transfers,CS81 - Dedicated facility	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	No other specific measures identified.	
CS16 - General exposures (open systems),Elevated temperature	No other specific measures identified.	
CS85 - Bulk product storage	No other specific measures identified.	

2.2 Contributing scenario controlling environmental exposure (ERC2, ESVOC SPERC 2.2.v1)

Not applicable	
ERC2	Formulation of preparations
ESVOC SPERC 2.2.v1	Formulation & packing of preparations and mixtures: Industrial (SU10)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation,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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 05

Use as binders and release agents

ES Ref.: 05
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC13, PROC14 SU3 ERC4 ESVOC SPERC 4.10a.v1
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application (including spraying and brushing), mould forming and casting and handling of waste. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC13, PROC14)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC6	Calendering operations
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
General exposures (closed systems)	No other specific measures identified.

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General exposures (closed systems),CS56 - with sample collection	No other specific measures identified.	
General exposures (closed systems),CS55 - Batch process,CS56 - with sample collection	No other specific measures identified.	
CS16 - General exposures (open systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	No other specific measures identified.	
Roller, spreader, flow application	No other specific measures identified.	
CS4 - Dipping, immersion and pouring	No other specific measures identified.	
Article formation in mould	No other specific measures identified.	
CS14 - Bulk transfers,CS81 - Dedicated facility	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	No other specific measures identified.	

2.2 Contributing scenario controlling environmental exposure (ERC4, ESVOC SPERC 4.10a.v1)

Not applicable	
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ESVOC SPERC 4.10a.v1	Use as binders and release agents: Industrial (SU3)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation,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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 06

Use as binders and release agents

ES Ref.: 06
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC13, PROC14 SU22 ERC8a, ERC8d ESVOC SPERC 8.10b.v1
Processes, tasks activities covered	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC13, PROC14)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC6	Calendering operations
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
General exposures (closed systems)	No other specific measures identified.

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General exposures (closed systems),CS56 - with sample collection	No other specific measures identified.	
General exposures (closed systems),CS55 - Batch process,CS56 - with sample collection	No other specific measures identified.	
CS16 - General exposures (open systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	No other specific measures identified.	
Roller, spreader, flow application	No other specific measures identified.	
CS4 - Dipping, immersion and pouring	No other specific measures identified.	
Article formation in mould	No other specific measures identified.	
CS14 - Bulk transfers,CS81 - Dedicated facility	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	No other specific measures identified.	

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d, ESVOC SPERC 8.10b.v1)

Not applicable	
ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
ESVOC SPERC 8.10b.v1	Use as binders and release agents: Professional (SU22)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation,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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 07

Use in agrochemicals

ES Ref.: 07
ES Type: Worker

Use descriptors	PROC1, PROC4, PROC8a, PROC8b, PROC11, PROC13 SU22 ERC8a, ERC8d 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. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC4, PROC8a, PROC8b, PROC11, PROC13)

PROC1	Use in closed process, no likelihood of exposure
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
General exposures (closed systems)	No other specific measures identified.
CS16 - General exposures (open systems)	No other specific measures identified.
CS14 - Bulk transfers, CS81 - Dedicated facility	No other specific measures identified.
CS10 - Spraying	No other specific measures identified.
CS4 - Dipping, immersion and pouring	No other specific measures identified.
CS39 - Equipment cleaning and maintenance	No other specific measures identified.

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2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d, ESVOC SPERC 8.11a.v1)

Not applicable	
ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
ESVOC SPERC 8.11a.v1	Agrochemical uses: Professional (SU22)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects, Risk Management Measures are based on qualitative risk characterisation, 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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 08

Use in agrochemicals

ES Ref.: 08
ES Type: Consumer

Use descriptors	PC12, PC22, PC27 SU21 ERC8a, ERC8d ESVOC SPERC 8.11b.v1
Processes, tasks activities covered	Covers the consumer use of agrochemicals in liquid and solid forms. Consumer use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC12, PC22, PC27)


PC12	Fertilizers
PC22	Lawn and Garden Preparations, including fertilizers
PC27	Plant protection products

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	unless stated differently, Covers use up to 37500 g	
	Covers skin contact area up to 6600 cm ²	
Frequency and duration of use	unless stated differently, Covers use up to	4 Uses per day
	Covers exposure up to	8 Hours/event
Other given operational conditions affecting consumers exposure	Covers use at ambient temperatures, Unless otherwise stated.	
	Covers use in room size of 20 m ³	
	Covers use under typical household ventilation.	
	Fertilizers	Unless otherwise stated. Covers concentrations up to. Covers use up to. days/year. covers use up to 1 time/on day of use. Covers skin contact area up to. For each use event, assumes swallowed amount of . For each use event, covers use amounts up to: Covers outdoor use.
	Lawn and Garden Mixtures, including fertilizers	Unless otherwise stated. Covers concentrations up to 90%. Covers use up to 1. days/year. covers use up to 1 time/on day of use. ESIG GES Consumer Tool. For further information, please also consult our Internet site (http://www.progreen.co.uk/ind ex.php?c=61&p=132).
	Plant protection products	Unless otherwise stated. Covers concentrations up to 90%. Covers use 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,

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		assumes swallowed amount of . 0,3 g. For each use event, covers use amounts up to: 2500g. Covers outdoor use.
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Risk management measures

Other risk management measures:

Fertilizers	No specific risk management measure identified beyond those operational conditions stated.	
Lawn and Garden Mixtures, including fertilizers	No specific risk management measure identified beyond those operational conditions stated.	
Plant protection products	No specific risk management measure identified beyond those operational conditions stated.	

2.2 Contributing scenario controlling environmental exposure (ERC8a, ERC8d, ESVOC SPERC 8.11b.v1)

Not applicable	
ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
ESVOC SPERC 8.11b.v1	Agrochemical uses: Consumer (SU21)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Predicted exposures are not expected to exceed the 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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 09

Road and construction applications

ES Ref.: 09
ES Type: Worker

Use descriptors	PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13 SU22 ERC8d, ERC8f ESVOC SPERC 8.15.v1
Processes, tasks activities covered	Application of surface coatings and binders in road and construction activities, including paving uses, manual mastic and in the application of roofing and water-proofing membranes. Professional use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
CS14 - Bulk transfers, CS81 - Dedicated facility	No other specific measures identified.
CS7 - Small package filling	No other specific measures identified.
Roller, spreader, flow application	No other specific measures identified.
CS10 - Spraying	No other specific measures identified.
CS4 - Dipping, immersion and pouring	No other specific measures identified.
CS39 - Equipment cleaning and maintenance	No other specific measures identified.

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2.2 Contributing scenario controlling environmental exposure (ERC8d, ERC8f, ESVOC SPERC 8.15.v1)

Not applicable	
ERC8d	Wide dispersive outdoor use of processing aids in open systems
ERC8f	Wide dispersive outdoor use resulting in inclusion into or onto a matrix
ESVOC SPERC 8.15.v1	Road and Construction applications: Professional (SU22)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects, Risk Management Measures are based on qualitative risk characterisation, 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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 10

Use in rubber production and processing

ES Ref.: 10
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15, PROC21 SU3, SU10, SU11 ERC1, ERC4, ERC6d ESVOC SPERC 4.19.v1
Processes, tasks activities covered	Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15, PROC21)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC6	Calendering operations
PROC7	Industrial spraying
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC21	Low energy manipulation of substances bound in materials and/or articles

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise
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	exposures and to report any skin problems that may develop.	
General exposures (closed systems)	No other specific measures identified.	
General exposures (closed systems),CS56 - with sample collection	No other specific measures identified.	
General exposures (closed systems),CS55 - Batch process,CS56 - with sample collection	No other specific measures identified.	
CS16 - General exposures (open systems)	No other specific measures identified.	
CS30 - Mixing operations (open systems)	No other specific measures identified.	
CS64 - Calendering (including Banburys),CS70 - Vulcanisation,CS71 - Cooling cured articles	No other specific measures identified.	
CS10 - Spraying	No other specific measures identified.	
Small scale weighing	No other specific measures identified.	
CS4 - Dipping, immersion and pouring	No other specific measures identified.	
CS73 - Pressing uncured rubber blanks	No other specific measures identified.	
CS102 - Finishing operations	No other specific measures identified.	
CS36 - Laboratory activities	No other specific measures identified.	
CS14 - Bulk transfers,CS81 - Dedicated facility	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	No other specific measures identified.	

2.2 Contributing scenario controlling environmental exposure (ERC1, ERC4, ERC6d, ESVOG SPERC 4.19.v1)

Not applicable	
ERC1	Manufacture of substances
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ESVOG SPERC 4.19.v1	Rubber production and processing: Industrial (SU10)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation,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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 11

Use as a fuel

ES Ref.: 11 ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16 SU3 ERC7 ESVOC SPERC 7.12a.v1
Processes, tasks activities covered	Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC7, ESVOC SPERC 7.12a.v1)

Not applicable	
ERC7	Industrial use of substances in closed systems
ESVOC SPERC 7.12a.v1	Use as a fuel: Industrial (SU3)

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).


Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature), Assumes a good basic standard of occupational hygiene is implemented.

Risk management measures

Other risk management measures:

General measures (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
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	likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.	
General exposures (closed systems)	No other specific measures identified.	
General exposures (closed systems),CS56 - with sample collection	No other specific measures identified.	
General exposures (closed systems),CS55 - Batch process,CS56 - with sample collection	No other specific measures identified.	
CS2 - Process sampling	No other specific measures identified.	
CS16 - General exposures (open systems)	No other specific measures identified.	
CS107 - (closed systems)	No other specific measures identified.	
CS14 - Bulk transfers,CS81 - Dedicated facility	No other specific measures identified.	
CS39 - Equipment cleaning and maintenance	No other specific measures identified.	
CS85 - Bulk product storage	No other specific measures identified.	

3. Exposure estimation and reference to its source

3.1. Health

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

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Available hazard data do not enable the derivation of a DNEL for dermal irritant effects,Risk Management Measures are based on qualitative risk characterisation,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.
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 12

Explosives manufacture & use

ES Ref.: 12
ES Type: Worker

Use descriptors	PROC1, PROC3, PROC5, PROC8a, PROC8b SU22 ERC8e
Processes, tasks activities covered	Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer, mixing and charging) and equipment cleaning. Industrial use
Assessment method	see section 3 of this exposure scenario.

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC3, PROC5, PROC8a, PROC8b)

PROC1	Use in closed process, no likelihood of exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Product characteristics

Physical form	Solid at STP, liquid at elevated operating temperature, vapour pressure < 0.5 kPa
Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).

Operational conditions

Amount used	Not applicable
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	Not applicable
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.


Risk management measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems), CS55 - Batch process, CS56 - with sample collection	No other specific measures identified.
CS30 - Mixing operations (open systems)	No other specific measures identified.
CS14 - Bulk transfers, CS81 - Dedicated facility	No other specific measures identified.
CS39 - Equipment cleaning and maintenance	No other specific measures identified.

2.2 Contributing scenario controlling environmental exposure (ERC8e)

Not applicable	
ERC8e	Wide dispersive outdoor use of reactive substances in open systems

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Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario

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

Information for contributing exposure scenario

2.2	Not applicable
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4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health


Guidance - Health

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

Guidance - Environment

Not applicable

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1. Exposure scenario 13

Use in matches

ES Ref.: 13
ES Type: Consumer

Use descriptors	PC11 SU21 ERC8e
Processes, tasks activities covered	Consumer use

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC11)

Not applicable	
PC11	Explosives

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

2.2 Contributing scenario controlling environmental exposure (ERC8e)

Not applicable	
ERC8e	Wide dispersive outdoor use of reactive substances in open systems

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	Not applicable

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable


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

4.1. Health

Guidance - Health	Not applicable
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4.2. Environment

Guidance - Environment	Not applicable
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1. Exposure scenario 14

Use in fireworks

ES Ref.: 14
ES Type: Consumer

Use descriptors	PC11 SU21 ERC8e
Processes, tasks activities covered	Consumer use

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC11)

Not applicable	
PC11	Explosives

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

2.2 Contributing scenario controlling environmental exposure (ERC8e)

Not applicable	
ERC8e	Wide dispersive outdoor use of reactive substances in open systems

Product characteristics

No additional information

Operational conditions

No additional information

Risk management measures

No additional information

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	Not applicable

3.2. Environment

Information for contributing exposure scenario	
2.2	Not applicable

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

4.1. Health

Guidance - Health	Not applicable
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4.2. Environment

Guidance - Environment	Not applicable
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