Annex to the safety data sheet

Table of contents of the Annex

PW-15: Professional use	52		
PW-15: Professional use	53		
PW-15: Professional use	54		
C-1: Consumer use	55		
C-2: Consumer use	56		
C-3: Consumer use	57		
C-4: Consumer use	58		
C-5: Consumer use	59		
SL-1: Lubricants, greases, release products	60		
SL-1: Lubricants, greases, release products	61		
SL-2: Paper articles	62		
SL-3: Manufacture of textiles, leather, fur	63		
SL-3: Manufacture of textiles, leather, fur	64		
SL-4: Washing and cleaning products	65		
SL-4: Washing and cleaning products	66		
SL-5: Articles	67		
SL-5: Articles	68		
SL-6: Cosmetics, personal care products	69		
SL-6: Cosmetics, personal care products	70		
SL-7: Pharmaceuticals	71		
SL-7: Pharmaceuticals	72		
SL-8: Food/Feedstuff	73		
SL-8: Food/Feedstuff	74		

1. GES ZnSO4-0: M-1: Production of metal powders (wet processes)

1.1. Title section

M-1: Production of metal powders (wet processes)

ES Ref.: GES ZnSO4-0 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of primary or secondary zinc bearing material in the manufacture of ZnSO4 in several process steps, collection of the substance produced and packaging.	ERC1
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of primary or secondary zinc bearing material in the manufacture of ZnSO4 in several process steps, collection of the substance produced and packaging.	PROC2, PROC3, PROC5, PROC8b, PROC9, PROC22, PROC26

Processes, tasks, activities covered	CS1 The manufacturing process includes: • Reception of zinc-bearing materials and transfer to the reaction tank • Feeding of the zinc-bearing materials (containing zinc metal, zinc oxide or zinc hydroxide) into the mixing tank. The leaching reaction with sulphuric acid solutions is kept at the properpH and temperature. • Separation of the leach-residue (insoluble sulphates and steriles) occurs in covered settlers;if needed, the leachate may be filtered on adapted filters, • Purification steps may be applied of which: o Oxidation (with air or oxygen) of some of the present elements (i.e. Fe) followed by another sedimentation or filtration step, if needed o Hydrolysis (with ZnO-rich reagent) of some of the hydrolysable elements (i.e. Fe, Al, …) followed by another sedimentation or filtration step, if needed o Cementation (with zinc powder) of some of the present elements (i.e. Cu, Cd, Ni, Co, …) followed by another sedimentation or filtration step, if needed • Concentration by water evaporation, under exhaust hood. • Pouring on a cooling belt • Crystallisation and occasionally drying, in closed reactor. • Discharge and packaging of produced zinc sulphate crystals. Workers have to place and adjust the bag or drum under the discharge pipe and to set the process in motion. Filled bagsor drums are subsequently closed and carried to the storage area. • Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m3 capacity); solids are packed in bags or drums. • Maintenance activities Manufacture
Assessment method	EUSES

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of primary orsecondary zinc bearing material in the manufacture of ZnSO4 in several process steps, collection of the substance produced and packaging. (ERC1)

ERC1	Manufacture of the substance
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Degree of purity, > 80%

Amount used, frequency and duration of use (or from service life)

Annual amount per site	12500 t/yr
Continuous	Manufacture

Technical and organisational conditions and measures

Onsite wastewater treatment required. Prevent entry to sewers and public waters. precipitation. Sedimentation. Filtration. Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs. 90 - 99.98%. Use carefully: Sulfuric acid. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill. Treat air emissions. Fabric filter. Wet scrubber for dust elimination of waste gases	

Control the emission of particles. Control measures to prevent releases. SEVESO 2	ISO 9000, ISO 1400X, ... Regular cleaning of equipment, work area and clothing. Handle in accordance with good industrial hygiene and safety practice. Ensure operatives are trained to minimise exposures

Conditions and measures related to sewage treatment plant

Unless otherwise stated. Size of the sewage treatmentplant (STP). Default	2000 m^3/d

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration. External recovery and recycling of waste should comply with applicable local and/or national regulations. Dry processes. Water-based process. Can be recycled	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	Unless otherwise stated. Default

1.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of primary or secondary zincbearing material in the manufacture of ZnSO4 in several process steps, collection of the substance produced and packaging. (PROC2, PROC3, PROC5, PROC8b, PROC9, PROC22, PROC26)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC22	Manufacturing and processing of minerals and/or metals at substantially elevated temperature
PROC26	Handling of solid inorganic substances at ambient temperature

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Dustiness	Dustiness, 26.7 mg/g

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	<= 96 T (32 T/shift)
Exposure duration	8 h/day End of shift

Technical and organisational conditions and measures

Local exhaust ventilation. Measures in case of dust release. Handle product within a closed system . Use carefully: Sulfuric acid. Measures to be taken in case of accidental spillage oraccidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	>= 84 (%)
Air cyclones for dust collection	>= 70 (%)
Filter	>= 50 (%)
Handle product within a closed system . Dust formation. Ensure all national/local regulations are observed	

Regular cleaning of equipment, work area and clothing	
Store according to local legislation	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Personal Protection in First Aid and Measures. Regular cleaning of equipment, work area and clothing. Training staff on good practice

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable protective clothing and gloves. Efficiency of at least:	>= 90 %
If inhalative exposure above the occupational exposure limit cannot be excluded, adequate respiratory protection equipment must be used.	
Half-mask. Use a dust filter. Efficiency of at least:	75 % Filter type: P1
Half-mask. Use a dust filter. Efficiency of at least:	90 % Filter type: P2
Half-mask. Use a dust filter. Efficiency of at least:	95 % Filter type: P3
Full face mask. Use a dust filter. Efficiency of at least:	75 % Filter type: P1
Full face mask. Use a dust filter. Efficiency of at least:	90 % Filter type: P2
Full face mask. Use a dust filter. Efficiency of at least:	97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Indoor	

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of primary orsecondary zinc bearing material in the manufacture of ZnSO4 in several process steps, collection of the substance produced and packaging. (ERC1)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process,water may be created (i.e. cleaning),Closed systems are used in order to prevent unintended emissions,Indoor use,Can be recycled		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0044	0.0206	< 0.22	
Freshwater sediment	mg/kg dwt	156	117.8	< 0.67	
Soil	mg/kg dwt	41	35.6	0.39	

1.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of primary or secondary zinc bearing material in the manufacture of ZnSO4 in several process steps, collection of the substance produced and packaging. (PROC2, PROC3, PROC5, PROC8b, PROC9, PROC22, PROC26)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.006	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.236	

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

1.4.1. Environment

Guidance - Environment	No additional information available.

1.4.2. Health

Guidance - Health	No additional information available.

2. GES ZnSO4-3: F-1: Use as laboratory reagent (ZnSO4)

2.1. Title section

F-1: Use as laboratory reagent (ZnSO4)

ES Ref.: GES ZnSO4-3
ES Type: Worker
Version: 0.0

Author: Soydan Yalçın
Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The Industrial and professional use of ZnSO4 as active laboratory reagent in aqueous or organic media, foranalysis or synthesis.	ERC2, ERC3
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 as active laboratory reagent in aqueous or organic media, for analysis or synthesis.	PROC15

Processes, tasks, activities covered	CS1 The zinc sulphate is used for • Analysis: sample (solid or liquid) treatment or preparation: the substance is in the sample orin the reagents • or synthesis: manipulations are usually under ventilation (e.g. laminar flow, ventilation hood) • The substance is used o at the industrial scale, in industrial installations for air control and water treatment o at the professional scale by laboratories Formulation
Assessment method	EUSES

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of ZnSO4 as active laboratory reagent in aqueous or organic media, for analysis or synthesis. (ERC2, ERC3)

ERC2	Formulation into mixture
ERC3	Formulation into solid matrix
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Degree of purity, > 80%

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5 t/yr Industrial
Annual amount per site	0.5 t/yr Professional
Intermittent release	Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Use appropriate air emissions abatement systems (e.g. wet or dry scrubber or local STP) to ensure that the emission levels defined by local regulations are not exceeded . Contact wastedisposal services	Metallic. Acidic aqueous solution. Recycling
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Regular cleaning of equipment, work area and clothing. Keep good industrial hygiene

Ensure all national/local regulations are observed	

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was te (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Zinc. Can be recycled	58 % (estimated value)
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

2.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 as activelaboratory reagent in aqueous or organic media, for analysis or synthesis. (PROC15)

PROC15	Use as laboratory reagent

Product (article) characteristics

Physical form of product	Solid, Liquid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Degree of purity, > 80%
Dustiness	Solid, high dustiness, Worst case assumption

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	5 t/yr Industrial
Annual site tonnage	0.5 t/yr Professional
Intermittent	Worst case assumption. Continuous

Technical and organisational conditions and measures

Handle product within a closed system . Local exhaust ventilation. Measures in case of dust release. Ensure all national/local regulations are observed. Regular cleaning of equipment,work area and clothing. Store according to local legislation	
Handle product only in closed system or provide appropriate exhaust ventilation	
Dust formation	Ensure all national/local regulations are observed
Store according to local legislation	
Regular cleaning of equipment, work area and clothing	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Probability,High temperature	
Indoor	

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of ZnSO4 as active laboratory reagent in aqueous or organic media, for analysis or synthesis. (ERC2, ERC3)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor use,Can be recycled,Laboratory use		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.165	
Freshwater sediment	mg/kg dwt	46	117.8	0.2	
Sewage treatment plant	mg/l	0.2	0.1	0	
Soil	mg/kg dwt	41	35.6	0.39	

2.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 as active laboratory reagentin aqueous or organic media, for analysis or synthesis. (PROC15)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.0024 mg/kg bodyweight/day	0	MEASE
Inhalation - Long-term - systemic effects	1.125 mg/m³	0.45	MEASE
Sum RCR - Long-term - systemic effects		0.45	

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

2.4.1. Environment

Guidance - Environment	No additional information available.

2.4.2. Health

Guidance - Health	No additional information available.

3. GES ZnSO4-1: F-2: Dry formulation

3.1. Title section

F-2: Dry formulation

ES Ref.: GES ZnSO4-1	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, thestarting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	ERC2, ERC3
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC14, PROC19, PROC26

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate is: • Removed from the packaging and stored in silos after delivery. • Extracted from the silo, dosed and fed with the other reagents to the mixing tank. Mixing occurs batch-wise or continuously, according the process receipt. The mixing occurs in a closed tank/chamber. • The preparation (dry or wet (solvent/paste) matrix) is further used as such or packed for further treatment/use Formulation
Assessment method	EUSES

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2, ERC3)

ERC2	Formulation into mixture
ERC3	Formulation into solid matrix
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Degree of purity, > 80%

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 t/yr
Intermittent	Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Regular cleaning of equipment, work area and clothing. Handle in accordance with good industrial hygiene and safety practice. Ensure operatives are trainedto minimise exposures. Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

3.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC14, PROC19, PROC26)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
PROC19	Manual activities involving hand contact
PROC26	Handling of solid inorganic substances at ambient temperature

Product (article) characteristics

Physical form of product	Solid, Liquid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Concentration, Component, Variable
Dustiness	Solid, high dustiness, Worst case assumption

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	5000 T
Maximum daily site tonnage	14 T
Exposure duration	8 h/day End of shift

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product within a closed system	
Dust formation	Ensure all national/local regulations are observed
Store according to local legislation	
Regular cleaning of equipment, work area and clothing	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory

Protective gloves	Avoid any direct contact with the product

The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Probability,High temperature	(~= 100 °C)
Indoor	

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2, ERC3)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor use,Can be recycled,water may be created (i.e. cleaning)		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

3.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possiblyfollowed by packing. (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC14, PROC19, PROC26)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.006	
Inhalation - Long-term - systemic effects	0.25 mg/m³	0.1	
Sum RCR - Long-term - systemic effects		0.106	

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

3.4.1. Environment

Guidance - Environment	No additional information available.

3.4.2. Health

Guidance - Health	No additional information available.

4. GES ZnSO4-1: F-3: Wet formulation

4.1. Title section

F-3: Wet formulation

ES Ref.: GES ZnSO4-1 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, thestarting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	ERC2
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	PROC2, PROC3, PROC8b, PROC9

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate is: • Removed from the packaging and stored in silos after delivery. • Extracted from the silo, dosed and fed with the other reagents to the mixing tank. Mixingoccurs batch-wise or continuously, according the process receipt. The mixing occurs in a closed tank/chamber. • The preparation (dry or wet (solvent/paste) matrix) is further used as such or packed forfurther treatment/use Formulation
Assessment method	EUSES

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2)

ERC2	Formulation into mixture
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Degree of purity, > 80%

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 t/yr
Intermittent	Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Regular cleaning of equipment, work area and clothing. Handle in accordance with good industrial hygiene and safety practice. Ensure operatives are trainedto minimise exposures. Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 %
	(estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

4.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulationof preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (PROC2, PROC3, PROC8b, PROC9)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product (article) characteristics

Physical form of product	Solid, Liquid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Concentration, Component, Variable
Dustiness	Solid, high dustiness, 26.7 mg/g

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	5000 T
Maximum daily site tonnage	14 T
Exposure duration	8 h/day End of shift

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product within a closed system	
Dust formation	Ensure all national/local regulations are observed
Store according to local legislation	
Regular cleaning of equipment, work area and clothing	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3

Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Probability,High temperature	(~= 100 °C)
Indoor	

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor use,Can be recycled,water may be created (i.e. cleaning)		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

4.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possiblyfollowed by packing. (PROC2, PROC3, PROC8b, PROC9)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.006	
Inhalation - Long-term - systemic effects	0.25 mg/m³	0.1	
Sum RCR - Long-term - systemic effects		0.106	

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

4.4.1. Environment

Guidance - Environment	No additional information available.

4.4.2. Health

Guidance - Health	No additional information available.

5. GES ZnSO4-1: F-4: Formulation into mixture

5.1. Title section

F-4: Formulation into mixture

ES Ref.: GES ZnSO4-1 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, thestarting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	ERC2
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate is: • Removed from the packaging and stored in silos after delivery. • Extracted from the silo, dosed and fed with the other reagents to the mixing tank. Mixingoccurs batch-wise or continuously, according the process receipt. The mixing occurs in a closed tank/chamber. • The preparation (dry or wet (solvent/paste) matrix) is further used as such or packed forfurther treatment/use Formulation
Assessment method	EUSES

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2)

ERC2	Formulation into mixture
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Degree of purity, > 80%

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 t/yr
Intermittent	Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Regular cleaning of equipment, work area and clothing. Handle in accordance with good industrial hygiene and safety practice. Ensure operatives are trainedto minimise exposures. Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

5.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Product (article) characteristics

Physical form of product	Solid, Liquid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Concentration, Component, Variable
Dustiness	Solid, high dustiness, Worst case assumption

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	5000 T
Maximum daily site tonnage	14 T
Exposure duration	8 h/day End of shift

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product within a closed system	
Dust formation	Ensure all national/local regulations are observed
Store according to local legislation	
Regular cleaning of equipment, work area and clothing	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Probability,High temperature	(~= 100 °C)
Indoor	

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor use,Can be recycled,water may be created (i.e. cleaning)		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

5.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possiblyfollowed by packing. (PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.006	
Inhalation - Long-term - systemic effects	0.25 mg/m³	0.1	
Sum RCR - Long-term - systemic effects		0.106	

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

5.4.1. Environment

Guidance - Environment	No additional information available.

5.4.2. Health

Guidance - Health	No additional information available.

6. GES ZnSO4-1: F-5: Distribution

6.1. Title section

F-5: Distribution

ES Ref.: GES ZnSO4-1 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, thestarting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	ERC2
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing.	PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate is: • Removed from the packaging and stored in silos after delivery. • Extracted from the silo, dosed and fed with the other reagents to the mixing tank. Mixingoccurs batch-wise or continuously, according the process receipt. The mixing occurs in a closed tank/chamber. • The preparation (dry or wet (solvent/paste) matrix) is further used as such or packed forfurther treatment/use Formulation
Assessment method	EUSES

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2)

ERC2	Formulation into mixture
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Degree of purity, > 80%

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 t/yr
Intermittent	Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Regular cleaning of equipment, work area and clothing. Handle in accordance with good industrial hygiene and safety practice. Ensure operatives are trainedto minimise exposures. Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 %
	(estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m^3/d Unless otherwise stated. Default

6.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Product (article) characteristics

Physical form of product	Solid, Liquid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Concentration, Component, Variable
Dustiness	Solid, high dustiness, Worst case assumption

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	5000 T
Maximum daily site tonnage	14 T
Exposure duration	8 h/day End of shift

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product within a closed system	
Dust formation	Ensure all national/local regulations are observed
Store according to local legislation	
Regular cleaning of equipment, work area and clothing	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Probability,High temperature	(~= 100 °C)
Indoor	

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 inthe formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possibly followed by packing. (ERC2)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor use,Can be recycled,water may be created (i.e. cleaning)		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

6.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 in the formulation of preparations by mixing thoroughly, dry or in a solvent, the starting materials with potentially pressing, pelletizing, sintering, possiblyfollowed by packing. (PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.006	
Inhalation - Long-term - systemic effects	0.25 mg/m³	0.1	
Sum RCR - Long-term - systemic effects		0.106	

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

6.4.1. Environment

Guidance - Environment	No additional information available.

6.4.2. Health

Guidance - Health	No additional information available.

7. GES ZnSO4-2: IW-1: Industrial use

7.1. Title section

IW-1: Industrial use

ES Ref.: GES ZnSO4-2 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations inthe manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	ERC6a
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	PROC2, PROC3, PROC8b, PROC9, PROC15

Processes, tasks, activities covered	CS1 Description of activities/process(es) covered in the Exposure Scenario • Reception of the ZnSO4 or ZnSO4-containing formulation, or ZnSO4-bearing raw material inthe reaction tank • Sequential addition of reagents for purification steps and filtration on press filter, whenneeded (ventilation is adapted). • Concentration by water evaporation, under exhaust hood, is optional. • Possible pouring on a cooling belt, is optional as well • Discharge and packaging of produced zinc compounds. Workers have to place and adjustthe bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area. • Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m3 capacity), solid products are packed in bags or drums. • Maintenance activities • For the specific process of electrogalvanizing, which is covered by this scenario, the electrogalvanizing bath consists of one or more tanks, usually made of a ceramic material, which contain zinc sulphate in solution. The steel passes through the bath and its surface is coated with zinc/iron-zinc alloys. Because of the speed of the strip (up to 180 m/min) and theshort exposure time, the coating consists of a very thin layer. Industrial use
Assessment method	EUSES

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (ERC6a)

ERC6a	Use of intermediate
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	>= 99 %
Concentration of substance in product	Pure product

Amount used, frequency and duration of use (or from service life)

Daily amount per site	<= 75 T ZnSO4 > Zn. Metal compounds
Intermittent	< 12 days/yr Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases

Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter

Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

7.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (PROC2, PROC3, PROC8b, PROC9, PROC15)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Product (article) characteristics

Physical form of product	Solution, Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Pure product, Solution

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	<= 25 T End of shift
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product only in closed system or provide appropriate exhaust ventilation	
Dust formation	Ensure all national/local regulations are observed
Regular cleaning of equipment, work area and clothing	

Store according to local legislation	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.
	Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Indoor	

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (ERC6a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Leaching agent. leaching, filtering, purification
Drying and storage		grinding
Indoor		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0035	0.0206	0.17	
Freshwater sediment	mg/kg dwt	53	117.8	0.23	
Soil	mg/kg dwt	41	35.6	0.39	

7.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC2, PROC3, PROC8b, PROC9, PROC15)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.5 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.83 mg/m³	0.2	
Sum RCR - Long-term - systemic effects		0.25	

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

7.4.1. Environment

Guidance - Environment	No additional information available.

7.4.2. Health

Guidance - Health	No additional information available.

8. GES ZnSO4-2: IW-2: Industrial use

8.1. Title section

IW-2: Industrial use

ES Ref.: GES ZnSO4-2	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations inthe manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	ERC6a
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	PROC2, PROC8b, PROC22, PROC26

Processes, tasks, activities covered	CS1 Description of activities/process(es) covered in the Exposure Scenario • Reception of the ZnSO4 or ZnSO4-containing formulation, or ZnSO4-bearing raw material inthe reaction tank • Sequential addition of reagents for purification steps and filtration on press filter, whenneeded (ventilation is adapted). • Concentration by water evaporation, under exhaust hood, is optional. • Possible pouring on a cooling belt, is optional as well • Discharge and packaging of produced zinc compounds. Workers have to place and adjustthe bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area. • Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m3 capacity), solid products are packed in bags or drums. • Maintenance activities • For the specific process of electrogalvanizing, which is covered by this scenario, the electrogalvanizing bath consists of one or more tanks, usually made of a ceramic material, which contain zinc sulphate in solution. The steel passes through the bath and its surface is coated with zinc/iron-zinc alloys. Because of the speed of the strip (up to 180 m/min) and theshort exposure time, the coating consists of a very thin layer. Industrial use
Assessment method	EUSES

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (ERC6a)

ERC6a	Use of intermediate
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	>= 99 %
Concentration of substance in product	Pure product

Amount used, frequency and duration of use (or from service life)

Daily amount per site	<= 75 T ZnSO4 > Zn. Metal compounds
Intermittent	< 12 days/yr Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases

Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter

Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

8.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (PROC2, PROC8b, PROC22, PROC26)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC22	Manufacturing and processing of minerals and/or metals at substantially elevated temperature
PROC26	Handling of solid inorganic substances at ambient temperature

Product (article) characteristics

Physical form of product	Solution, Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Pure product, Solution

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	<= 25 T End of shift
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product only in closed system or provide appropriate exhaust ventilation	
Dust formation	Ensure all national/local regulations are observed
Regular cleaning of equipment, work area and clothing	
Store according to local legislation	

ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Indoor	

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (ERC6a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Leaching agent. leaching, filtering, purification
Drying and storage		grinding
Indoor		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0035	0.0206	0.17	
Freshwater sediment	mg/kg dwt	53	117.8	0.23	
Soil	mg/kg dwt	41	35.6	0.39	

8.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC2, PROC8b, PROC22, PROC26)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.5 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.83 mg/m³	0.2	
Sum RCR - Long-term - systemic effects		0.25	

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

8.4.1. Environment

Guidance - Environment	No additional information available.

8.4.2. Health

Guidance - Health	No additional information available.

9. GES ZnSO4-2: IW-3: Industrial use

9.1. Title section

IW-3: Industrial use

ES Ref.: GES ZnSO4-2 | Author: Soydan Yalçın
ES Type: Worker | Date of issue: 25/04/2018
Version: 0.0

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations inthe manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	ERC6a
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	PROC2, PROC8b, PROC22, PROC26

Processes, tasks, activities covered	CS1 Description of activities/process(es) covered in the Exposure Scenario • Reception of the ZnSO4 or ZnSO4-containing formulation, or ZnSO4-bearing raw material inthe reaction tank • Sequential addition of reagents for purification steps and filtration on press filter, whenneeded (ventilation is adapted). • Concentration by water evaporation, under exhaust hood, is optional. • Possible pouring on a cooling belt, is optional as well • Discharge and packaging of produced zinc compounds. Workers have to place and adjustthe bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area. • Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m3 capacity), solid products are packed in bags or drums. • Maintenance activities • For the specific process of electrogalvanizing, which is covered by this scenario, the electrogalvanizing bath consists of one or more tanks, usually made of a ceramic material, which contain zinc sulphate in solution. The steel passes through the bath and its surface is coated with zinc/iron-zinc alloys. Because of the speed of the strip (up to 180 m/min) and theshort exposure time, the coating consists of a very thin layer. Industrial use
Assessment method	EUSES

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (ERC6a)

ERC6a	Use of intermediate
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	>= 99 %
Concentration of substance in product	Pure product

Amount used, frequency and duration of use (or from service life)

Daily amount per site	<= 75 T ZnSO4 > Zn. Metal compounds
Intermittent	< 12 days/yr Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	

Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter

Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

9.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (PROC2, PROC8b, PROC22, PROC26)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC22	Manufacturing and processing of minerals and/or metals at substantially elevated temperature
PROC26	Handling of solid inorganic substances at ambient temperature

Product (article) characteristics

Physical form of product	Solution, Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Pure product, Solution

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	<= 25 T End of shift
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product only in closed system or provide appropriate exhaust ventilation	
Dust formation	Ensure all national/local regulations are observed

Regular cleaning of equipment, work area and clothing	
Store according to local legislation	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Indoor	

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying,filtering and packaging. (ERC6a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Leaching agent. leaching, filtering, purification
Drying and storage		grinding
Indoor		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0035	0.0206	0.17	
Freshwater sediment	mg/kg dwt	53	117.8	0.23	
Soil	mg/kg dwt	41	35.6	0.39	

9.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC2, PROC8b, PROC22, PROC26)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.5 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.83 mg/m³	0.2	
Sum RCR - Long-term - systemic effects		0.25	

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

9.4.1. Environment

Guidance - Environment	No additional information available.

9.4.2. Health

Guidance - Health	No additional information available.

10. GES ZnSO4-2: IW-4: Industrial use

10.1. Title section

IW-4: Industrial use

ES Ref.: GES ZnSO4-2 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations inthe manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	ERC6a
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	PROC1, PROC2, PROC3, PROC4, PROC8b, PROC9, PROC15

Processes, tasks, activities covered	CS1 Description of activities/process(es) covered in the Exposure Scenario • Reception of the ZnSO4 or ZnSO4-containing formulation, or ZnSO4-bearing raw material inthe reaction tank • Sequential addition of reagents for purification steps and filtration on press filter, whenneeded (ventilation is adapted). • Concentration by water evaporation, under exhaust hood, is optional. • Possible pouring on a cooling belt, is optional as well • Discharge and packaging of produced zinc compounds. Workers have to place and adjustthe bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area. • Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m3 capacity), solid products are packed in bags or drums. • Maintenance activities • For the specific process of electrogalvanizing, which is covered by this scenario, the electrogalvanizing bath consists of one or more tanks, usually made of a ceramic material, which contain zinc sulphate in solution. The steel passes through the bath and its surface is coated with zinc/iron-zinc alloys. Because of the speed of the strip (up to 180 m/min) and theshort exposure time, the coating consists of a very thin layer. Industrial use
Assessment method	EUSES

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (ERC6a)

ERC6a	Use of intermediate
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	>= 99 %
Concentration of substance in product	Pure product

Amount used, frequency and duration of use (or from service life)

Daily amount per site	<= 75 T ZnSO4 > Zn. Metal compounds
Intermittent	< 12 days/yr Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases

Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter

Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

10.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC1, PROC2, PROC3, PROC4, PROC8b, PROC9, PROC15)

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

Product (article) characteristics

Physical form of product	Solution, Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Pure product, Solution

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	<= 25 T End of shift
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product only in closed system or provide appropriate exhaust ventilation	

Dust formation	Ensure all national/local regulations are observed
Regular cleaning of equipment, work area and clothing	

Store according to local legislation	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Indoor	

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (ERC6a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Leaching agent. leaching, filtering, purification
Drying and storage		grinding
Indoor		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0035	0.0206	0.17	
Freshwater sediment	mg/kg dwt	53	117.8	0.23	
Soil	mg/kg dwt	41	35.6	0.39	

10.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC1, PROC2, PROC3, PROC4, PROC8b, PROC9, PROC15)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.5 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.83 mg/m³	0.2	

Sum RCR - Long-term - systemic effects		0.25	

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

10.3.2. Environment

Guidance - Environment	No additional information available.

10.3.3. Health

Guidance - Health	No additional information available.

11. GES ZnSO4-4: IW-5: Industrial use

11.1. Title section

IW-5: Industrial use

ES Ref.: GES ZnSO4-4 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 or ZnSO4 - formulationsas component for the manufacture of solid blends and matrices for further downstream use.	ERC6a
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of solid blends and matrices for further downstream use.	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC22

Processes, tasks, activities covered	CS1 In the described process, the ZnSO4 (or Zn compound) containing preparation/mixture is optionally: • Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature • Molten at high temperature (>500°C) and further cast as glassy material • Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use Industrial use
Assessment method	EUSES

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC6a)

ERC6a	Use of intermediate
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

11.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3,PROC4, PROC5, PROC8b, PROC9, PROC22)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC22	Manufacturing and processing of minerals and/or metals at substantially elevated temperature

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 15 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaustventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 %
	Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	No generation of waste water during process
High temperature	Probability
Indoor	

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC6a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor		Can be recycled
High temperature.		Probability
Dry processes		water may be created (i.e. cleaning)

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

11.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC22)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

11.4.1. Environment

Guidance - Environment	No additional information available.

11.4.2. Health

Guidance - Health	No additional information available.

12. GES ZnSO4-2: IW-6: Industrial use

12.1. Title section

IW-6: Industrial use

ES Ref.: GES ZnSO4-2	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations inthe manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	ERC6a
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	PROC3, PROC8b, PROC21

Processes, tasks, activities covered	CS1 Description of activities/process(es) covered in the Exposure Scenario • Reception of the ZnSO4 or ZnSO4-containing formulation, or ZnSO4-bearing raw material inthe reaction tank • Sequential addition of reagents for purification steps and filtration on press filter, whenneeded (ventilation is adapted). • Concentration by water evaporation, under exhaust hood, is optional. • Possible pouring on a cooling belt, is optional as well • Discharge and packaging of produced zinc compounds. Workers have to place and adjustthe bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area. • Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m3 capacity), solid products are packed in bags or drums. • Maintenance activities • For the specific process of electrogalvanizing, which is covered by this scenario, the electrogalvanizing bath consists of one or more tanks, usually made of a ceramic material, which contain zinc sulphate in solution. The steel passes through the bath and its surface is coated with zinc/iron-zinc alloys. Because of the speed of the strip (up to 180 m/min) and theshort exposure time, the coating consists of a very thin layer. Industrial use
Assessment method	EUSES

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (ERC6a)

ERC6a	Use of intermediate
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	>= 99 %
Concentration of substance in product	Pure product

Amount used, frequency and duration of use (or from service life)

Daily amount per site	<= 75 T ZnSO4 > Zn. Metal compounds
Intermittent	< 12 days/yr Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases

Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter

Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

12.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC3, PROC8b, PROC21)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC21	Low energy manipulation and handling of substances bound in/on materials or articles

Product (article) characteristics

Physical form of product	Solution, Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Pure product, Solution

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	<= 25 T End of shift
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product only in closed system or provide appropriate exhaust ventilation	
Dust formation	Ensure all national/local regulations are observed
Regular cleaning of equipment, work area and clothing	
Store according to local legislation	

ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Indoor	

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (ERC6a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Leaching agent. leaching, filtering, purification
Drying and storage		grinding
Indoor		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0035	0.0206	0.17	
Freshwater sediment	mg/kg dwt	53	117.8	0.23	
Soil	mg/kg dwt	41	35.6	0.39	

12.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC3, PROC8b, PROC21)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.5 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.83 mg/m³	0.2	
Sum RCR - Long-term - systemic effects		0.25	

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

12.4.1. Environment

Guidance - Environment	No additional information available.

12.4.2. Health

Guidance - Health	No additional information available.

13. GES ZnSO4-2: IW-7: Industrial use

13.1. Title section

IW-7: Industrial use

ES Ref.: GES ZnSO4-2 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations inthe manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	ERC4
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging.	PROC2, PROC3, PROC5, PROC8b, PROC26

Processes, tasks, activities covered	CS1 Description of activities/process(es) covered in the Exposure Scenario • Reception of the ZnSO4 or ZnSO4-containing formulation, or ZnSO4-bearing raw material inthe reaction tank • Sequential addition of reagents for purification steps and filtration on press filter, whenneeded (ventilation is adapted). • Concentration by water evaporation, under exhaust hood, is optional. • Possible pouring on a cooling belt, is optional as well • Discharge and packaging of produced zinc compounds. Workers have to place and adjustthe bag or drum under the discharge pipe and to set the process in motion. Filled bags or drums are subsequently closed and carried to the storage area. • Exposure to dust can occur during packing of the powder. Solutions are packed in intermediate bulk containers (ca. 1 m3 capacity), solid products are packed in bags or drums. • Maintenance activities • For the specific process of electrogalvanizing, which is covered by this scenario, the electrogalvanizing bath consists of one or more tanks, usually made of a ceramic material, which contain zinc sulphate in solution. The steel passes through the bath and its surface is coated with zinc/iron-zinc alloys. Because of the speed of the strip (up to 180 m/min) and theshort exposure time, the coating consists of a very thin layer. Industrial use
Assessment method	EUSES

13.2. Conditions of use affecting exposure

13.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (ERC4)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	>= 99 %
Concentration of substance in product	Pure product

Amount used, frequency and duration of use (or from service life)

Daily amount per site	<= 75 T ZnSO4 > Zn. Metal compounds
Intermittent	< 12 days/yr Worst case assumption. Continuous

Technical and organisational conditions and measures

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsiteand offsite municipal treatment plant) RMMs. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases

Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter

Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

13.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC2, PROC3, PROC5, PROC8b, PROC26)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC26	Handling of solid inorganic substances at ambient temperature

Product (article) characteristics

Physical form of product	Solution, Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Pure product, Solution

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	<= 25 T End of shift
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	90 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Handle product only in closed system or provide appropriate exhaust ventilation	
Dust formation	Ensure all national/local regulations are observed
Regular cleaning of equipment, work area and clothing	

Store according to local legislation	
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.
	Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Indoor	

13.3. Exposure estimation and reference to its source

13.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (ERC4)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Leaching agent. leaching, filtering, purification
Drying and storage		grinding
Indoor		

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0035	0.0206	0.17	
Freshwater sediment	mg/kg dwt	53	117.8	0.23	
Soil	mg/kg dwt	41	35.6	0.39	

13.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations in the manufacturing of other inorganic or organic zinc substances in a solvent-based matrix with potentially drying, filtering and packaging. (PROC2, PROC3, PROC5, PROC8b, PROC26)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.5 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.83 mg/m³	0.2	
Sum RCR - Long-term - systemic effects		0.25	

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

13.4.1. Environment

Guidance - Environment	No additional information available.

13.4.2. Health

Guidance - Health	No additional information available.

14. GES ZnSO4-4: IW-8: Industrial use

14.1. Title section

IW-8: Industrial use

ES Ref.: GES ZnSO4-4 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 or ZnSO4 - formulationsas component for the manufacture of solid blends and matrices for further downstream use.	ERC4, ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of solid blends and matrices for further downstream use.	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14, PROC15

Processes, tasks, activities covered	CS1 In the described process, the ZnSO4 (or Zn compound) containing preparation/mixture is optionally: • Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature • Molten at high temperature (>500°C) and further cast as glassy material • Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use Industrial use
Assessment method	EUSES

14.2. Conditions of use affecting exposure

14.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC4, ERC5)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was te (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

14.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3,PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14, PROC15)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC13	Treatment of articles by dipping and pouring
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
PROC15	Use as laboratory reagent

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 15 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection

Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	No generation of waste water during process
High temperature	Probability
Indoor	

14.3. Exposure estimation and reference to its source

14.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC4, ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor		Can be recycled
High temperature.		Probability
Dry processes		water may be created (i.e. cleaning)

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

14.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14, PROC15)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

14.4.1. Environment

Guidance - Environment	No additional information available.

14.4.2. Health

Guidance - Health	No additional information available.

15. GES ZnSO4-5: IW-9: Industrial use

15.1. Title section

IW-9: Industrial use

ES Ref.: GES ZnSO4-5 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC6b
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC4, PROC5, PROC6, PROC8b, PROC9, PROC13

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

15.2. Conditions of use affecting exposure

15.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC6b)

ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

15.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC4, PROC5,PROC6, PROC8b, PROC9, PROC13)

PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC6	Calendering operations
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 %
	Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

15.3. Exposure estimation and reference to its source

15.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC6b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

15.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC4, PROC5, PROC6, PROC8b, PROC9, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

15.4.1. Environment

Guidance - Environment	No additional information available.

15.4.2. Health

Guidance - Health	No additional information available.

16. GES ZnSO4-5: IW-10: Industrial use

16.1. Title section

IW-10: Industrial use

ES Ref.: GES ZnSO4-5 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC6b
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC3, PROC4, PROC5, PROC6, PROC8b, PROC9, PROC13

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

16.2. Conditions of use affecting exposure

16.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC6b)

ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

16.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC3, PROC4,PROC5, PROC6, PROC8b, PROC9, PROC13)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC6	Calendering operations
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaustventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Full face mask. Efficiency of at least:	>= 90 %
	Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

16.3. Exposure estimation and reference to its source

16.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC6b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

16.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC3, PROC4, PROC5, PROC6, PROC8b, PROC9, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

16.4.1. Environment

Guidance - Environment	No additional information available.

16.4.2. Health

Guidance - Health	No additional information available.

17. GES ZnSO4-5: IW-11: Industrial use

17.1. Title section

IW-11: Industrial use

ES Ref.: GES ZnSO4-5	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC5, ERC6a, ERC6d
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC3, PROC4, PROC5, PROC8b, PROC9, PROC10, PROC13

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

17.2. Conditions of use affecting exposure

17.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5, ERC6a, ERC6d)

ERC5	Use at industrial site leading to inclusion into/onto article
ERC6a	Use of intermediate
ERC6d	Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

17.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC3, PROC4,PROC5, PROC8b, PROC9, PROC10, PROC13)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaustventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 %
	Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

17.3. Exposure estimation and reference to its source

17.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5, ERC6a, ERC6d)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

17.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC3, PROC4, PROC5, PROC8b, PROC9, PROC10, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

17.4.1. Environment

Guidance - Environment	No additional information available.

17.4.2. Health

Guidance - Health	No additional information available.

18. GES ZnSO4-5: IW-12: Industrial use

18.1. Title section

IW-12: Industrial use

ES Ref.: GES ZnSO4-5 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC4, ERC5, ERC6a, ERC6b
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

18.2. Conditions of use affecting exposure

18.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC4, ERC5, ERC6a, ERC6b)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
ERC6a	Use of intermediate
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.

SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

18.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC1, PROC2,PROC3, PROC5, PROC8b, PROC9, PROC14)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection

Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

18.3. Exposure estimation and reference to its source

18.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC4, ERC5, ERC6a, ERC6b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

18.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

18.4.1. Environment

Guidance - Environment	No additional information available.

18.4.2. Health

Guidance - Health	No additional information available.

19. GES ZnSO4-4: IW-13: Industrial use

19.1. Title section

IW-13: Industrial use

ES Ref.: GES ZnSO4-4	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 or ZnSO4 - formulationsas component for the manufacture of solid blends and matrices for further downstream use.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of solid blends and matrices for further downstream use.	PROC3, PROC5, PROC8b, PROC9

Processes, tasks, activities covered	CS1 In the described process, the ZnSO4 (or Zn compound) containing preparation/mixture is optionally: • Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature • Molten at high temperature (>500°C) and further cast as glassy material • Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use Industrial use
Assessment method	EUSES

19.2. Conditions of use affecting exposure

19.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

19.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of solid blends and matrices for further downstream use. (PROC3, PROC5, PROC8b,PROC9)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 15 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3

Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	No generation of waste water during process
High temperature	Probability
Indoor	

19.3. Exposure estimation and reference to its source

19.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor		Can be recycled
High temperature.		Probability
Dry processes		water may be created (i.e. cleaning)

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

19.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of solid blends and matrices for further downstream use. (PROC3, PROC5, PROC8b, PROC9)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

19.4.1. Environment

Guidance - Environment	No additional information available.

19.4.2. Health

Guidance - Health	No additional information available.

20. GES ZnSO4-5: IW-13: Industrial use

20.1. Title section

IW-13: Industrial use

ES Ref.: GES ZnSO4-5	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC3, PROC5, PROC8b, PROC9

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

20.2. Conditions of use affecting exposure

20.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

20.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC3, PROC5,PROC8b, PROC9)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3

Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

20.3. Exposure estimation and reference to its source

20.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

20.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC3, PROC5, PROC8b, PROC9)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

20.4.1. Environment

Guidance - Environment	No additional information available.

20.4.2. Health

Guidance - Health	No additional information available.

21. GES ZnSO4-4: IW-14: Industrial use

21.1. Title section

IW-14: Industrial use

ES Ref.: GES ZnSO4-4	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 or ZnSO4 - formulationsas component for the manufacture of solid blends and matrices for further downstream use.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of solid blends and matrices for further downstream use.	PROC4, PROC5, PROC8b, PROC9

Processes, tasks, activities covered	CS1 In the described process, the ZnSO4 (or Zn compound) containing preparation/mixture isoptionally: • Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature • Molten at high temperature (>500°C) and further cast as glassy material • Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use Industrial use
Assessment method	EUSES

21.2. Conditions of use affecting exposure

21.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

21.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of solid blends and matrices for further downstream use. (PROC4, PROC5, PROC8b,PROC9)

PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 15 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	No generation of waste water during process
High temperature	Probability
Indoor	

21.3. Exposure estimation and reference to its source

21.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor		Can be recycled
High temperature.		Probability
Dry processes		water may be created (i.e. cleaning)

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

21.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of solid blends and matrices for further downstream use. (PROC4, PROC5, PROC8b, PROC9)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

21.4.1. Environment

Guidance - Environment	No additional information available.

21.4.2. Health

Guidance - Health	No additional information available.

22. GES ZnSO4-5: IW-14: Industrial use

22.1. Title section

IW-14: Industrial use

ES Ref.: GES ZnSO4-5	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC4, PROC5, PROC8b, PROC9

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

22.2. Conditions of use affecting exposure

22.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

22.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC4, PROC5,PROC8b, PROC9)

PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

22.3. Exposure estimation and reference to its source

22.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

22.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC4, PROC5, PROC8b, PROC9)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

22.4.1. Environment

Guidance - Environment	No additional information available.

22.4.2. Health

Guidance - Health	No additional information available.

23. GES ZnSO4-4: IW-15: Industrial use

23.1. Title section

IW-15: Industrial use

ES Ref.: GES ZnSO4-4	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 or ZnSO4 - formulationsas component for the manufacture of solid blends and matrices for further downstream use.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of solid blends and matrices for further downstream use.	PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14

Processes, tasks, activities covered	CS1 In the described process, the ZnSO4 (or Zn compound) containing preparation/mixture is optionally: • Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature • Molten at high temperature (>500°C) and further cast as glassy material • Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/useIndustrial use
Assessment method	EUSES

23.2. Conditions of use affecting exposure

23.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

23.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3,PROC5, PROC8a, PROC8b, PROC9, PROC14)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 15 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaustventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 %
	Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	No generation of waste water during process
High temperature	Probability
Indoor	

23.3. Exposure estimation and reference to its source

23.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor		Can be recycled
High temperature.		Probability
Dry processes		water may be created (i.e. cleaning)

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

23.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

23.4.1. Environment

Guidance - Environment	No additional information available.

23.4.2. Health

Guidance - Health	No additional information available.

24. GES ZnSO4-5: IW-15: Industrial use

24.1. Title section

IW-15: Industrial use

ES Ref.: GES ZnSO4-5	Author: Soydan Yalçın
ES Type: Worker	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

24.2. Conditions of use affecting exposure

24.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

24.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC1, PROC2,PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaustventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 %
	Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

24.3. Exposure estimation and reference to its source

24.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

24.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

24.4.1. Environment

Guidance - Environment	No additional information available.

24.4.2. Health

Guidance - Health	No additional information available.

25. GES ZnSO4-4: IW-16: Industrial use

25.1. Title section

IW-16: Industrial use

ES Ref.: GES ZnSO4-4 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 or ZnSO4 - formulationsas component for the manufacture of solid blends and matrices for further downstream use.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of solid blends and matrices for further downstream use.	PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14

Processes, tasks, activities covered	CS1 In the described process, the ZnSO4 (or Zn compound) containing preparation/mixture is optionally: • Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature • Molten at high temperature (>500°C) and further cast as glassy material • Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use Industrial use
Assessment method	EUSES

25.2. Conditions of use affecting exposure

25.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

25.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3,PROC5, PROC8b, PROC9, PROC14)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 15 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3

Use a dust filter. Full face mask. Efficiency of at least:	>= 75 %
	Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	No generation of waste water during process
High temperature	Probability
Indoor	

25.3. Exposure estimation and reference to its source

25.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor		Can be recycled
High temperature.		Probability
Dry processes		water may be created (i.e. cleaning)

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

25.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of solid blends and matrices for further downstream use. (PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

25.4.1. Environment

Guidance - Environment	No additional information available.

25.4.2. Health

Guidance - Health	No additional information available.

26. GES ZnSO4-5: IW-16: Industrial use

26.1. Title section

IW-16: Industrial use

ES Ref.: GES ZnSO4-5 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

26.2. Conditions of use affecting exposure

26.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

26.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC1, PROC2,PROC3, PROC5, PROC8b, PROC9, PROC14)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing.Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3

Use a dust filter. Full face mask. Efficiency of at least:	>= 75 %
	Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

26.3. Exposure estimation and reference to its source

26.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

26.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC1, PROC2, PROC3, PROC5, PROC8b, PROC9, PROC14)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

26.4.1. Environment

Guidance - Environment	No additional information available.

26.4.2. Health

Guidance - Health	No additional information available.

27. GES ZnSO4-7: IW-17: Industrial use

27.1. Title section

IW-17: Industrial use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC4
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Industrial use
Assessment method	EUSES

27.2. Conditions of use affecting exposure

27.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m^3/d Unless otherwise stated. Default

27.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection

Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

27.3. Exposure estimation and reference to its source

27.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

27.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9,PROC10, PROC13, PROC14)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

27.4.1. Environment

Guidance - Environment	No additional information available.

27.4.2. Health

Guidance - Health	No additional information available.

28. GES ZnSO4-7: IW-18: Industrial use

28.1. Title section

IW-18: Industrial use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC4
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Industrial use
Assessment method	EUSES

28.2. Conditions of use affecting exposure

28.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

28.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

28.3. Exposure estimation and reference to its source

28.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

28.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9,PROC10, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

28.4.1. Environment

Guidance - Environment	No additional information available.

28.4.2. Health

Guidance - Health	No additional information available.

29. GES ZnSO4-7: IW-19: Industrial use

29.1. Title section

IW-19: Industrial use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC4
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Industrial use
Assessment method	EUSES

29.2. Conditions of use affecting exposure

29.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)

Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

29.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection

Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

29.3. Exposure estimation and reference to its source

29.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

29.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9,PROC10, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

29.4.1. Environment

Guidance - Environment	No additional information available.

29.4.2. Health

Guidance - Health	No additional information available.

30. GES ZnSO4-7: IW-20: Industrial use

30.1. Title section

IW-20: Industrial use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC4
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC2, PROC3, PROC4, PROC7, PROC8a, PROC9, PROC10, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Industrial use
Assessment method	EUSES

30.2. Conditions of use affecting exposure

30.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)

Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

30.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC9, PROC10, PROC13)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

30.3. Exposure estimation and reference to its source

30.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recyclethe material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

30.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC9, PROC10,PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

30.4.1. Environment

Guidance - Environment	No additional information available.

30.4.2. Health

Guidance - Health	No additional information available.

31. GES ZnSO4-7: IW-21: Industrial use

31.1. Title section

IW-21: Industrial use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC4
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Industrial use
Assessment method	EUSES

31.2. Conditions of use affecting exposure

31.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

31.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

31.3. Exposure estimation and reference to its source

31.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC4)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

31.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9,PROC10, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

31.4.1. Environment

Guidance - Environment	No additional information available.

31.4.2. Health

Guidance - Health	No additional information available.

32. GES ZnSO4-4: IW-22: Industrial use

32.1. Title section

IW-22: Industrial use

ES Ref.: GES ZnSO4-4 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial use of ZnSO4 or ZnSO4 - formulationsas component for the manufacture of solid blends and matrices for further downstream use.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of solid blends and matrices for further downstream use.	PROC4, PROC5, PROC8b, PROC9

Processes, tasks, activities covered	CS1 In the described process, the ZnSO4 (or Zn compound) containing preparation/mixture is optionally: • Pressed at high temperature (>1000°C), grinded and re-pressed or fritted at high temperature • Molten at high temperature (>500°C) and further cast as glassy material • Pressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use Industrial use
Assessment method	EUSES

32.2. Conditions of use affecting exposure

32.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual amount per site	5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

32.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of solid blends and matrices for further downstream use. (PROC4, PROC5, PROC8b,PROC9)

PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 15 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	No generation of waste water during process
High temperature	Probability
Indoor	

32.3. Exposure estimation and reference to its source

32.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 orZnSO4 - formulations as component for the manufacture of solid blends and matrices for further downstream use. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor		Can be recycled
High temperature.		Probability
Dry processes		water may be created (i.e. cleaning)

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

32.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of solid blends and matrices for further downstream use. (PROC4, PROC5, PROC8b, PROC9)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

32.4.1. Environment

Guidance - Environment	No additional information available.

32.4.2. Health

Guidance - Health	No additional information available.

33. GES ZnSO4-5: IW-22: Industrial use

33.1. Title section

IW-22: Industrial use

ES Ref.: GES ZnSO4-5 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	ERC5
Worker		
CS2	Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.	PROC4, PROC5, PROC8b, PROC9

Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate containing preparation/mixture is: • unpacked and stored in silos • Extracted from the silo, dosed and fed with the other reagents and/or solvents to the mixingtank, batch-wise or continuously, according the process receipt. • The resulting zinc salt containing mixture (solution, dispersion, paste) is directly further processed, or packed, for further treatment/use. Industrial use
Assessment method	EUSES

33.2. Conditions of use affecting exposure

33.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 5000 T
Continuous	Worst case assumption

Technical and organisational conditions and measures

Production of metal powders (wet processes)	
Measures to be taken in case of accidental spillage or accidental leakage. Dike and containspill	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

33.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC4, PROC5,PROC8b, PROC9)

PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product (article) characteristics

Physical form of product	Liquid, Paste, Dispersion
Concentration of substance in product	> 25 %
Concentration of substance in product	% in mixture
Dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	<= 5000 T
Maximum daily site tonnage	<= 20 T
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
ISO 9000, ISO-ICS 13100	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing. Ensure operatives are trained to minimise exposures

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Production of metal powders (wet processes)	
Indoor	

33.3. Exposure estimation and reference to its source

33.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4-formulations as component for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (ERC5)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
water may be created (i.e. cleaning)		
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0034	0.0206	0.16	
Freshwater sediment	mg/kg dwt	45	117.8	0.19	
Soil	mg/kg dwt	41	35.6	0.39	

33.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4-formulations ascomponent for the manufacture of dispersions, pastes or other viscous or polymerized matrices. (PROC4, PROC5, PROC8b, PROC9)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.05 mg/kg bodyweight/day	0.05	
Inhalation - Long-term - systemic effects	0.57 mg/m³	0.23	
Sum RCR - Long-term - systemic effects		0.28	

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

33.4.1. Environment

Guidance - Environment	No additional information available.

33.4.2. Health

Guidance - Health	No additional information available.

34. GES ZnSO4-7: PW-1: Professional use

34.1. Title section

PW-1: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8c, ERC8f
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC2, PROC3, PROC4, PROC7, PROC8b, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

34.2. Conditions of use affecting exposure

34.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m^3/d Unless otherwise stated. Default

34.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8b, PROC13)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC7	Industrial spraying
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 %
	Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

34.3. Exposure estimation and reference to its source

34.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

34.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC2, PROC3, PROC4, PROC7, PROC8b, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

34.4.1. Environment

Guidance - Environment	No additional information available.

34.4.2. Health

Guidance - Health	No additional information available.

35. GES ZnSO4-7: PW-2: Professional use

35.1. Title section

PW-2: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8c, ERC8f
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

35.2. Conditions of use affecting exposure

35.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

35.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13)

PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

35.3. Exposure estimation and reference to its source

35.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recyclethe material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

35.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11,PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

35.4.1. Environment

Guidance - Environment	No additional information available.

35.4.2. Health

Guidance - Health	No additional information available.

36. GES ZnSO4-7: PW-3: Professional use

36.1. Title section

PW-3: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8c, ERC8f
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC3, PROC4, PROC8a, PROC10, PROC11, PROC19

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

36.2. Conditions of use affecting exposure

36.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

36.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC3, PROC4, PROC8a, PROC10, PROC11,PROC19)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC19	Manual activities involving hand contact

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3

Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

36.3. Exposure estimation and reference to its source

36.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

36.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC3, PROC4, PROC8a, PROC10, PROC11, PROC19)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

36.4.1. Environment

Guidance - Environment	No additional information available.

36.4.2. Health

Guidance - Health	No additional information available.

37. GES ZnSO4-7: PW-4: Professional use

37.1. Title section

PW-4: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8c, ERC8f
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC4, PROC8a

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

37.2. Conditions of use affecting exposure

37.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

37.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC4, PROC8a)

PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

37.3. Exposure estimation and reference to its source

37.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recyclethe material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

37.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC4, PROC8a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

37.4.1. Environment

Guidance - Environment	No additional information available.

37.4.2. Health

Guidance - Health	No additional information available.

38. GES ZnSO4-7: PW-5: Professional use

38.1. Title section

PW-5: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8c, ERC8f
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC4, PROC8a

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

38.2. Conditions of use affecting exposure

38.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

38.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC4, PROC8a)

PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

38.3. Exposure estimation and reference to its source

38.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recyclethe material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

38.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC4, PROC8a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

38.4.1. Environment

Guidance - Environment	No additional information available.

38.4.2. Health

Guidance - Health	No additional information available.

39. GES ZnSO4-7: PW-6: Professional use

39.1. Title section

PW-6: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8a, ERC8d
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

39.2. Conditions of use affecting exposure

39.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8a, ERC8d)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m^3/d Unless otherwise stated. Default

39.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC3, PROC5, PROC8a, PROC8b, PROC9,PROC15)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposureor processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3

Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

39.3. Exposure estimation and reference to its source

39.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8a, ERC8d)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

39.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

39.4.1. Environment

Guidance - Environment	No additional information available.

39.4.2. Health

Guidance - Health	No additional information available.

40. GES ZnSO4-8: PW-6: Professional use

40.1. Title section

PW-6: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8a, ERC8d
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

40.2. Conditions of use affecting exposure

40.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8d)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

40.3. Exposure estimation and reference to its source

40.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8d)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

40.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

40.4.2. Health

Guidance - Health	No additional information available.

41. GES ZnSO4-7: PW-7: Professional use

41.1. Title section

PW-7: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8b
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC5, PROC8a, PROC8b, PROC9, PROC11

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

41.2. Conditions of use affecting exposure

41.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8b)

ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)

Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

41.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC5, PROC8a, PROC8b, PROC9, PROC11)

PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC11	Non industrial spraying

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

41.3. Exposure estimation and reference to its source

41.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recycle the material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

41.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC5, PROC8a, PROC8b, PROC9, PROC11)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

41.4.1. Environment

Guidance - Environment	No additional information available.

41.4.2. Health

Guidance - Health	No additional information available.

42. GES ZnSO4-8: PW-7: Professional use

42.1. Title section

PW-7: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8b
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

42.2. Conditions of use affecting exposure

42.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8b)

ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

42.3. Exposure estimation and reference to its source

42.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

42.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

42.4.2. Health

Guidance - Health	No additional information available.

43. GES ZnSO4-7: PW-8: Professional use

43.1. Title section

PW-8: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8e
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC5, PROC8a, PROC11

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

43.2. Conditions of use affecting exposure

43.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8e)

ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)

Waste Fraction. Zn and compounds	0.056 % (estimated value)

Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

43.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC5, PROC8a, PROC11)

PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC11	Non industrial spraying

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3

Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

43.3. Exposure estimation and reference to its source

43.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8e)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recyclethe material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

43.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC5, PROC8a, PROC11)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

43.4.1. Environment

Guidance - Environment	No additional information available.

43.4.2. Health

Guidance - Health	No additional information available.

44. GES ZnSO4-8: PW-8: Professional use

44.1. Title section

PW-8: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8e
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

44.2. Conditions of use affecting exposure

44.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8e)

ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

44.3. Exposure estimation and reference to its source

44.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8e)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

44.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

44.4.2. Health

Guidance - Health	No additional information available.

45. GES ZnSO4-7: PW-9: Professional use

45.1. Title section

PW-9: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC1, ERC8a, ERC8b, ERC8d, ERC8e
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC8a, PROC19

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

45.2. Conditions of use affecting exposure

45.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC1, ERC8a, ERC8b, ERC8d, ERC8e)

ERC1	Manufacture of the substance
ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

45.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use ofdispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC8a, PROC19)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC19	Manual activities involving hand contact

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike andcontain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 %
	Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

45.3. Exposure estimation and reference to its source

45.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC1, ERC8a, ERC8b, ERC8d,ERC8e)

Information for contributing exposure scenario
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer: This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	**Release rate**	**Release estimation method**
Water-based process		Release to waste water from process. Recyclethe material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	**Unit**	**Exposure estimation**	**PNEC**	**RCR**	**Assessment method**
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

45.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions,pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC8a, PROC19)

Information for contributing exposure scenario
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer: This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	**Exposure estimate**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

45.4.1. Environment

Guidance - Environment	No additional information available.

45.4.2. Health

Guidance - Health	No additional information available.

46. GES ZnSO4-8: PW-9: Professional use

46.1. Title section

PW-9: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC1, ERC8a, ERC8b, ERC8d, ERC8e
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

46.2. Conditions of use affecting exposure

46.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC1, ERC8a, ERC8b, ERC8d, ERC8e)

ERC1	Manufacture of the substance
ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

46.3. Exposure estimation and reference to its source

46.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC1, ERC8a, ERC8b, ERC8d, ERC8e)

Information for contributing exposure scenario		
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer: This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.		
Release route	**Release rate**	**Release estimation method**
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	**Unit**	**Exposure estimation**	**PNEC**	**RCR**	**Assessment method**
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

46.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

46.4.2. Health

Guidance - Health	No additional information available.

47.1. Title section

PW-10: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8a, ERC8c
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

47.2. Conditions of use affecting exposure

47.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8c)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

47.3. Exposure estimation and reference to its source

47.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8c)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

47.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

47.4.2. Health

Guidance - Health	No additional information available.

48. GES ZnSO4-8: PW-11: Professional use

48.1. Title section

PW-11: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8c, ERC8f
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

48.2. Conditions of use affecting exposure

48.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

48.3. Exposure estimation and reference to its source

48.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

48.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

48.4.2. Health

Guidance - Health	No additional information available.

49. GES ZnSO4-6: PW-12: Professional use

49.1. Title section

PW-12: Professional use

ES Ref.: GES ZnSO4-6 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The Industrial and professional use of solid substrates containing less than 25%w/w of ZnSO4.	ERC8c, ERC8f
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of solid substrates containing less than 25%w/w of ZnSO4.	PROC5, PROC6, PROC8b, PROC9, PROC10, PROC13, PROC19, PROC26

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Final application, embedding, or shaping to produce the end product or article. Professional use
Assessment method	EUSES

49.2. Conditions of use affecting exposure

49.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of solid substrates containing less than 25%w/w of ZnSO4. (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	< 25 %
Concentration of substance in product	Limit the substance content in the product to 25 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	50 T Professional
Annual amount per site	<= 500 T Industrial
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value)
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

49.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of solidsubstrates containing less than 25%w/w of ZnSO4. (PROC5, PROC6, PROC8b, PROC9, PROC10, PROC13, PROC19, PROC26)

PROC5	Mixing or blending in batch processes
PROC6	Calendering operations
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC19	Manual activities involving hand contact
PROC26	Handling of solid inorganic substances at ambient temperature

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	< 25 %
Concentration of substance in product	Limit the substance content in the product to 25 %
Dustiness	Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	50 t/yr (typical). Professional. Industrial
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3

Use a dust filter. Full face mask. Efficiency of at least:	>= 75 %

	Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	
Indoor	

49.3. Exposure estimation and reference to its source

49.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of solid substrates containing less than 25%w/w of ZnSO4. (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Dry processes		water may be created (i.e. cleaning)
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0051	0.0206	0.25	
Freshwater sediment	mg/kg dwt	231	117.8	0.98	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

49.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of solid substrates containing less than 25%w/w of ZnSO4. (PROC5, PROC6, PROC8b, PROC9, PROC10, PROC13, PROC19, PROC26)

Information for contributing exposure scenario

REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,PROC (Process category),4, 5, 6, 8b, 9, 10, 13, 19, 26,If the occupational exposure limit is exceeded:4,hours,Dust production: dust mask with filter type P1,Process category,11,Respiratory protection,Efficiency of at least:90 - 99.98%,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.576 mg/kg bodyweight/day	0.069	MEASE
Inhalation - Long-term - systemic effects	0.675 mg/m³	<= 0.27	MEASE
Sum RCR - Long-term - systemic effects		<= 0.339	

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

49.4.1. Environment

Guidance - Environment	No additional information available.

49.4.2. Health

Guidance - Health	No additional information available.

50. GES ZnSO4-6: PW-13: Professional use

50.1. Title section

PW-13: Professional use

ES Ref.: GES ZnSO4-6 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The Industrial and professional use of solid substrates containing less than 25%w/w of ZnSO4.	ERC8c, ERC8f
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of solid substrates containing less than 25%w/w of ZnSO4.	PROC4, PROC5, PROC6, PROC8b, PROC9, PROC10, PROC13, PROC19, PROC26

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Final application, embedding, or shaping to produce the end product or article. Professional use
Assessment method	EUSES

50.2. Conditions of use affecting exposure

50.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of solid substrates containing less than 25%w/w of ZnSO4. (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	< 25 %
Concentration of substance in product	Limit the substance content in the product to 25 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	50 T Professional
Annual amount per site	<= 500 T Industrial
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value)
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

50.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of solidsubstrates containing less than 25%w/w of ZnSO4. (PROC4, PROC5, PROC6, PROC8b, PROC9, PROC10, PROC13, PROC19, PROC26)

PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC6	Calendering operations
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC19	Manual activities involving hand contact
PROC26	Handling of solid inorganic substances at ambient temperature

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	< 25 %
Concentration of substance in product	Limit the substance content in the product to 25 %
Dustiness	Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	50 t/yr (typical). Professional. Industrial
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2

Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	
Indoor	

50.3. Exposure estimation and reference to its source

50.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of solid substrates containing less than 25%w/w of ZnSO4. (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Dry processes		water may be created (i.e. cleaning)
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0051	0.0206	0.25	
Freshwater sediment	mg/kg dwt	231	117.8	0.98	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

50.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of solid substratescontaining less than 25%w/w of ZnSO4. (PROC4, PROC5, PROC6, PROC8b, PROC9, PROC10, PROC13, PROC19, PROC26)

Information for contributing exposure scenario

REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,PROC (Process category),4, 5, 6, 8b, 9, 10, 13, 19, 26,If the occupational exposure limit is exceeded:4,hours,Dust production: dust mask with filter type P1,Process category,11,Respiratory protection,Efficiency of at least:90 - 99.98%,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.576 mg/kg bodyweight/day	0.069	MEASE
Inhalation - Long-term - systemic effects	0.675 mg/m³	<= 0.27	MEASE
Sum RCR - Long-term - systemic effects		<= 0.339	

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

50.4.1. Environment

Guidance - Environment	No additional information available.

50.4.2. Health

Guidance - Health	No additional information available.

51. GES ZnSO4-8: PW-14: Professional use

51.1. Title section

PW-14: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8a, ERC8c, ERC8d, ERC8f
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

51.2. Conditions of use affecting exposure

51.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

51.3. Exposure estimation and reference to its source

51.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

51.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

51.4.2. Health

Guidance - Health	No additional information available.

52. GES ZnSO4-6: PW-15: Professional use

52.1. Title section

PW-15: Professional use

ES Ref.: GES ZnSO4-6 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure (1): The Industrial and professional use of solid substrates containing less than 25%w/w of ZnSO4.	ERC8a, ERC8b, ERC8c, ERC8d
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of solid substrates containing less than 25%w/w of ZnSO4.	PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC10, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Final application, embedding, or shaping to produce the end product or article. Professional use
Assessment method	EUSES

52.2. Conditions of use affecting exposure

52.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of solid substrates containing less than 25%w/w of ZnSO4. (ERC8a, ERC8b, ERC8c, ERC8d)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	< 25 %
Concentration of substance in product	Limit the substance content in the product to 25 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	50 T Professional
Annual amount per site	<= 500 T Industrial
Continuous	Worst case assumption

Technical and organisational conditions and measures

No generation of waste water during process	
Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	
Treat air emission to provide a typical removal efficiency of	>= 50 (%). Wet scrubber for dust elimination of waste gases
Treat air emission to provide a typical removal efficiency of	>= 99 (%). Fabric filter
Control the emission of particles	ISO 9000, ISO 1400X, ... Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant	
Size of the sewage treatment plant (STP)	2000 m³/d Unless otherwise stated. Default

Conditions and measures related to treatment of waste (including article waste)

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value)
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

52.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of solidsubstrates containing less than 25%w/w of ZnSO4. (PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC10, PROC13)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	< 25 %
Concentration of substance in product	Limit the substance content in the product to 25 %
Dustiness	Solid, low dustiness, Worst case assumption, Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	50 t/yr (typical). Professional. Industrial
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Handle product within a closed system . Measures in case of dust release. Local exhaustventilation	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded: Use recommended respiratory protection
Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1

Use a dust filter. Half-mask. Efficiency of at least:	>= 90 %
	Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Dry processes	
Indoor	

52.3. Exposure estimation and reference to its source

52.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial andprofessional use of solid substrates containing less than 25%w/w of ZnSO4. (ERC8a, ERC8b, ERC8c, ERC8d)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Dry processes		water may be created (i.e. cleaning)
Indoor		Can be recycled

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0051	0.0206	0.25	
Freshwater sediment	mg/kg dwt	231	117.8	0.98	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

52.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of solid substratescontaining less than 25%w/w of ZnSO4. (PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC10, PROC13)

Information for contributing exposure scenario

REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,PROC (Process category),4, 5, 6, 8b, 9, 10, 13, 19, 26,If the occupational exposure limit is exceeded:4,hours,Dust production: dust mask with filter type P1,Process category,11,Respiratory protection,Efficiency of at least:90 - 99.98%,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.576 mg/kg bodyweight/day	0.069	MEASE
Inhalation - Long-term - systemic effects	0.675 mg/m³	<= 0.27	MEASE
Sum RCR - Long-term - systemic effects		<= 0.339	

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

52.4.1. Environment

Guidance - Environment	No additional information available.

52.4.2. Health

Guidance - Health	No additional information available.

53. GES ZnSO4-7: PW-15: Professional use

53.1. Title section

PW-15: Professional use

ES Ref.: GES ZnSO4-7 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Contributing scenario controlling environmental exposure(1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	ERC8a, ERC8b, ERC8c, ERC8d
Worker		
CS2	Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4.	PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC10, PROC13

Processes, tasks, activities covered	CS1 This scenario covers both the industrial scale processes and professional use. In the described process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/unpacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use
Assessment method	EUSES

53.2. Conditions of use affecting exposure

53.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): The Industrial and professionaluse of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8a, ERC8b, ERC8c, ERC8d)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Assessment method	EUSES

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %

Amount used, frequency and duration of use (or from service life)

Annual amount per site	<= 50 T Professional. (typical)
Annual amount per site	<= 500 T Industrial
ZnSO4,% in mixture	<= 30
Continuous	Worst case assumption

Technical and organisational conditions and measures

Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of. 90 - 99.98%. precipitation. Sedimentation. Filtration	
Additional information	Exposure estimation
Treat air emissions.	Wet scrubber for dust elimination of waste gases
Control the emission of particles	Ensure operatives are trained to minimise exposures. Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing
Treat air emissions.	Ensure all national/local regulations are observed.
SEVESO 2	Compliance with applicable regulations

Conditions and measures related to sewage treatment plant

Size of the sewage treatment plant (STP)	2000 m^3/d Unless otherwise stated. Default

Conditions and measures related to treatment of was	te (including article waste)
Waste Fraction. Zinc. Produced	3.1 % (estimated value)
Waste Fraction. Zn and compounds	0.056 % (estimated value)
Waste Fraction. Downstream user	0.3 % (estimated value)
Waste code	See section 13 of the SDS
Dispose of in accordance with relevant local regulations	2008/98/EC, 2000/76/EC, 1999/31/EC
Waste Fraction	58 % Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current legislation	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m³/d Unless otherwise stated. Default

53.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC1, PROC2, PROC8a, PROC8b, PROC9,PROC10, PROC13)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processeswith equivalent containment conditions
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 30 %
Concentration of substance in product	Solution, Pastes
Dustiness	Solid, low dustiness

Amount used (or contained in articles), frequency and duration of use/exposure

Annual site tonnage	50 t/yr (typical). Professional. Industrial
Maximum daily site tonnage	0.15 T
Maximum daily site tonnage	0.05 T End of shift
Annual site tonnage	1 (estimated value). Professional
Exposure duration	8 h/day End of shift. Worst case assumption

Technical and organisational conditions and measures

Technical conditions and measures at process level (source) to prevent release	Do not allow product to spread into the environment. Outdoor use
Handle product within a closed system . Measures in case of dust release. Local exhaust ventilation. Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill	
Local exhaust ventilation - efficiency of at least	84 (%)
Air cyclones for dust collection. Efficiency of at least:	70 (%)
Use a dust filter. Efficiency of at least:	50 (%)
Ensure operatives are trained to minimise exposures	Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing

Conditions and measures related to personal protection, hygiene and health evaluation

Protective clothing. Efficiency of at least:	>= 90 % Mandatory
Protective gloves	Avoid any direct contact with the product
The product is stable at normal handling and storage conditions. Respiratory protection equipment not absolutely necessary	If the occupational exposure limit is exceeded:Use recommended respiratory protection

Use a dust filter. Half-mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Half-mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Half-mask. Efficiency of at least:	>= 95 % Filter type: P3
Use a dust filter. Full face mask. Efficiency of at least:	>= 75 % Filter type: P1
Use a dust filter. Full face mask. Efficiency of at least:	>= 90 % Filter type: P2
Use a dust filter. Full face mask. Efficiency of at least:	>= 97.5 % Filter type: P3
Safety glasses	optional

Other conditions affecting workers exposure

Exposed skin surface assumed:face	
Water-based process	Industrial use
Fertilizer,Wet formulation	enclosed. Working area
Indoor or outdoor use	Professional use

53.3. Exposure estimation and reference to its source

53.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (ERC8a, ERC8b, ERC8c, ERC8d)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),Soil, agricultural,No additional risk management measures required,Handling large quantities of product:Chemical safety assessment (Additional information),(100 T/y),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Water-based process		Release to waste water from process. Recyclethe material as far as possible. water may be created (i.e. cleaning)
Industrial:Fertilizer		Indoor. Can be recycled. Waste treatment
Indoor or outdoor use		Professional use

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0039	0.0206	0.19	
Freshwater sediment	mg/kg dwt	101	117.8	0.43	
Sewage treatment plant	mg/l	0.014	0.1	0.13	
Soil	mg/kg dwt	41	35.6	0.39	

53.3.2. Worker exposure Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30%w/w of ZnSO4. (PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC10, PROC13)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available atthe time of compilation (cfr Revision date and Version number),PROC (Process category),Respiratory protection,If the occupational exposure limit is exceeded:1,hours,Outdoor use,Professional use,Dust production: dust mask with filter type P1,If the occupational exposure limit is exceeded:4,hours,For the derivation of RCRs, please refer to the CSR.

Route of exposure and typeof effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.48 mg/kg bodyweight/day	0.058	MEASE
Inhalation - Long-term - systemic effects	0.05 mg/m³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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

53.4.1. Environment

Guidance - Environment	No additional information available.

53.4.2. Health

Guidance - Health	No additional information available.

54. GES ZnSO4-8: PW-15: Professional use

54.1. Title section

PW-15: Professional use

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8a, ERC8b, ERC8c, ERC8d
Processes, tasks, activities covered	Wide dispersive use (Zn) Professional use	

54.2. Conditions of use affecting exposure

54.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8b, ERC8c, ERC8d)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

54.3. Exposure estimation and reference to its source

54.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8b, ERC8c, ERC8d)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

54.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

54.4.2. Health

Guidance - Health	No additional information available.

55.1. Title section

C-1: Consumer use

ES Ref.: GES ZnSO4-8	Author: Soydan Yalçın
ES Type: Consumer	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Wide dispersive use (Zn)	ERC8a, ERC8c, ERC8d, ERC8f
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

55.2. Conditions of use affecting exposure

55.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

55.3. Exposure estimation and reference to its source

55.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

55.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

55.4.2. Health

Guidance - Health	No additional information available.

56.1. Title section

C-2: Consumer use

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8a
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

56.2. Conditions of use affecting exposure

56.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

56.3. Exposure estimation and reference to its source

56.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

56.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

56.4.2. Health

Guidance - Health	No additional information available.

57.1. Title section

C-3: Consumer use

ES Ref.: GES ZnSO4-8	Author: Soydan Yalçın
ES Type: Consumer	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Wide dispersive use (Zn)	ERC8a, ERC8b, ERC8d, ERC8e, ERC9b
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

57.2. Conditions of use affecting exposure

57.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8b, ERC8d, ERC8e, ERC9b)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
ERC9b	Widespread use of functional fluid (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

57.3. Exposure estimation and reference to its source

57.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8b, ERC8d, ERC8e, ERC9b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

57.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

57.4.2. Health

Guidance - Health	No additional information available.

58.1. Title section

C-4: Consumer use

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC8c, ERC8f
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

58.2. Conditions of use affecting exposure

58.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

58.3. Exposure estimation and reference to its source

58.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8c, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

58.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

58.4.2. Health

Guidance - Health	No additional information available.

59.1. Title section

C-5: Consumer use

ES Ref.: GES ZnSO4-8	Author: Soydan Yalçın
ES Type: Consumer	Date of issue: 25/04/2018
Version: 0.0	

Environment		
CS1	Wide dispersive use (Zn)	ERC8a, ERC8c, ERC8d, ERC8f
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

59.2. Conditions of use affecting exposure

59.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

59.3. Exposure estimation and reference to its source

59.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

59.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

59.4.2. Health

Guidance - Health	No additional information available.

60.1. Title section

SL-1: Lubricants, greases, release products

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use Professional use	

60.2. Conditions of use affecting exposure

60.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC11a)

ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

60.3. Exposure estimation and reference to its source

60.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

60.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

60.4.2. Health

Guidance - Health	No additional information available.

61.1. Title section

SL-1: Lubricants, greases, release products

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

61.2. Conditions of use affecting exposure

61.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC11a)

ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

61.3. Exposure estimation and reference to its source

61.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

61.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

61.4.2. Health

Guidance - Health	No additional information available.

62.1. Title section

SL-2: Paper articles

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use ManufactureFormulation	

62.2. Conditions of use affecting exposure

62.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

62.3. Exposure estimation and reference to its source

62.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

62.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

62.4.2. Health

Guidance - Health	No additional information available.

63.1. Title section

SL-3: Manufacture of textiles, leather, fur

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use Professional use	

63.2. Conditions of use affecting exposure

63.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

63.3. Exposure estimation and reference to its source

63.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

63.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

63.4.2. Health

Guidance - Health	No additional information available.

64.1. Title section

SL-3: Manufacture of textiles, leather, fur

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

64.2. Conditions of use affecting exposure

64.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

64.3. Exposure estimation and reference to its source

64.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

64.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

64.4.2. Health

Guidance - Health	No additional information available.

65.1. Title section

SL-4: Washing and cleaning products

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC11b
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use Professional use	

65.2. Conditions of use affecting exposure

65.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC11b)

ERC11b	Widespread use of articles with high or intended release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

65.3. Exposure estimation and reference to its source

65.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC11b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

65.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

65.4.2. Health

Guidance - Health	No additional information available.

66.1. Title section

SL-4: Washing and cleaning products

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC11b
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

66.2. Conditions of use affecting exposure

66.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC11b)

ERC11b	Widespread use of articles with high or intended release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

66.3. Exposure estimation and reference to its source

66.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC11b)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

66.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

66.4.2. Health

Guidance - Health	No additional information available.

67.1. Title section

SL-5: Articles

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use Professional use	

67.2. Conditions of use affecting exposure

67.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a)

ERC10a	Widespread use of articles with low release (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

67.3. Exposure estimation and reference to its source

67.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

67.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

67.4.2. Health

Guidance - Health	No additional information available.

68.1. Title section

SL-5: Articles

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

68.2. Conditions of use affecting exposure

68.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a)

ERC10a	Widespread use of articles with low release (outdoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

68.3. Exposure estimation and reference to its source

68.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

68.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

68.4.2. Health

Guidance - Health	No additional information available.

69.1. Title section

SL-6: Cosmetics, personal care products

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use Professional use	

69.2. Conditions of use affecting exposure

69.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

69.3. Exposure estimation and reference to its source

69.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

69.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

69.4.2. Health

Guidance - Health	No additional information available.

70.1. Title section

SL-6: Cosmetics, personal care products

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

70.2. Conditions of use affecting exposure

70.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

70.3. Exposure estimation and reference to its source

70.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

70.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

70.4.2. Health

Guidance - Health	No additional information available.

71.1. Title section

SL-7: Pharmaceuticals

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use Professional use	

71.2. Conditions of use affecting exposure

71.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

71.3. Exposure estimation and reference to its source

71.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

71.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

71.4.2. Health

Guidance - Health	No additional information available.

72.1. Title section

SL-7: Pharmaceuticals

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

72.2. Conditions of use affecting exposure

72.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

72.3. Exposure estimation and reference to its source

72.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

72.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

72.4.2. Health

Guidance - Health	No additional information available.

73.1. Title section

SL-8: Food/Feedstuff

ES Ref.: GES ZnSO4-8 ES Type: Worker Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Industrial use Professional use	

73.2. Conditions of use affecting exposure

73.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Conditions and measures related to sewage treatment plant

Municipal sewage treatment plant is assumed.	
Estimated substance removal from wastewater via municipal sewage treatment	80 %
Size of the sewage treatment plant (STP)	2000 m³/d EUSES. Default

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

73.3. Exposure estimation and reference to its source

73.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.51	

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

73.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

73.4.2. Health

Guidance - Health	No additional information available.

74.1. Title section

SL-8: Food/Feedstuff

ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018

Environment		
CS1	Wide dispersive use (Zn)	ERC10a, ERC11a
Processes, tasks, activities covered	Wide dispersive use (Zn) Consumer use	

74.2. Conditions of use affecting exposure

74.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Product (article) characteristics

Physical form of product	Solid
Concentration of substance in product	<= 100 %
Concentration of substance in product	Variable

Amount used, frequency and duration of use (or from service life)

Annual site tonnage: ,Not relevant	Sewage treatment plant. measured data
Wide dispersive use	365 days/yr

Other conditions affecting environmental exposure

Local freshwater dilution factor:	10

74.3. Exposure estimation and reference to its source

74.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC10a, ERC11a)

Information for contributing exposure scenario

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1,REACH Disclaimer:
This information is based on current knowledge. Consistency of data in the SDS with CSR is considered, as far as the information is available at the time of compilation (cfr Revision date and Version number),For the derivation of RCRs, please refer to the CSR.

Release route	Release rate	Release estimation method
Indoor or outdoor use		Probability. Consumer products ending up down the drain after use. No intended release

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0064	0.0206	0.78	
Freshwater sediment	mg/kg dwt	73.4	117.8	0.62	
Sewage treatment plant	mg/l	0.0776	0.1	0.19	
Soil	mg/kg dwt	55	35.6	0.11	

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

74.4.1. Environment

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances

74.4.2. Health

Guidance - Health	No additional information available.