Annex to the safety data sheet

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

Environment 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 E 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, PROC5b, PROC9, PROC22, PROC26 Processes, tasks, activities covered CS1 The manufacturing process includes: • Reception of zine-bearing materials and transfer to the reaction tank • Reception of zine-bearing materials (containing zine metal, zine oxide or zine hydroxide) into the mixing tank. The leach-residue (insoluble sulphates and steriles) occurs in covered settlers; if needd the leachate may be filtered on adapted filters. • Purification steps may be applied of which: • O Svidation (with air or oxygen) of some of the present elements (i.e. Fe, Al,,) followed by another sedimentation or filtration step, if needdd • Concentration by water expoartion, under exhaust hood. • Pouring on a cooling belt • Cystallistation of observation, under exhaust hood. • Pouring on a cooling belt • Cystallistation adopted zincs, 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 power. Solido are packed in bagsor drums.	1.1. Title section M-1: Production of metal powders (wet processes)		ES Ref.: GES Zi ES Type: Vers		Author: Soydan Yalçır Date of issue: 25/04/2018
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, 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. 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 applied of which: • Oxidation (with air or oxygen) of some of the present elements (i.e. Fe) followed by another sedimentation or filtration step, if needed • Hydrolysis (with ZnO-rich reagent) of some of the hydrolysable 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 • Crostration and cocasionally 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.	Environment				
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, PROC9, 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 needd the leachate may be filtered on adapted filters, • Purification steps may be applied of which: • Oxidation (with air or oxygen) of some of the present elements (i.e. Fe, Al,) followed by another sedimentation or filtration step, if needed • 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 bet • 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	CS1	The Industrial use of primary or secondary zinc bearing material in the manufacture of ZnSO4 in several process steps,		ERC1	
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. 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: • Oxidation (with air or oxygen) of some of the present elements (i.e. Fe) followed by another sedimentation or filtration step, if needed • Hydrolysis (with ZnO-rich reagent) of some of the hydrolysable elements (i.e. Fe, Al,) 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	Worker				
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Maintenance activities Manufacture		The manufacturing J • Reception of zinc- • Feeding of the zinc mixing tank. The lease temperature. • Separation of the I the leachate may be • Purification steps i o Oxidation (with ail sedimentation or fill o Hydrolysis (with 2 followed by another o Cementation (with followed by another • Concentration by v • Pouring on a cooli • Crystallisation and • Discharge and pace bag or drum under the subsequently closed • Exposure to dust co intermediate bulk cc • Maintenance activ	The manufacturing process includes: • Reception of zinc-bearing materials and transfer • Feeding of the zinc-bearing materials (containin mixing tank. The leaching reaction with sulphuric temperature. • Separation of the leach-residue (insoluble sulphus the leachate may be filtered on adapted filters, • Purification steps may be applied of which: • Oxidation (with air or oxygen) of some of the p sedimentation or filtration step, if needed • Hydrolysis (with ZnO-rich reagent) of some of followed by another sedimentation or filtration step • Concentration by water evaporation, under exhat • Concentration by water evaporation, under exhat • Pouring on a cooling belt • Crystallisation and occasionally drying, in closed • Discharge and packaging of produced zinc sulpf bag or drum under the discharge pipe and to set th subsequently closed and carried to the storage are • Exposure to dust can occur during packing of the intermediate bulk containers (ca. 1 m3 capacity); s		 bxide or zinc hydroxide) into the tept at the properpH and bccurs in covered settlers; if needed, be. Fe) followed by another lements (i.e. Fe, Al,) (i.e. Cu, Cd, Ni, Co,) bers have to place and adjust the n. Filled bagsor drums are bis are packed in

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

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 m³/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	2008/98/EC, 2000/76/EC, 1999/31/EC	
regulations		
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:

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)

Unless otherwise stated. Default

PROC2	Chemical production or refinery in closed continuous process with occasional controlled 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
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

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 est	imation 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	Exposu estimati		PNEC	RCI	R	Assessment method
Freshwater	mg/l	0.0044		0.0206	< 0.2	22	
Freshwater sediment	mg/kg dwt	156		117.8	< 0.0	57	
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/m ³	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 Author: Soydan Yalçın ES Ref.: GES ZnSO4-3 F-1: Use as laboratory reagent (ZnSO4) Date of issue: 25/04/2018 ES Type: Worker Version: 0.0 Environment CS1 ERC2, ERC3 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. Worker CS2 PROC15 Contributing scenario controlling worker exposure (2): The Industrial use of ZnSO4 as active laboratory reagent in aqueous or organic media, for analysis or synthesis. 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

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 plan				
Size of the sewage treatment plant (STP) 2000 m ³ /d				
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 %			
Waste code	(estimated value) See section 13 of the SDS			
Dispose of in accordance with relevant local	2008/98/EC, 2000/76/EC, 1999/31/EC			
regulations Zinc. Can be recycled	58 %			
Zific. Can be recycled	(estimated value)			
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			
2.2.2. Control of worker exposure: Contributing scenario co		strial use of ZnSO4 as activelaboratory		
reagent in aqueous or organic media, for analysis or synthe	sis. (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 assump	otion		
Amount used (or contained in articles), frequency and dur	ation 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 ventile release. Ensure all national/local regulations are observed. Re- and clothing. Store according to local legislation				
Handle product only in closed system or provide appropriate e	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, h	ygiene 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 condition 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	RCI	R	Assessment method		
Freshwater	mg/l	0.0034		0.0206	0.16	5		
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/m ³	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	
e		ES Type	: Worker	Date of issue: 25/04/2018	
		Ver	rsion: 0.0		
Environment					
CS1	The Industrial use of ZnSO4 in the s by mixing thoroughly, dry or in a so	g scenario controlling environmental exposure(1): ial use of ZnSO4 in the formulation of preparations horoughly, dry or in a solvent, thestarting materials ally pressing, pelletizing, sintering, possibly packing.		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	• Removed from th • Extracted from th batch-wise or con tank/chamber.	 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 		gents to the mixing tank. Mixing occurs eipt. The mixing occurs in a closed	
Assessment method					

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 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. (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)
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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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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 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
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

Amount used (of contained in a neces), requerey and datation 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 accommon poleted to a suscept and other having and health analysis.	

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)
T 1	

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 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. (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 ra	te		Release est	imation method		
Indoor use,Can be recycle cleaning)	d,water may be created	l (i.e.						
Protection target	Unit	Exposu estimat		PNEC	RCI	R	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, PROC9, 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/m ³	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

F-3: Wet formulation		ES Ref.: GES ZnSO4-1 ES Type: Worker		Author: Soydan Yalçın
				Date of issue: 25/04/2018
		Ve	ersion: 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	
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, F	PROC3, PROC8b, PROC9
Processes, tasks, activities covered	 CS1 In the described process, the zinc sulphate is: Removed from the packaging and stored in Extracted from the silo, dosed and fed with batch-wise or continuously, according the protank/chamber. The preparation (dry or wet (solvent/paste)) treatment/use Formulation 		other reagent s receipt. The	s to the mixing tank. Mixingoccurs e mixing occurs in a closed
Assessment method				
Assessment method	LUSES			

4.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): 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. (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 onsite and	
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	t 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
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

4.2.2. 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, PROC8b, PROC9)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled 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
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 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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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 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. (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 rateRelease		Release esti	mation method	
Indoor use, Can be recycled, water may be created (i.e.							
cleaning)							
Protection target	Unit	Exposure		PNEC	RCI	R	Assessment method
		estimation					
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/m ³	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 Z ES Type: Vers		Author: Soydan Yalçın Date of issue: 25/04/2018
Environment			I	
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, 1 PROC9, 1	PROC3, PROC8a, PROC8b, PROC15
Processes, tasks, activities covered	CS1 In the described process, the zinc sulphate • Removed from the packaging and stored • Extracted from the silo, dosed and fed wi batch-wise or continuously, according the tank/chamber. • The preparation (dry or wet (solvent/past treatment/use Formulation		ther reagen receipt. The	ts to the mixing tank. Mixingoccurs e mixing occurs in a closed
Assessment method	EUSES			
5.2. Conditions of use affectin	ng exposure			

5.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): 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. (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

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 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
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

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

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 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. (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 est	imation method
Indoor use,Can be recycle cleaning)	d,water may be created	(i.e.					
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

F-S: Distribution List etc. 192 Eloch Table of the set of th	5.1. Title section		ES Pef · GES 7	ZnSO4 1	Author: Soydan Yalçın
Invironment Version: 0.0 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	F-5: Distribution		ES Ref.: GES ZnSO4-1		• •
Environment 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 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					Date of issue: 25/04/2018
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			Ver	sion: 0.0	
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. Image: Control Contence Control Control Control Control Control	Environment				
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 Formulation	CS1	The Industrial use of ZnSO4 in the by mixing thoroughly, dry or in a so with potentially pressing, pelletizing	formulation of preparations olvent, thestarting materials	ERC2	
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. 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 Formulation	Worker				
 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 	CS2	Industrial use of ZnSO4 in the form mixing thoroughly, dry or in a solve with potentially pressing, pelletizing	ulation of preparations by ent, the starting materials		
	Processes, tasks, activities covered	In the described pro • Removed from th • Extracted from th batch-wise or conti- tank/chamber. • The preparation (or treatment/use	e packaging and stored in silos e silo, dosed and fed with the o nuously, according the process	ther reage receipt. T	ents to the mixing tank. Mixingoccurs The mixing occurs in a closed
Assessment memod	Assessment method				
	Assessment method	EUSES			
5.2. Conditions of use affecting exposure	2 Conditions of use offectin				

6.2.1. Control of environmental exposure: Contributing scenario controlling environmental exposure (1): 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. (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)
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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	
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, PROC9b, 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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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 offecting workers exposure	

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 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. (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 recycle cleaning)	d,water may be create	ed (i.e.					
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

IW-1: Industrial use		ES Ref.: GES Zn	ISO4-2	Author: Soydan Yalçın
IV I. Muserial use		ES Type: Worker Version: 0.0		Date of issue: 25/04/2018
Environment				
CS1	Contributing scenario controlling en The industrial use of ZnSO4 or ZnSU manufacturing of other inorganic or a solvent-based matrix with potentia packaging.	O4-formulations in the organic zinc substances in	ERC6a	
Worker				
CS2	Contributing scenario controlling we industrial use of ZnSO4 or ZnSO4-f manufacturing of other inorganic or solvent-based matrix with potentially packaging.	formulations in the organic zinc substances in a	PROC2, PROC3	3, PROC8b, PROC9, PROC15
Processes, tasks, activities covered	Reception of the Z reaction tank Sequential additio (ventilation is adapt Concentration by Possible pouring of Discharge and pac or drum under the d subsequently closed Exposure to dust of containers (ca. 1 m2 Maintenance activy For the specific pr electrogalvanizing b contain zinc sulphat zinc/iron-zinc alloyy the coating consists	water evaporation, under exhaus on a cooling belt, is optional as w ckaging of produced zinc compo- lischarge pipe and to set the proof a and carried to the storage area. can occur during packing of the 3 capacity), solid products are pa- vities roccess of electrogalvanizing, whi- bath consists of one or more tank- te in solution. The steel passes th	mulation, or ZnS ps and filtration of at hood, is optiona- vell unds. Workers ha cess in motion. Fi powder. Solution tacked in bags or d ich is covered by cs, usually made o prough the bath at	O4-bearing raw material inthe on press filter, whenneeded al. ave to place and adjustthe bag lled bags or drums are s are packed in intermediate bulk lrums. this scenario, the of a ceramic material, which
Assessment method	Industrial use 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	

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 accidenta	al leakage. Dike and containspill		
Control the emission of particle	'S		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 pl	ant (STP)	2000 m ³ /d Unless otherwise stated. Default		
Conditions and measures rela	ted to treatment of waste (inc	luding article waste)		
Waste Fraction. Zinc. Produced		3.1 % (estimated value)		
Waste Fraction. Zn and compo	unds	0.056 % (estimated value)		
Waste Fraction. Downstream u	ser	0.3 % (estimated value)		
Waste code Dispose of in accordance with r	elevant local	See section 13 of the SDS 2008/98/EC, 2000/76/EC, 1999/31/EC		
regulations		2000/20/10/10/10/10/10/10/10/10/10/10/10/10/10		
Water-based process. Recycle of compliance with current legisla preferred to disposal or incinera	tion. Recycling is			
Other conditions affecting en				
Flow rate of receiving water at	least:	18000 m³/d Unless otherwise stated. Default		
7.2.2. Control of worker ormor	una Contributing goonaria aa		rich was of 7x504 or 7x504 formulations	
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, PROC9, PROC15)				
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions			
PROC3	Manufacture or formulation i processes with equivalent con	n in the chemical industry in closed batch processes with occasional controlled exposureor containment condition		
PROC8b	Transfer of substance or mixt	sture (charging and discharging) at dedicated facilities		
PROC9	Transfer of substance or mixt	ure into small containers (dedicated filling li	ine, including weighing)	
PROC15	Use as laboratory reagent			
Product (article) characterist	ics			
Physical form of product		Solution, Solid		
Concentration of substance in p		<= 100 %		
Concentration of substance in p	roduct	Pure product, Solution		
Amount used (or contained in	articles), frequency and dura	ntion 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 d			
ventilation. Measures to be take spill	en in case of accidental spillage	or accidental leakage. Dike and contain		
Local exhaust ventilation - efficiency	ciency of at least		90 (%)	
Air cyclones for dust collection	. Efficiency of at least:		70 (%)	
Use a dust filter. Efficiency of a	at least:		50 (%)	
Handle product only in closed s	system or provide appropriate e	xhaust 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	

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

Exposed skin surface assumed:face

Indoor

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			I		Leaching agent. leaching, filtering, purification		
Drying and storage					grinding		
Indoor		İ					
Protection target	Unit	Exposu estimati		PNEC	RCI	R Assessment method	
Freshwater	mg/l	0.0035		0.0206	0.17	7	
Freshwater sediment	mg/kg dwt	53		117.8	0.23	3	
Soil	mg/kg dwt	41		35.6	0.39	9	

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/m ³	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 2 ES Type		Author: Soydan Yalçın Date of issue: 25/04/2018
	1		Vei	ISIOII: 0.0	
Environment					
CS1	The industrial manufacturing	use of ZnSO4 or ZnS g of other inorganic or	wironmental exposure (1): O4-formulations inthe organic zinc substances in ally drying, filtering and	ERC6a	L
Worker					
CS2	industrial use manufacturing	of ZnSO4 or ZnSO4-1 g of other inorganic or	orker exposure (2): The formulations in the organic zinc substances in a ly drying, filtering and	PROC2	2, PROC8b, PROC22, PROC26
Processes, tasks, activities covered		Reception of the <i>L</i> reaction tank Sequential addition (ventilation is adaption Concentration by Possible pouring of Discharge and paid drum under the disc subsequently closed Exposure to dust containers (ca. 1 mi Maintenance activ For the specific p electrogalvanizing contain zinc sulpha zinc/iron-zinc alloy	on of reagents for purification s ted). water evaporation, under exhau on a cooling belt, is optional as ckaging of produced zinc comp charge pipe and to set the proce d and carried to the storage area can occur during packing of the 3 capacity), solid products are p vities roccess of electrogalvanizing, w bath consists of one or more tau te in solution. The steel passes	prmulatio teps and : ust hood, well bounds. W ess in mot a. e powder: packed in hich is cc nks, usua through t	n, or ZnSO4-bearing raw material inthe filtration on press filter, whenneeded is optional. Vorkers have to place and adjustthe bag or tion. Filled bags or drums are . Solutions are packed in intermediate bulk bags or drums.
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

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	

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
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 m ³ /d Unless otherwise stated. Default
. 0	ntrolling 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, PROC2b, PROC22, PROC26)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with 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

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 1		Release rate		Release estimation method			
Water-based process						Leaching a	gent. leaching, filtering, purification
Drying and storage						grinding	
Indoor							
Protection target	Unit	Exposu estimati		PNEC	RCF	ł	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/m ³	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 2 ES Type Ver		Author: Soydan Yalçın Date of issue: 25/04/2018
Environment				
CS1	Contributing scenario controlling er The industrial use of ZnSO4 or ZnS manufacturing of other inorganic or a solvent-based matrix with potentia packaging.	O4-formulations in the organic zinc substances in	ERC6a	
Worker				
CS2	Contributing scenario controlling w industrial use of ZnSO4 or ZnSO4 manufacturing of other inorganic or solvent-based matrix with potentiall packaging.	formulations in the organic zinc substances in a	PROC2, Pl	ROC8b, PROC22, PROC26
Processes, tasks, activities covered	 Reception of the A reaction tank Sequential additic (ventilation is adap Concentration by Possible pouring Discharge and padrum under the diss subsequently closed Exposure to dust containers (ca. 1 m Maintenance activ For the specific p electrogalvanizing contain zinc sulpha zinc/iron-zinc alloy 	on of reagents for purification s ted). water evaporation, under exhau on a cooling belt, is optional as ckaging of produced zinc comp charge pipe and to set the proce d and carried to the storage area can occur during packing of the 3 capacity), solid products are p vities rocess of electrogalvanizing, w bath consists of one or more tau te in solution. The steel passes	prmulation, o teps and filtr ast hood, is o well younds. Work ess in motion a. e powder. So packed in bag hich is cover nks, usually r through the l	or ZnSO4-bearing raw material inthe ation on press filter, whenneeded optional. cers have to place and adjustthe bag or . Filled bags or drums are olutions are packed in intermediate bulk gs or drums.
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) characteristi	Product (article) characteristics					
Physical form of product		Solid				
Concentration of substance in p	roduct	>= 99 %				
Concentration of substance in p	roduct	Pure product				
Amount used, frequency and	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						

Sibile waste water a camera required rotal enterency of removal from waste water after	
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 accident	al leakage. Dike and containspill			
Control the emission of particle	2S		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,		
Tarat sin anti-siana			work area and clothing Ensure all national/local regulations are		
Treat air emissions.	Treat air emissions.		observed.		
SEVESO 2			Compliance with applicable regulations		
Conditions and measures rela	ted to sewage treatment plan	t			
Size of the sewage treatment pl	ant (STP)	2000 m ³ /d			
	4 .] 4 . 4 4	Unless otherwise stated. Default			
Conditions and measures rela Waste Fraction, Zinc, Produced		<u> </u>			
waste Fraction. Zinc. Produced	I	3.1 % (estimated value)			
Waste Fraction. Zn and compou	unds	0.056 %			
Waste Fraction. Downstream us	sor	(estimated value) 0.3 %			
waste i faction. Downstream u		(estimated value)			
Waste code	1 . 1 1	See section 13 of the SDS			
Dispose of in accordance with r regulations	elevant local	2008/98/EC, 2000/76/EC, 1999/31/EC			
Water-based process. Recycle of	or dispose of in compliance				
with current legislation. Recycl					
other conditions affecting environment					
Flow rate of receiving water at	-	18000 m ³ /d			
Flow fate of fecerving water at	least.	Unless otherwise stated. Default			
9.2.2. Control of worker exposi	9.2.2. Control of worker exposure: Contributing scenario controlling worker exposure (2): The industrial use of ZnSO4 or ZnSO4- formulations				
		stances in a solvent-based matrix with pot	entially drying,filtering and packaging.		
(PROC2, PROC8b, PROC22, I PROC2		ery in closed continuous process with occas	in all and we like the second s		
PROC2	equivalent containment cond		ional controlled exposure of processes with		
PROC8b	Transfer of substance or mix	ture (charging and discharging) at dedicated	facilities		
PROC22	Manufacturing and processin	g of minerals and/or metals at substantially of	elevated temperature		
PROC26	Handling of solid inorganic s	substances at ambient temperature			
Product (article) characteristi	ics				
Physical form of product		Solution, Solid			
Concentration of substance in p	roduct	<= 100 %			
Concentration of substance in p		Pure product, Solution			
Amount used (or contained in		ation of use/evposure			
Maximum daily site tonnage	rarucies), rrequency and dura	<= 25 T			
waxiniani dariy she tonnage		End of shift			
Exposure duration	Exposure duration				
End of shift. Worst case assumption Technical and organisational conditions and measures					
		ust release. Local exhaust ventilation.			
Measures to be taken in case of accidental spillage or accidental leakage. Dike and contain spill					
Local exhaust ventilation - effic	ciency of at least		90		
Air cyclones for dust collection			(%) 70		
	. Efficiency of at least.		(%)		
Use a dust filter. Efficiency of a	at least:		50		
Handle product only in closed s	system or provide appropriate e	xhaust ventilation	(%)		
Dust formation	,		Ensure all national/local regulations are		
			observed		

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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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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			Leachi		Leaching a	gent. leaching, filtering, purification	
Drying and storage				grinding			
Indoor							
Protection target	Unit	Exposu estimati		PNEC	RCI	ł	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/m ³	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 Z	InSO4-2	Author: Soydan Yalçın
ivv-4. muustiai use		ES Type: Ver	Worker sion: 0.0	Date of issue: 25/04/2018
Environment				
CS1	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	
Worker				
CS2	Contributing scenario controlling w industrial use of ZnSO4 or ZnSO4- manufacturing of other inorganic or solvent-based matrix with potential packaging.	formulations in the rorganic zinc substances in a	PROC1, PROC2 PROC9, PROC2	2, PROC3, PROC4, PROC8b, 15
Processes, tasks, activities covered	Description of activ • Reception of the reaction tank • Sequential addition (ventilation is adaption • Concentration by • Possible pouring • Discharge and pan or drum under the subsequently closed • Exposure to dust containers (ca. 1 m • Maintenance activ • For the specific p electrogalvanizing contain zinc sulphan zinc/iron-zinc alloy the coating consistent	ckaging. 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		
Assessment method	Industrial use 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 ZnSO4formulations 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 p	roduct	>= 99 %
Concentration of substance in p	roduct	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

Onsite wastewater treatment required. Total efficiency of removal from wastewater after onsite and	
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 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	
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 ZnSO4formulations 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

	containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or 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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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 ZnSO4formulations 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	Exposu estimati		PNEC	RCI	R	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/m ³	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

1.1. Title section					
IW-5: Industrial use		ES Ref.: GES ZnSO4-4		Author: Soydan Yalçın	
		ES Type: Worker Version: 0.0		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.				
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	optionally: • Pressed at high te temperature • Molten at high ter • Pressed and peller	ocess, the ZnSO4 (or Zn compo emperature (>1000°C), grinded mperature (>500°C) and further tized at low temperature packed, or used as such, in furth	and re-pr	ressed or fritted at high glassy material	
Assessment method	EUSES				
Assessment method	EUSES				
1 2 Conditions of use office					
1.2. Conditions of use affect					
1.2.1. Control of environmental exp	posure: Contributing scenario contro	lling environmental exposure	e (1): The	e 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 ISO 9000, ISO 1400X, ... Ensure operatives are Control the emission of particles 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
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 m ³ /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 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
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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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	

11.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 or ZnSO4 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 b	be created (i.e. cleaning)	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

Guidance - Environment	dance - 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 Z ES Type		Author: Soydan Yalçın Date of issue: 25/04/2018	
				rsion: 0.0	Date 01 188ue. 23/04/2018
Environment					
CS1	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	I	
Worker					
CS2	industrial use of ZnS manufacturing of ot	SO4 or ZnSO4- her inorganic or	orker exposure (2): The formulations in the organic zinc substances in a ly drying, filtering and	PROC:	3, PROC8b, PROC21
Processes, tasks, activities covered	• R read • So (ver • C • Pr • D or c sub • E con • M • Fo elect con zind the	scription of active eception of the 2 ction tank equential addition itilation is adap oncentration by possible pouring ischarge and pa- drum under the of sequently closed xposure to dust tainers (ca. 1 m laintenance active or the specific p ctrogalvanizing tain zinc sulpha c/iron-zinc alloy	on of reagents for purification s ted). water evaporation, under exhau on a cooling belt, is optional as ckaging of produced zinc comp discharge pipe and to set the pro- d and carried to the storage area can occur during packing of the 3 capacity), solid products are p vities roccess of electrogalvanizing, w bath consists of one or more tau te in solution. The steel passes	teps and a ust hood, well younds. W pocess in r a. e powder poacked in hich is co nks, usua through t	n, or ZnSO4-bearing raw material inthe filtration on press filter, whenneeded is optional. Vorkers have to place and adjustthe bag notion. Filled bags or drums are . Solutions are packed in intermediate bulk bags or drums.
Assessment method		SES			

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 ZnSO4formulations 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)

	<i>,</i>
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 onsite and	
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 m ³ /d Unless otherwise stated. Default	
Conditions and measures related to treatment of waste (including article waste)		
Waste Fraction. Zinc. Produced	3.1 %	

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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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 m ³ /d Unless otherwise stated. Default
. 0	rio 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 nackaging. (PROC3, PROC3), PROC21)

packaging. (PKUC3, PKUC30, PKUC21)		
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 $% \mathcal{A}(\mathcal{A})$

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: Pl		
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	·		
Expand akin surface assumed face			

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 ra	Release rate		Release estimation method	
Water-based process					Leaching a	gent. leaching, filtering, purification	
Drying and storage				grinding			
Indoor							
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

Guidance - Environment No additional information available.			
12.4.2. Health			
Guidance - Health	No additional information available.		

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

IW-7: Industrial use		ES Ref.: GES Z	inSO4-2	Author: Soydan Yalçın
		ES Type: Worker Version: 0.0		Date of issue: 25/04/2018
Environment				
CS1	Contributing scenario controlling en The industrial use of ZnSO4 or ZnS manufacturing of other inorganic on a solvent-based matrix with potenti packaging.	SO4-formulations in the rorganic zinc substances in	ERC4	
Worker				
CS2	Contributing scenario controlling w industrial use of ZnSO4 or ZnSO4- manufacturing of other inorganic or solvent-based matrix with potential packaging.	formulations in the r organic zinc substances in a	PROC2, PROC	3, PROC5, PROC8b, PROC26
Processes, tasks, activities covered	 Reception of the reaction tank Sequential additid (ventilation is adapted of the concentration by Possible pouring) Discharge and padrum under the dissubsequently close Exposure to dust containers (ca. 1 m) Maintenance action For the specific pelectrogalvanizing contain zinc sulphazinc/iron-zinc allog the coating consist 	water evaporation, under exhau on a cooling belt, is optional as ackaging of produced zinc comp acharge pipe and to set the proce d and carried to the storage area can occur during packing of the 13 capacity), solid products are p vities process of electrogalvanizing, wh bath consists of one or more tar ate in solution. The steel passes	rmulation, or ZnS eps and filtration ast hood, is option well ounds. Workers h ss in motion. Fille powder. Solution acked in bags or o hich is covered by ths, usually made through the bath a	SO4-bearing raw material inthe on press filter, whenneeded al. ave to place and adjustthe bag or ed bags or drums are as are packed in intermediate bulk drums.
	Industrial use 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 ZnSO4formulations 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) EUSES Assessment method Product (article) characteristics Physical form of product Solid >= 99 % Concentration of substance in product 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 accidenta	al leakage. Dike and containspill			
Control the emission of particle	28		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 rela	e i				
Size of the sewage treatment pla	ant (STP)	2000 m ³ /d Unless otherwise stated. Default			
Conditions and measures rela	ted to treatment of waste (inc	luding article waste)			
Waste Fraction. Zinc. Produced	I	3.1 % (estimated value)			
Waste Fraction. Zn and compou	unds	0.056 % (estimated value)			
Waste Fraction. Downstream us	ser	0.3 % (estimated value)			
Waste code		See section 13 of the SDS			
Dispose of in accordance with r regulations	elevant local	2008/98/EC, 2000/76/EC, 1999/31/EC			
Water-based process. Recycle of					
with current legislation. Recycli preferred to disposal or incinera					
Other conditions affecting env					
Flow rate of receiving water at	least:	18000 m ³ /d Unless otherwise stated. Default			
13.2.2. Control of worker ex formulations in the manufactu packaging. (PROC2, PROC3, I	ring of other inorganic or org	rio controlling worker exposure (2): 1 ganic zinc substances in a solvent-based i	The industrial use of ZnSO4 or ZnSO4- matrix with potentially drying, filtering and		
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions				
PROC3	Manufacture or formulation i processes with equivalent con		cesses with occasional controlled exposureor		
PROC5	Mixing or blending in batch				
PROC8b	Transfer of substance or mixt	ure (charging and discharging) at dedicated	facilities		
PROC26	Handling of solid inorganic s	ubstances at ambient temperature			
Product (article) characteristi	ics				
Physical form of product		Solution, Solid			
Concentration of substance in p		<= 100 %			
Concentration of substance in p	roduct	Pure product, Solution			
Amount used (or contained in	articles), frequency and dura	ntion of use/exposure			
Maximum daily site tonnage		<= 25 T End of shift			
Exposure duration		End of shift 8 h/day End of shift. Worst case assumption			
Technical and organisational conditions and measures					
Handle product within a closed		ust release. Local exhaust			
		or accidental leakage. Dike and contain			
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 s	system or provide appropriate ex	xhaust 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 ZnSO4formulations 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, purific		gent. leaching, filtering, purification	
Drying and storage		Ę		grinding	grinding		
Indoor							
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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, 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/m ³	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

4.1. Title section				
IW-8: Industrial use		ES Ref.: GES 2	ZnSO4-4	Author: Soydan Yalçın
		ES Type: Worker		Date of issue: 25/04/2018
		Ver	rsion: 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.		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	optionally: • Pressed at high te temperature • Molten at high ter • Pressed and pellet	 In the described process, the ZnSO4 (or Zn compound) containing optionally: Pressed at high temperature (>1000°C), grinded and re-pressed of temperature Molten at high temperature (>500°C) and further cast as glassy repressed and pelletized at low temperature And subsequently packed, or used as such, in further treatment/use 		
Assessment method EUSES				
4.2. Conditions of use affect	ing exposure			
14.2.1. Control of environmental exp	osure: Contributing scenario contro	lling environmental exposure	e (1): The Iı	ndustrial 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 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			
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 m ³ /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)				

PROCIS, PROCI4, PROCIS)	
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 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
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

$\label{eq:constant} \textbf{Amount used (or contained in articles), frequency and duration of use/exposure}$

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

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	

14.3.1. 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 r		water may b	nay 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/m ³	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

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	Author: Soydan Yalçın
Tw-9: Industrial use				e: Worker	Date of issue: 25/04/2018
				ersion: 0.0	
Environment	1				
CS1	Contributing scenar	io controlling en	wironmental exposure (1):	ERC6b	
0.51	The industrial use of			LICOU	
			ispersions, pastes or other		
	viscous or polymeri	zed matrices.			
Worker					
CS2	Contributing scenario controlling w			PROC4, PROC PROC13	5, PROC6, PROC8b, PROC9,
		O4 or ZnSO4-formulations as component of dispersions, pastes or other viscous or		FROCIS	
	polymerized matrice				
Processes, tasks, activities covered	CS	1			
	In t	he described pro	ocess, the zinc sulphate contain	ning preparation/m	ixture is:
		npacked and stor			/ 1 / / 1 · · / 1
			nuously, according the proces		/or solvents to the mixingtank,
			salt containing mixture (solu		aste) is directly further
	pro	cessed, or packe	ed, for further treatment/use.		
		ustrial use			
Assessment method	EU	SES			
	<u>ر</u> •				
15.2. Conditions of use affec					
15.2.1. Control of environmental ex formulations as component for the p					
		-	site (no inclusion into or onto		~~)
	JSES				
Product (article) characteristics					
Physical form of product		Solid			
Concentration of substance in produce	ot	> 25 %			
Concentration of substance in produc			% in mixture		
Amount used, frequency and dura	tion of use (or from se	-			
Annual amount per site Continuous			<= 5000 T Worst case assumption		
		worst case	assumption		
Technical and organisational cond				1	
Production of metal powders (wet pr					
Measures to be taken in case of accid	dental spillage or accide	ntal leakage. Dil	ke and containspill		
Onsite wastewater treatment required	d. Treat onsite wastewat	ter (prior to recei	iving water		
discharge) to provide the required re					
Sedimentation. Filtration Treat air emissions.					
Treat air emissions. Treat air emission to provide a typical removal efficiency of			>= 50		
Treat all emission to provide a typical femoval efficiency of				ber for dust elimination of waste	
			gases		
Treat air emission to provide a typical removal efficiency of		>= 99 (%). Fabric filte	N F		
Control the emission of particles				1400X, Ensure operatives are	
				trained to minin	nise exposures. Handle in
					n good industrial hygiene and safety
				work area and c	ar cleaning of equipment,
Treat air emissions.				Ensure all natio	nal/local regulations are
SEVESO 2				observed.	th applicable regulations
SEVESO 2				Compnance wit	in 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
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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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
Water-based process. Recycle or dispose of in compliance	
with current legislation. Recycling is	
preferred to disposal or incineration	
Other conditions affecting environmental exposure	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m ³ /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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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		

other conditions infecting workers expos

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 orZnSO4formulations 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	Exposur estimati		PNEC	RCI	ł	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, 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/m ³	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

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	Author: Soydan Yalçın
Tw-10. Industrial use			ES Type	: Worker	Date of issue: 25/04/2018
			Ve	rsion: 0.0	
Environment					
CS1			vironmental exposure (1):	ERC6b	
	The industrial use of Z		O4-formulations as ispersions, pastes or other		
	viscous or polymerized		ispersions, pastes of other		
Worker					
CS2			orker exposure (2): The		C4, PROC5, PROC6, PROC8b,
			ormulations as component PROC9, PROC13		DC13
	polymerized matrices.	uispersions, j	pastes of other viscous of		
Processes, tasks, activities cover	red CS1				
	In the		ocess, the zinc sulphate contain	ing preparation/	mixture is:
		icked and stor		than naganta an	nd/or solvents to the mixingtank,
	batch-	wise or contin	nuously, according the process	s receipt.	a/or solvents to the mixingtank,
	• The	resulting zinc	salt containing mixture (solut	ion, dispersion,	paste) is directly further
			ed, for further treatment/use.		
Assessment method	EUSE	rial use			
Assessment method	EUSE	6			
16.2. Conditions of use af	fecting exposure				
16.2.1. Control of environmenta	Il exposure: Contributing sce	nario contro	lling environmental exposure	e (1): The indus	strial use of ZnSO4 orZnSO4-
formulations as component for					
ERC6b	Use of reactive processing aid	e of reactive processing aid at industrial site (no inclusion into or or			
Assessment method EUSES					
Product (article) characteristic	28				
Physical form of product		Solid			
Concentration of substance in pr	oduct	> 25 %			
Concentration of substance in pr	oduct	% in mixtur	re		
Amount used, frequency and d	luration of use (or from servi	ce life)			
Annual amount per site		<= 5000 T			
Continuous		Worst case	assumption		
Technical and organisational c	conditions and measures			-	
Production of metal powders (we	1 ,				
Measures to be taken in case of a	accidental spillage or accidenta	il leakage. Dil	ke and containspill		
Onsite wastewater treatment req	uired. Treat onsite wastewater	(prior to recei	iving water		
discharge) to provide the required removal efficiency of. 90 - 99.98%. precipi Sedimentation. Filtration			pitation.		
Treat air emissions.					
Treat air emission to provide a typical removal efficiency of				>= 50	
			· /	bber for dust elimination of waste	
Treat air emission to provide a typical removal efficiency of				gases >= 99	
			(%). Fabric fi		
Control the emission of particles				O 1400X, Ensure operatives are simise exposures. Handle in	
					ith good industrial hygiene and safety
			practice. Regu	ular cleaning of equipment,	
Treat air emissions.				work area and Ensure all nat	l clothing ional/local regulations are
				observed.	-
SEVESO 2				Compliance v	vith applicable regulations
Conditions and measures relat	ed to sewage treatment plant				

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

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: Pl

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 orZnSO4formulations 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 est	imation method
water may be created (i.e. cleaning)							
Indoor						Can be recy	cled
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

Guidance - Environment	No additional information available.
16.4.2. Health	
Guidance - Health	No additional information available.

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

IW-11: Industrial use			ES Ref.: GES	ZnSO4-5	Author: Soydan Yalçın
			ES Type: Worker		Date of issue: 25/04/2018
			Ve	rsion: 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, ERC6	ı, ERC6d
Worker					
CS2	industrial use of for the manufa	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, PRO PROC10, PR	C4, PROC5, PROC8b, PROC9, DC13
• unpacked and st • Extracted from batch-wise or con • The resulting zi				other reagents and receipt.	d/or solvents to the mixingtank,
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 orZnSO4formulations 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 rela	8 1			
Size of the sewage treatment plant (STP)		2000 m ³ /d Unless otherwise stated. Default		
Conditions and measures rela	ated to treatment of waste (in	cluding article waste)		
Waste Fraction. Zinc. Produced 3.1 % (estimated value)				
Waste Fraction. Zn and compo	unds	0.056 % (estimated value)		
Waste Fraction. Downstream u	ser	0.3 % (estimated value)		
Waste code		See section 13 of the SDS		
Dispose of in accordance with regulations	relevant local	2008/98/EC, 2000/76/EC, 1999/31/EC		
Water-based process. Recycle of with current legislation. Recycle preferred to disposal or incinera	ling is			
Other conditions affecting en	vironmental exposure			
Flow rate of receiving water at	least:	18000 m ³ /d Unless otherwise stated. Default		
17.2.2. Control of worker expo component for the manufactur PROC13)	sure: Contributing scenario e of dispersions, pastes or ot	controlling worker exposure (2): The indu her viscous or polymerized matrices. (PRO	Istrial use of ZnSO4 or ZnSO4- formulations as DC3, PROC4,PROC5, PROC8b, PROC9, PROC10,	
PROC3	Manufacture or formulation processes with equivalent co		cesses with occasional controlled exposureor	
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 brushi		, , , , , , , , , , , , , , , , , , , ,	
PROC13	Treatment of articles by dip			
Product (article) characterist	ics			
Physical form of product		Liquid, Paste, Dispersion		
Concentration of substance in p	product	> 25 %		
Concentration of substance in p	product	% in mixture		
Dustiness		Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness		
Amount used (or contained in	n articles), frequency and du	ration of use/exposure		
Annual site tonnage		<= 5000 T		
Maximum daily site tonnage		<= 20 T		
Exposure duration 8 h/day End of s		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	

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			

17.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4formulations 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 est	imation method	
water may be created (i.e. cle	eaning)						
Indoor					Can be recy	cled	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

IW-12: Industrial use		ES Ref.: GES ZnSO4-5		Author: Soydan Yalçın
		ES Type: '	Worker	Date of issue: 25/04/2018
		Vers	ion: 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.		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, PRC PROC9, PRC	C2, PROC3, PROC5, PROC8b, C14
Processes, tasks, activities covered	 unpacked and sto Extracted from the batch-wise or contine The resulting zince 	bed process, the zinc sulphate containing preparation/mixture is: and stored in silos from the silo, dosed and fed with the other reagents and/or solvents to the mixing or continuously, according the process receipt. ng zinc salt containing mixture (solution, dispersion, paste) is directly further r packed, for further treatment/use.		nd/or solvents to the mixingtank,
	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 orZnSO4formulations 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	
	ated to sewage treatment plan	nt	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Size of the sewage treatment plant (STP) 2000 m³/d Unless otherwise stated. Default				
Conditions and measures rel	ated to treatment of waste (in			
Waste Fraction. Zinc. Produce	,	3.1 %		
		(estimated value)		
Waste Fraction. Zn and compo	ounds	0.056 % (estimated value)		
Waste Fraction. Downstream	user	0.3 %		
Waste code		(estimated value) See section 13 of the SDS		
Dispose of in accordance with	relevant local	2008/98/EC, 2000/76/EC, 1999/31/EC		
regulations				
Water-based process. Recycle with current legislation. Recycle preferred to disposal or inciner	ling is			
Other conditions affecting er				
Flow rate of receiving water at	•	18000 m³/d		
Flow fate of fecerving water a	t least.	Unless otherwise stated. Default		
18.2.2. Control of worker expo component for the manufactu PROC14)	osure: Contributing scenario or re of dispersions, pastes or oth	controlling worker exposure (2): The indu her viscous or polymerized matrices. (PRO	Istrial use of ZnSO4 or ZnSO4- formulations as DC1, PROC2,PROC3, PROC5, PROC8b, PROC9,	
PROC1	Chemical production or refin containment conditions	nery in closed process without likelihood of	exposure or processes with equivalent	
PROC2		Chemical production or refinery in closed continuous process with occasional controlled 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			
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, ext	trusion, pelettisation, granulation		
Product (article) characteris	tics			
Physical form of product		Liquid, Paste, Dispersion		
Concentration of substance in	product	> 25 %		
Concentration of substance in	product	% in mixture		
		Dustiness, 26.7 mg/g, Solid, low dustiness dustiness	Dustiness, 26.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, medium dustiness	
Amount used (or contained i	n articles), frequency and dur	ation 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 organisationa	l conditions and measures	1		
-	d system . Measures in case of	dust release. Local exhaust		
Local exhaust ventilation - eff	iciency 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 rel	ated to personal protection, h	ygiene and health evaluation		
Protective clothing. Efficiency	of at least:		>= 90 % Mandatory	
Protective gloves The product is stable at normal handling and storage conditions		ns. Respiratory protection	Avoid any direct contact with the product If the occupational exposure limit is exceeded:Use	
equipment not absolutely nece	essary		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	

18.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4formulations 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 rat	e		Release es	timation method	
water may be created (i.e	cleaning)							
Indoor					Can be rec	ycled	-	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

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
		Ve	rsion: 0.0	
Environment				
CS1	Contributing scenario controlling en The Industrial use of ZnSO4 or ZnS component for the manufacture of se for further downstream use.	O4 - formulationsas	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	8, PROC5, PROC8b, PROC9
Processes, tasks, activities cover	In the described pro optionally: • Pressed at high ter temperature • Molten at high ter • Pressed and pellet And subsequently p Industrial use	sed at high temperature (>1000°C), grinded and re-pressed or fritted at high erature ten at high temperature (>500°C) and further cast as glassy material sed and pelletized at low temperature subsequently packed, or used as such, in further treatment/use		essed or fritted at high lassy material
Assessment method	EUSES	EUSES		
19.2. Conditions of use af	fecting exposure			
	ll exposure: Contributing scenario contro the manufacture of solid blends and matr			
ERC5	Use at industrial site leading to inclusion into/onto article			
Assessment method EUSES				
Product (article) characteristic	2S			

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%. pr	recipitation.
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 m	3/4

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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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 m ³ /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

5.7 mg/g, Solid, low dustiness, Worst case assumption, Solid, high
5

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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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	

19.3.1. 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 recy	rcled
High temperature.				Probability			
Dry processes					water may l	be created (i.e. cleaning)	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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

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			ES Ref.: GES 2	72504.5	Author: Soydan Yalçın
IW-13: Industrial use					Date of issue: 25/04/2018
			e: Worker Date of issue: 25/04/ ersion: 0.0		
Environment	1			I	
CS1	Contributing scongrig og	Contributing scenario controlling environmental exposure			
CSI	The industrial use of ZnS			ERC5	
	component for the manufacture of				
	viscous or polymerized r	matrices.			
Worker					
CS2	Contributing scenario co			PROC3, PROC5, PROC8b, PROC9	
	for the manufacture of di		formulations as component	1	
	polymerized matrices.	F, I			
Processes, tasks, activities covered	CS1			1	
		escribed pro	cess, the zinc sulphate contain	ing prepar	ation/mixture is:
		ked and stor			
			e silo, dosed and fed with the o nuously, according the process		ents and/or solvents to the mixingtank,
			salt containing mixture (soluti		sion, paste) is directly further
			d, for further treatment/use.		
	Industria	al use			
Assessment method	EUSES				
20.2. Conditions of use affecti					
20.2.1. Control of environmental exponential exponential exponent for the m					
-		_		matrices	. (EKC5)
Assessment method EUSES					
Product (article) characteristics					
Physical form of product		Solid			
Concentration of substance in product		> 25 %			
Concentration of substance in product		% in mixtur	e		
Amount used, frequency and durati	on of use (or from service	e life)			
Annual amount per site		<= 5000 T			
Continuous	1	Worst case	assumption		
Technical and organisational condit	tions and measures				
Production of metal powders (wet pro	cesses)				
Measures to be taken in case of accide	ental spillage or accidental	leakage. Dil	ke and containspill		
Onsite westernates treatment serviced. The target is the service of the service o			iving water		
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	et scrubber for dust elimination of waste
				gases	et setubber for dust eminiation of waste
Treat air emission to provide a typical removal efficiency of				>= 99	
Control the emission of particles				oric filter 00, ISO 1400X, Ensure operatives are	
control are emission of purificies				to minimise exposures. Handle in	
			accorda	nce with good industrial hygiene and safety	
					. Regular cleaning of equipment, ea and clothing
Treat air emissions.					all national/local regulations are
				observe	d.
SEVESO 2				Complia	ance 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
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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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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 m ³ /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, 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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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	

20.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4formulations 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 est	mation method	
water may be created (i.e. cle	eaning)						
Indoor						Can be recy	cled
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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, 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/m ³	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

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 2	ZnSO4-4	Author: Soydan Yalçın
		ES Type	: Worker	Date of issue: 25/04/2018
		Ve	rsion: 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.			PROC5, PROC8b, PROC9
Processes, tasks, activities cover	In the described pro • Pressed at high te temperature • Molten at high ter • Pressed and pellet	ocess, the ZnSO4 (or Zn compo mperature (>1000°C), grinded nperature (>500°C) and further tized at low temperature backed, or used as such, in furth	and re-press	ssy material
Assessment method EUSES				
21.2. Conditions of use af	facting ornervo			
			(4)	
	l exposure: Contributing scenario contro he manufacture of solid blends and matr			
ERC5	Use at industrial site leading to inclusion into/onto article			

Assessment method	EUSES		
Product (article) characteristi	cs		
Physical form of product		Solid	
Concentration of substance in pa	roduct	<= 100 %	
Concentration of substance in pr	roduct	Variable	
Amount used, frequency and o	duration of use (or from servi	ce life)	
Annual amount per site		5000 T	
Continuous		Worst case assumption	
Technical and organisational	conditions and measures		
No generation of waste water du	uring process		
Onsite wastewater treatment required. Treat onsite wastewater discharge) to provide the required removal efficiency of. 90 - 9 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	ted 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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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 m ³ /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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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	

21.3.1. 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.						Probab	ility
Dry processes						water n	nay be created (i.e. cleaning)
Protection target	Unit	Exposu estimati		PNEC	RCI	R	Assessment method
Freshwater	mg/l	0.0034		0.0206	0.16		
Freshwater sediment	mg/kg dv	vt 45		117.8	0.19		
Soil	mg/kg dv	vt 41		35.6	0.39		
21.3.2. Worker exposure Con for the manufacture of solid							or ZnSO4-formulations ascomponent ROC9)
Information for contribution	ng exposur	e scenario					
1, REACH Disclaimer:	n current kn	owledge. Consistency	of data in the S	SDS with CSR	is considered		isation ratios are expected to be less than as the information is available at the time of
Route of exposure and type effects	eof E	xposure estimate		RCR			Method
Dermal - Long-term - system effects	nic 0.	05 mg/kg bodyweight/	/day	0.05			
Inhalation - Long-term - systemic effects	0.	57 mg/m ³		0.23			
Sum RCR - Long-term - systemic effects				0.28			
21.4. Guidance to Dow	nstream	User to evaluate	whether he	works insid	e the bou	ndaries	s set by the FS
21.4.1. Environment	iisti cain	User to evaluate	whether he	WOLKS IIISIG		nuar ic.	s set by the ES
Guidance - Environment		No additional info	ormation availab	le.			
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 2		Author: Soydan Yalçın	
			ES Type		Date of issue: 25/04/2018	
			Ver	rsion: 0.0		
Environment						
CS1			vironmental exposure (1):	ERC5		
	The industrial use of component for the t					
		component for the manufacture of dispersions, pastes or other viscous or polymerized matrices.				
Worker	1 2					
CS2	Contributing scenar	rio controlling w	orker exposure (2): The	PROC4, PROC5, PROC8b, PROC9		
			formulations as component			
			pastes or other viscous or			
	polymerized matric	es.				
Processes, tasks, activities covered						
		-	cess, the zinc sulphate contain	ing preparatio	on/mixture is:	
		npacked and stor		ther reagents	and/or solvents to the mixingtank,	
	bat	ch-wise or conti	nuously, according the process	receipt.	_	
			salt containing mixture (soluti	on, dispersio	n, paste) is directly further	
	1	· •	ed, for further treatment/use.			
		lustrial use				
Assessment method	EU	JSES				
22.2. Conditions of use af	footing ornoging					
		•				
22.2.1. Control of environmental formulations as component for t						
ERC5	Use at industrial site leading			matrices. (E	ince)	
Assessment method	EUSES	ing to inclusion in				
Product (article) characteristic	S					
Physical form of product		Solid				
Concentration of substance in pro-		> 25 %				
Concentration of substance in pro-	oduct	% in mixtur	e			
Amount used, frequency and d	uration of use (or from se	ervice life)				
Annual amount per site		<= 5000 T				
Continuous		Worst case	Worst case assumption			
Technical and organisational co	onditions and measures					
Production of metal powders (we	et processes)					
Measures to be taken in case of a		ental leakage. Di	ke and containspill			
		-	-			
Onsite wastewater treatment required discharge) to provide the required						
Sedimentation. Filtration	a removal efficiency of. 90	- 99.98%. precij	pitation.			
Treat air emissions.						
Treat air emission to provide a ty	pical removal efficiency of	f		>= 50		
					crubber for dust elimination of waste	
Treat air emission to provide a typical removal efficiency of		gases >= 99				
reat an emission to provide a typical femoval efficiency of			(%). Fabric	filter		
Control the emission of particles					ISO 1400X, Ensure operatives are	
					ninimise exposures. Handle in with good industrial hygiene and safety	
					e with good industrial hygiene and safety egular cleaning of equipment,	
				work area a	and clothing	
Treat air emissions.					national/local regulations are	
				observed.		

Conditions and measures related to sewage treatment plant

SEVESO 2

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

Compliance with applicable regulations

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

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	

22.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4formulations 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 est	imation method	
water may be created (i.e.	cleaning)							
Indoor						Can be recy	vcled	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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, 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/m ³	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

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 2	ZnSO4-4	Author: Soydan Yalçın
				: Worker	Date of issue: 25/04/2018
			Ver	rsion: 0.0	
Environment					
CS1	Contributing scenario con The Industrial use of ZnSC component for the manufa for further downstream us	O4 or ZnS acture of s	O4 - formulationsas	ERC5	
Worker					
CS2	Industrial use of ZnSO4 o	Contributing scenario controlling worker ex Industrial use of ZnSO4 or ZnSO4-formula for the manufacture of solid blends and mat downstream use.			I, PROC2, PROC3, PROC5, PROC8a, 3b, PROC9, PROC14
Processes, tasks, activities cover	In the des optionally • Pressed temperatu • Molten • Pressed And subs	y: at high te at high ten at high ten and pelle	process, the ZnSO4 (or Zn comport mperature (>1000°C), grinded mperature (>500°C) and further tized at low temperature proceed, or used as such, in further	and re-pr	essed or fritted at high glassy material
Assessment method EUSE					
23.2. Conditions of use at	23.2. Conditions of use affecting exposure				
23.2.1. Control of environmenta					e Industrial use of ZnSO4 orZnSO4 - C5)
ERC5 Use at industrial site leading to inclusion			nto/onto article		
Assessment method EUSES					
Product (article) characteristic	cs				
Physical form of product S		Solid			
Concentration of substance in product		<= 100 %			
Concentration of substance in pr	roduct V	ariable			
Amount used, frequency and d	duration of use (or from service l	ife)			

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 ISO 9000, ISO 1400X, ... Ensure operatives are Control the emission of particles 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
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Flow rate of receiving water at least:	18000 m ³ /d
C C	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)

1110 03,1110 011.)	
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 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)
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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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	

ng 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 or ZnSO4 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	lease route Release rate		Release estin		Release est	imation method	
Indoor						Can be recy	cled
High temperature.				Probability			
Dry processes	sses				water may be created (i.e. cleaning)		
Protection target	Unit	Exposu estimati		PNEC	RCI	ł	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/m ³	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

Guidance - Environment	No additional information available.
23.4.2. Health	
Guidance - Health	No additional information available.

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

04.4 Title section						
24.1. Title section IW-15: Industrial use			ES Ref.: GES	ZnSO4-5	Author: Soydan Yalçın	
Tw-15: muusthai use				e: Worker	Date of issue: 25/04/2018	
			Ve	ersion: 0.0		
Environment		-				
CS1	Contributing scen	nario controlling en	vironmental exposure (1):	ERC5		
		e of ZnSO4 or ZnSO				
	viscous or polym		spersions, pastes or other			
Worker	1 7					
CS2	Contributing scen	nario controlling wo	orker exposure (2): The	PROC1, PROC	2, PROC3, PROC5, PROC8a,	
		f ZnSO4 or ZnSO4-formulations as component ture of dispersions, pastes or other viscous or		PROC8b, PROC	PROC8b, PROC9, PROC14	
	polymerized mat		bastes of other viscous of			
Processes, tasks, activities cove		CS1				
Processes, tasks, activities cove			cess, the zinc sulphate contain	ning preparation/m	ixture is:	
		 unpacked and stor 	ed in silos	•••		
			e silo, dosed and fed with the nuously, according the proces		or solvents to the mixingtank,	
		• The resulting zinc	salt containing mixture (solut		ste) is directly further	
	-	· · ·	d, for further treatment/use.			
		Industrial use				
Assessment method		EUSES				
24.2. Conditions of use a	ffacting exposure					
24.2.1. Control of environment		a conorio control	ling onvironmental evenesur	o (1): The industr	ial use of 7nSO4 or 7nSO4	
formulations as component for						
ERC5	Use at industrial site lea	ding to inclusion in	to/onto article			
Assessment method						
Product (article) characteristi	cs					
Physical form of product		Solid				
Concentration of substance in p	roduct	> 25 %				
Concentration of substance in product		% in mixture	e			
Amount used, frequency and	duration of use (or from	service life)				
Annual amount per site		<= 5000 T	<= 5000 T			
Continuous		Worst case a	Worst case assumption			
Technical and organisational	conditions and measures	5				
Production of metal powders (w	vet processes)					
Measures to be taken in case of	accidental spillage or acc	idental leakage. Dik	te and containspill			
Onsite wastewater treatment rec	mired Treat onsite waster	water (prior to recei	ving water			
Onsite wastewater treatment required. Treat onsite wastewater (prior to rece discharge) to provide the required removal efficiency of. 90 - 99.98%. preci						
Sedimentation. Filtration Treat air emissions.						
	typical removal efficiency	of		>= 50		
Treat air emission to provide a typical removal efficiency of				per for dust elimination of waste		
Treat air emission to provide a typical removal efficiency of			>= 99 (%). Fabric filte	r		
Control the emission of particles				ISO 9000, ISO	1400X, Ensure operatives are	
					nise exposures. Handle in	
				practice. Regula	n good industrial hygiene and safety ar cleaning of equipment,	
				work area and c	lothing	
Treat air emissions.				Ensure all national/local regulations are observed.		
SEVESO 2					h applicable regulations	
Conditions and measures rela	ted 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
Water-based process. Recycle or dispose of in compliance with current legislation. Recycling is preferred to disposal or incineration	

Flow rate of receiving water at least:	18000 m³/d
Tiow fate of feeerving water at least.	Unless otherwise stated. Default
	Chiefs 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 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)
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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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	

24.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4formulations 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 est	imation method	
water may be created (i.e. o	cleaning)						
Indoor						Can be recy	vcled
Protection target	Unit	Exposu estimati		PNEC	RCI	ł	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/m ³	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 2	ZnSO4-4	Author: Soydan Yalçın
		ES Type:	: Worker	Date of issue: 25/04/2018
		Ver	rsion: 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	Industrial use of ZnSO4 or ZnSO4-	ontributing scenario controlling worker exposure (2): The dustrial use of ZnSO4 or ZnSO4-formulations as component r the manufacture of solid blends and matrices for further ownstream use.		, PROC2, PROC3, PROC5, PROC8b, , PROC14
Processes, tasks, activities covered	optionally: • Pressed at high te temperature • Molten at high ter • Pressed and peller	ocess, the ZnSO4 (or Zn compo emperature (>1000°C), grinded mperature (>500°C) and further tized at low temperature packed, or used as such, in furth	and re-pre	essed or fritted at high lassy material
Assessment method EUSES				
	· · · · · · · · · · · · · · · · · · ·			
25.2. Conditions of use affect	ting 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	Use at industrial site leading to inclusion into/onto article		
Assessment method	EUSES	EUSES		
Product (article) charact	eristics			
Physical form of product		Solid		
Concentration of substance	e in product	<= 100 %		
Concentration of substance	e in product	Variable		
Amount used, frequency	and duration of use (or from serv	vice life)		
Annual amount per site		5000 T		
Continuous		Worst case assumption		
Technical and organisati	onal conditions and measures			
No generation of waste wa	ter during process			
	nt required. Treat onsite wastewate equired removal efficiency of. 90 -			
Treat air emissions.				
Treat air emission to provi	de a typical removal efficiency of		>= 50 (%). Wet scrubber for dust elimination of waste gases	
Treat air emission to provi	de a typical removal efficiency of		>= 99 (%). Fabric filter	
Control the emission of pa	rticles		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 m ³ /d Unless otherwise stated. Default
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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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
Water-based process. Recycle or dispose of in compliance	
with current legislation. Recycling is	
preferred to disposal or incineration	

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 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
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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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	

25.3.1. 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	Exposu estimati		PNEC	RCI	R	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, 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/m ³	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	Author: Soydan Yalçın	
1 vv - 10. muusu tai use	5			: Worker	Date of issue: 25/04/2018	
			Ve	rsion: 0.0		
Environment						
CS1			vironmental exposure (1):	ERC5		
		se of ZnSO4 or ZnS	O4-formulations as ispersions, pastes or other			
		nerized matrices.	ispersions, pastes of other			
Worker						
CS2			orker exposure (2): The	PROC1, PROC2, PROC3, PROC5, PROC8b,		
		ZnSO4 or ZnSO4-formulations as component ture of dispersions, pastes or other viscous or		PROC9, PRC	JC 14	
	polymerized ma					
Processes, tasks, activities cove	ered	CS1		-		
			bcess, the zinc sulphate contain	ing preparation	/mixture is:	
		unpacked and storExtracted from the		other reagents ar	nd/or solvents to the mixingtank,	
		batch-wise or contin	nuously, according the process	receipt.	C .	
			e salt containing mixture (solut ed, for further treatment/use.	ion, dispersion,	paste) is directly further	
		Industrial use	a, for further treatment use.			
Assessment method		EUSES				
26.2. Conditions of use a	ffecting exposure					
26.2.1. Control of environment formulations as component for						
ERC5	Use at industrial site le	eading to inclusion ir	nto/onto article			
Assessment method	EUSES					
Product (article) characteristi	ics					
Physical form of product		Solid				
Concentration of substance in p	oroduct	> 25 %				
Concentration of substance in p	roduct	% in mixtur	e			
Amount used, frequency and	duration of use (or fron	n service life)				
Annual amount per site		<= 5000 T				
Continuous		Worst case	assumption			
Technical and organisational		es				
Production of metal powders (w						
Measures to be taken in case of	accidental spillage or ac	cidental leakage. Dil	ke and containspill			
Onsite wastewater treatment rec						
discharge) to provide the requir Sedimentation. Filtration	ed removal efficiency of	. 90 - 99.98%. precij	pitation.			
Treat air emissions.						
Treat air emission to provide a t	typical removal efficienc	y of		>= 50		
				gases	abber for dust elimination of waste	
Treat air emission to provide a t	typical removal efficienc	y of		>= 99 (%). Fabric fi	ilter	
Control the emission of particles					O 1400X, Ensure operatives are	
				nimise exposures. Handle in vith good industrial hygiene and safety		
			practice. Reg	ular cleaning of equipment,		
Treat air emissions.				work area and clothing Ensure all national/local regulations are		
				observed.		
SEVESO 2				Compliance v	with applicable regulations	
Conditions and measures rela	ted to sewage treatmen	t 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	2008/98/EC, 2000/76/EC, 1999/31/EC	
regulations		
Water-based process. Recycle or dispose of in compliance		
with current legislation. Recycling is		
preferred to disposal or incineration		

Flow rate of receiving water at least:	18000 m ³ /d
C C	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 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
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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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	
	•

26.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4formulations 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 recy	vcled	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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/m ³	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
20.4.1.	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		1	ES Ref.: GES	ZnSO4-7	Author: Soydan Yalçın
Tw-1/: muusthai use				e: Worker	Date of issue: 25/04/2018
			V	ersion: 0.0	
Environment		_			
CS1	Contributing scena	Contributing scenario controlling environmental exposure(1):		ERC4	
	The Industrial and	professional use of	of dispersions, pastes and		
	polymerised substr	ates containing up	to 30% w/w of ZnSO4.		
Worker					
CS2	Contributing scenario controlling worker e		when everyone (2). The		2 DDOC4 DDOC7 DDOC%
0.52			spersions, pastes and	PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14	
			to 30% w/w of ZnSO4.		
Processes, tasks, activities cove	ered CS	51			
			s both the industrial scale pro		
		llowing steps:	containing preparation/mixtu	are is further proces	sed, involvingpotentially the
	• I	Reception/unpacki	ing of material		
	• I	Production and/or	formulation/mixing of the en	d product or article	
			spraying, embedding		
		dustrial use			
Assessment method	EL	JSES			
07.0 Conditions of use o	ffacting own course				
27.2. Conditions of use a			••••••••••		
27.2.1. Control of environmental dispersions, pastes and polymer				re (1): The Industr	ial and professionaluse of
ERC4			trial site (no inclusion into or	onto article)	
Assessment method	EUSES				
Product (article) characteristi					
Physical form of product		Solid			
Concentration of substance in p	roduct	<= 30 %			
Ĩ					
Amount used, frequency and	duration of use (or from se				
Annual amount per site		<= 50 T Professional	<= 50 T Professional. (typical)		
Annual amount per site			<= 500 T		
F		Industrial	Industrial		
ZnSO4,% in mixture		<= 30	<= 30 Worst case assumption		
Continuous		Worst case a	assumption		
Technical and organisational	conditions and measures				
Onsite wastewater treatment rec					
discharge) to provide the require Sedimentation. Filtration	red removal efficiency of. 90) - 99.98%. precip	pitation.		
Additional information			Exposure estimation	ation	
Treat air emissions.				r dust elimination of waste	
Control the emission of particles			gases	as are trained to minimize	
control the emission of particles				exposures. Hand	es are trained to minimise lle in accordance with good
				industrial hygier	ne and safety practice. Regular
Turat ain anniar'				cleaning of equi	pment, work area and clothing
Treat air emissions.				observed.	nal/local regulations are
SEVESO 2					h applicable regulations
Conditions and measures rela	nted to sewage treatment p	lant			
Size of the sewage treatment pla	ant (STP)	2000 m³/d			
- *		Unless other	wise 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	

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

27.2.2. 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, PROC8b, PROC9, PROC10, PROC13, PROC14)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled 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
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 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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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

27.3.1. 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 at the 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							vaste water from process. Recycle as far as possible. water may be cleaning)
Industrial:Fertilizer				Indoor. Can be recycled. Waste treatment		be recycled. Waste treatment	
Indoor or outdoor use					Professiona	l use	
Protection target	Unit	Exposur estimati		PNEC	RCF	ł	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 at the 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/m ³	<= 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

Guidance - Environment	No additional information available.

28. GES ZnSO4-7: IW-18: Industrial use

00 4 T'41,					
28.1. Title section			ES Ref.: GES	ZpSO4-7	Author: Soydan Yalçın
IW-18: Industrial use				e: Worker	Date of issue: 25/04/2018
				ersion: 0.0	2410 01 150401 257 0 1/2010
Environment		l			
CS1	Contributing soonari	o controlling on	vironmontal avposura(1);	ERC4	
CSI	The Industrial and p	ofessional use of	vironmental exposure(1): of dispersions, pastes and	EKC4	
polymerised substrates		es containing uj	s containing up to 30% w/w of ZnSO4.		
Worker					
CS2			controlling worker exposure (2): The onal use of dispersions, pastes and		3, PROC4, PROC7, PROC8a, C9, PROC10, PROC13
			containing up to 30% w/w of ZnSO4.		29,1100010,1100013
Processes, tasks, activities cove	ered CS1				
	This		s both the industrial scale pro		
		ess, the ZnSO4 owing steps:	containing preparation/mixtu	ire is further proces	ssed, involvingpotentially the
		ception/unpack	ing of material		
	• Pr	oduction and/or	formulation/mixing of the en	d product or article	
			spraying, embedding		
A ((1 1		Istrial use			
Assessment method	EUS	DES			
28.2. Conditions of use a	ffecting exposure				
28.2.1. Control of environmenta		anania aantual	ling onvironmental ornegur	o (1). The Inductor	ial and professionaluse of
dispersions, pastes and polymer				e (1). The muusu	iai and professionaluse of
ERC4	Use of non-reactive process	- sing aid at indus	strial site (no inclusion into or	onto article)	
Assessment method	EUSES				
Product (article) characteristi	ics				
Physical form of product		Solid			
Concentration of substance in p	product	<= 30 %			
Amount used, frequency and	duration of use (or from ser	vice life)			
Annual amount per site		<= 50 T			
Annual amount per site			Professional. (typical) <= 500 T		
Annual annount per site		Industrial			
ZnSO4,% in mixture		<= 30			
Continuous		Worst case assumption			
Technical and organisational					
Onsite wastewater treatment rec					
discharge) to provide the require Sedimentation. Filtration	ed removal efficiency of. 90 -	99.98%. precip	pitation.		
Additional information			Exposure estimation	ation	
Treat air emissions.			Wet scrubber fo gases	r dust elimination of waste	
Control the emission of particles				Ensure operative	es are trained to minimise
					dle in accordance with good ne and safety practice. Regular
					ipment, work area and clothing
Treat air emissions.					nal/local regulations are
SEVESO 2					h applicable regulations
Conditions and measures rela	ited to sewage treatment pla	nt		-	-
Size of the sewage treatment pla	ant (STP)	2000 m ³ /d			
		Unless otherwise stated. Default			

0.056 % (estimated			
value)			
0.3 %			
(estimated value)			
See section 13 of the SDS			
2008/98/EC, 2000/76/EC, 1999/31/EC			
58 %			
Can be recycled. (estimated value). Professional			

Flow rate of receiving water at least:	18000 m
	Unless of

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 of dispersions, 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 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
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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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 and professional 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 at the 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 est	imation method
Water-based process							waste water from process. Recycle l as far as possible. water may be . cleaning)
Industrial:Fertilizer						Indoor. Car	h be recycled. Waste treatment
Indoor or outdoor use					Professiona	l use	
Protection target	Unit	Exposur estimati		PNEC	RCI	ł	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/m ³	<= 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

Guidance - Environment No additional information available.			
28.4.2. Health			
Guidance - Health	No additional information available.		

29. GES ZnSO4-7: IW-19: Industrial use

00 4 T'41,						
29.1. Title section			ES Ref.: GES	ZpSO4-7	Author: Soydan Yalçın	
IW-19: Industrial use				e: Worker	Date of issue: 25/04/2018	
				ersion: 0.0	Duc 01 15500. 25, 04, 2010	
Et						
Environment		4 11'	• • • • • • • • • • • • • • • • • • • •	EDC4		
CS1	The Industrial and pr	ofessional use of	vironmental exposure(1): of dispersions, pastes and	ERC4		
	polymerised substrate	polymerised substrates containing up to 30% w/w of ZnSO4.				
NT 1						
Worker					A DROCH DROCT DROCO	
CS2	Industrial and profess		orker exposure (2): The		3, PROC4, PROC7, PROC8a, C9, PROC10, PROC13	
			p to 30% w/w of ZnSO4.			
Processes, tasks, activities cove	ered CS1					
			s both the industrial scale pro			
		ess, the ZnSO4 wing steps:	containing preparation/mixtu	ire is further proces	sed, involvingpotentially the	
	• Re	ception/unpack	ing of material			
			formulation/mixing of the en	d product or article	•	
			spraying, embedding			
Assessment method	EUS	strial use				
Assessment method	EUS	L3				
29.2. Conditions of use a	ffecting exposure					
29.2.1. Control of environment		enorio control	ling anvironmental exposur	o (1). The Industr	ial and professionaluse of	
dispersions, pastes and polymer				te (1). The industr	har and professionaluse of	
ERC4	Use of non-reactive process	ing aid at indus	trial site (no inclusion into or	onto article)		
Assessment method	EUSES					
Product (article) characteristi	ics					
Physical form of product		Solid				
Concentration of substance in p	product	<= 30 %				
Amount used, frequency and	duration of use (or from serv	vice life)				
Annual amount per site		<= 50 T				
Annual amount per site			Professional. (typical) <= 500 T			
Annual annount per site		Industrial				
ZnSO4,% in mixture		<= 30				
Continuous		Worst case assumption				
Technical and organisational						
Onsite wastewater treatment rec						
discharge) to provide the require Sedimentation. Filtration	ed removal efficiency of. 90 -	99.98%. precip	bitation.			
Additional information				Exposure estimation	ation	
Treat air emissions.				Wet scrubber for gases	r dust elimination of waste	
Control the emission of particle	es			Ensure operativ	es are trained to minimise	
					dle in accordance with good ne and safety practice. Regular	
					pment, work area and clothing	
Treat air emissions.			Ensure all national/local regulations are observed.			
SEVESO 2					h applicable regulations	
Conditions and measures rela	ited to sewage treatment plan	nt		· •	*	
Size of the sewage treatment pla	ant (STP)	2000 m ³ /d				
_		Unless other	rwise stated. Default			

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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
Waste Fraction	58 %
	Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current	
legislation	

Flow rate of receiving water at least:	18000 m ³ /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 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
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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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

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

Indoor or outdoor use

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:

Professional use

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), 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 est	imation method
Water-based process							vaste water from process. Recycle as far as possible. water may be cleaning)
Industrial:Fertilizer						Indoor. Can	be recycled. Waste treatment
Indoor or outdoor use						Professiona	l use
Protection target	Unit	Exposur estimati		PNEC	RCF	R	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. **Exposure estimate** RCR Method Route of exposure and typeof effects Dermal - Long-term - systemic 0.48 mg/kg bodyweight/day 0.058 MEASE effects MEASE 0.05 mg/m3 <= 0.2 Inhalation - Long-term systemic effects Sum RCR - Long-term -<= 0.258 systemic effects

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

Guidance - Environment No additio	nal information available.
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30. GES ZnSO4-7: IW-20: Industrial use

30.1. Title section					
IW-20: Industrial use			ES Ref.: GES	ZnSO4-7	Author: Soydan Yalçın
Tw-20: Industrial use				e: Worker	Date of issue: 25/04/2018
				ersion: 0.0	
Environment		•			
CS1	Contributing scenario	controlling en	vironmental exposure(1):	ERC4	
	The Industrial and pro	fessional use of	of dispersions, pastes and p to 30% w/w of ZnSO4.		
Worker					
CS2	Industrial and profession	ional use of dis	orker exposure (2): The spersions, pastes and p to 30% w/w of ZnSO4.	PROC2, PROC PROC9, PROC	3, PROC4, PROC7, PROC8a, 10, PROC13
Processes, tasks, activities cove	This s proce follow • Rec • Proc • Fina	ss, the ZnSO4 wing steps: eption/unpack duction and/or	s both the industrial scale pro containing preparation/mixtu ing of material formulation/mixing of the en spraying, embedding	are is further proces	sed, involvingpotentially the
Assessment method	EUSI	ES			
L					
30.2. Conditions of use at 30.2.1. Control of environmenta dispersions, pastes and polymer	al exposure: Contributing sco rised substrates containing u	p to 30%w/w	of ZnSO4. (ERC4)		ial and professionaluse of
ERC4	Use of non-reactive processi EUSES	ng aid at indus	strial site (no inclusion into or	onto article)	
Assessment method					
Product (article) characteristic	cs	0.1.1			
Physical form of product		Solid <= 30 %			
Concentration of substance in pr					
Amount used, frequency and o	duration of use (or from serv				
Annual amount per site		<= 50 T Professional	l. (typical)		
Annual amount per site		<= 500 T Industrial			
ZnSO4,% in mixture		<pre>industrial <= 30</pre>			
Continuous		Worst case assumption			
Technical and organisational of	conditions and measures	1			
Onsite wastewater treatment req discharge) to provide the require Sedimentation. Filtration Additional information	quired. Treat onsite wastewater			Exposure estima	ation
Treat air emissions.					r dust elimination of waste
				gases	
Control the emission of particles				exposures. Hand industrial hygier cleaning of equi	es are trained to minimise dle in accordance with good ne and safety practice. Regular pment, work area and clothing
Treat air emissions.				Ensure all nation observed.	nal/local regulations are
SEVESO 2					h applicable regulations
Conditions and measures related	ted to sewage treatment plan	t			
Size of the sewage treatment pla	ant (STP)	2000 m ³ /d Unless other	rwise stated. Default		

Conditions and measures related to treatment of waste (including article waste) Waste Fraction. Zinc. Produced 3.1 %

(estimated value)

waste Fraction. Zinc. Produced	

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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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

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 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
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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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 at the 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 metho		imation 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. Car	be recycled. Waste treatment
Indoor or outdoor use					Professiona	l use	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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 at the 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/m ³	<= 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

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	Author: Soydan Yalçın	
1 vv - 21. muusu tai use	;		ES Typ	e: Worker	Date of issue: 25/04/2018	
				ersion: 0.0		
Environment						
CS1			vironmental exposure(1):	ERC4		
	The Industrial and pr	ofessional use of	of dispersions, pastes and			
	polymerised substrate	es containing up	p to 30% w/w of ZnSO4.			
Worker						
CS2	Contributing scenario	o controlling wo	orker exposure (2): The	PROC2, PROC	3, PROC4, PROC7, PROC8a,	
	Industrial and profess	sional use of dis	onal use of dispersions, pastes and		PROC8b, PROC9, PROC10, PROC13	
	polymerised substrate	es containing up	ontaining up to 30% w/w of ZnSO4.			
Processes, tasks, activities cover		scenario cover	s both the industrial scale pro	cesses and professi	onal use. In the described	
			containing preparation/mixtu			
	follo	wing steps:				
	• Re	ception/unpack	ing of material formulation/mixing of the en	d product or article		
			spraying, embedding	a product of article		
	Indu	strial use				
Assessment method	EUS	ES				
	1					
31.2. Conditions of use a	ffecting exposure					
31.2.1. Control of environmenta				re (1): The Industr	ial and professionaluse of	
dispersions, pastes and polymer ERC4			· · · · ·	anto articlo)		
	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)					
Assessment method EUSES						
Product (article) characteristic	cs					
Physical form of product		Solid				
Concentration of substance in pr	roduct	<= 30 %				
Amount used, frequency and o	duration of use (or from serv	vice life)				
Annual amount per site		<= 50 T				
Annual amount per site		Professional	. (typical)			
r initialir anitolinit per site		Industrial				
ZnSO4,% in mixture		<= 30				
Continuous		Worst case assumption				
Technical and organisational of	conditions and measures					
Onsite wastewater treatment req						
discharge) to provide the require Sedimentation. Filtration	ed removal efficiency of. 90 -	99.98%. precip	pitation.			
Additional information				Exposure estimation	ation	
Treat air emissions.					r dust elimination of waste	
Control the emission of particles				gases Ensure operative	es are trained to minimise	
· · · · · · · · · · · · · · · · · · ·					lle in accordance with good	
					ne and safety practice. Regular	
Treat air emissions.				Ensure all nation	pment, work area and clothing	
				observed.		
SEVESO 2				Compliance wit	h applicable regulations	
Conditions and measures related						
Size of the sewage treatment pla	ant (STP)	2000 m ³ /d Unless other	wise stated. Default			

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

Waste Fraction. Zinc. Produced	3.1 % (estimated value)
	(estimated value)

0.056 % (estimated
value)
0.3 %
(estimated value)
See section 13 of the SDS
2008/98/EC, 2000/76/EC, 1999/31/EC
58 %
Can be recycled. (estimated value). Professional

Flow rate of receiving water at least: 18000 m³/d Unless other

Unless otherwise stated. Default

31.2.2. 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, PROC8b, PROC9, PROC10, PROC13)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled 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
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

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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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 at the 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	Rel		Release rate	Release rate		Release estimation method	
Water-based process							waste water from process. Recycle as far as possible. water may be cleaning)
Industrial:Fertilizer						Indoor. Car	be recycled. Waste treatment
Indoor or outdoor use					Professiona	l use	
Protection target	Unit	Exposu estimati		PNEC	RCI	ł	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/m ³	<= 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

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		Author: Soydan Yalçın	
		ES Type: Worker		Date of issue: 25/04/2018
		Ve	rsion: 0.0	
Environment				
CS1	vironmental exposure(1): O4 - formulationsas olid blends and matrices): 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.			4, PROC5, PROC8b, PROC9
Processes, tasks, activities covere	In the described pro optionally: • Pressed at high te temperature • Molten at high ter • Pressed and pellet	ocess, the ZnSO4 (or Zn compo mperature (>1000°C), grinded nperature (>500°C) and furthe tized at low temperature backed, or used as such, in furth	and re-pr	ressed or fritted at high glassy material
Assessment method EUSES				
	A			
32.2. Conditions of use af				
	l exposure: Contributing scenario contro he manufacture of solid blends and matr			
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

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 m ³ /d	

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
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 m ³ /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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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					

32.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The Industrial use of ZnSO4 or ZnSO4 - 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		1	Release estimation method			
Indoor				(Can be recycled			
High temperature.]	Probability			
Dry processes					,	water may be	e created (i.e. cleaning)	
Protection target	Unit	Exposur estimati		PNEC	RCR		Assessment method	
Freshwater	mg/l	0.0034		0.0206	0.16			
Freshwater sediment	mg/kg dw	t 45		117.8	0.19			
Soil	mg/kg dw	t 41		35.6	0.39			
for the manufacture of solid	blends and	matrices for further					nSO4-formulations ascomponent)	
Information for contributin	81						sure of workers and indirect huma	
1,REACH Disclaimer:	n current kno	wledge. Consistency	of data in t	he SDS with CSR is	considered,		n ratios are expected to be less that information is available at the time	
Route of exposure and type effects	of Ex	posure estimate		RCR			Method	
Dermal - Long-term - system effects	nic 0.0	5 mg/kg bodyweight/	day	0.05				
Inhalation - Long-term - systemic effects	0.5	7 mg/m ³		0.23				
Sum RCR - Long-term - systemic effects				0.28				
32.4. Guidance to Dow	nstroom	llcar to avaluata	whathar	he works inside	the bound	dorios sot	by the FS	
32.4.1. Environment	iisti cailii v		witetitet	ne works inside	the bound	uarres set	by the LS	
Guidance - Environment		No additional info	rmation avai	ilable.				
32.4.2. Health		1						

Guidance - Health	No additional information available.

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

33.1. Title section			ES D. f. CES	7-504.5	Anthony Constant Values	
IW-22: Industrial use		ES Ref.: GES 2		Author: Soydan Yalçın Date of issue: 25/04/2018		
			ES Type Ver	rsion: 0.0	Date 01 18sue. 25/04/2018	
Environment		. 11'	· (1)	EDG5		
CS1	The industrial use of 2		vironmental exposure (1): 04-formulations as	ERC5		
			ispersions, pastes or other			
	viscous or polymerize					
Worker						
CS2			orker exposure (2): The	PROC4, PROC5, PROC8b, PROC9		
			formulations as component			
	polymerized matrices		pastes or other viscous or			
		•				
Processes, tasks, activities covered	CS1 In the	e described pro	ocess, the zinc sulphate contain	ing preparat	tion/mixture is:	
		acked and stor		ing prepara	tion/mixture is.	
	• Ext	racted from th	e silo, dosed and fed with the o		ts and/or solvents to the mixingtank,	
			nuously, according the process		ion mosto) is dimently further	
			e salt containing mixture (soluti ed, for further treatment/use.	ion, dispersi	ion, paste) is directly further	
	-	strial use	.,			
Assessment method	EUSI					
33.2. Conditions of use affec	ting exposure					
33.2.1. Control of environmental ex		enario contro	lling environmental exposure	e (1): The ii	ndustrial use of ZnSO4 orZnSO4-	
formulations as component for the						
ERC5 Us	e at industrial site leading	to inclusion in	nto/onto article			
Assessment method EU	USES					
Product (article) characteristics						
Physical form of product		Solid				
Concentration of substance in produc	ct	> 25 %				
Concentration of substance in produc		% in mixtur	·e			
Amount used, frequency and dura		ice life)				
Annual amount per site	uon or use (or from serv	<= 5000 T				
Continuous		Worst case	assumption			
Technical and organisational cond	itions and massures		1			
-						
Production of metal powders (wet pr		-11-1 D	laa ah daa ah			
Measures to be taken in case of accid	iental spillage or accident	al leakage. Di	ke and containspill			
Onsite wastewater treatment required	d. Treat onsite wastewater	r (prior to rece	iving water			
discharge) to provide the required re	moval efficiency of. 90 -	99.98%. preci	pitation.			
Sedimentation. Filtration Treat air emissions.						
Treat air emissions. Treat air emission to provide a typical removal efficiency of						
Treat all emission to provide a typical femoval efficiency of				>= 50 (%). Wet	scrubber for dust elimination of waste	
				gases		
Treat air emission to provide a typical removal efficiency of				>= 99 (%). Fabr	ic filter	
Control the emission of particles				, ISO 1400X, Ensure operatives are		
			trained to	minimise exposures. Handle in		
			accordance	ce 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				Complian	ce 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
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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 m ³ /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, 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

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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		

33.3.1. Environmental release and exposure Contributing scenario controlling environmental exposure (1): The industrial use of ZnSO4 orZnSO4formulations 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. cle	eaning)						
Indoor					Can be recy	rcled	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	Assessment method
Freshwater	mg/l	0.0034		0.0206	0.16	1	
Freshwater sediment	mg/kg dwt	45		117.8	0.19)	
Soil	mg/kg dwt	41		35.6	0.39	1	

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, 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/m ³	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

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 us	e	ES Ref.: GES	ZnSO4-7	Author: Soydan Yalçın
			: Worker	Date of issue: 25/04/2018
		Ve	rsion: 0.0	
Environment				
CS1	The Industrial and professional us	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.		, ERC8f
Worker				
CS2	Industrial and professional use of	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.		2, PROC3, PROC4, PROC7, PROC8b, 3
Processes, tasks, activities cover	This scenario cov process, the ZnSC following steps: • Reception/unpa • Production and/ • Final application Professional use	D4 containing preparation/mixtu	re is furthe	professional use. In the described er processed, involvingpotentially the or article
Assessment method	EUSES	EUSES		
	20			
34.2. Conditions of use af	Ŭ Â			
	al exposure: Contributing scenario contributing substrates containing up to 30%w/			Industrial and professionaluse of
ERC8c	ERC8c Widespread use leading to inclusion into/onto article (indoor)			
ERC8f Widespread use leading to inclus		/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 - 9		
Sedimentation. Filtration	r r	
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	t	
Size of the sewage treatment plant (STP)	2000 m ³ /d	
	Unless otherwise stated. Default	
Conditions and measures related to treatment of waste (incl	luding 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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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

$18000 \text{ m}^{3}/\text{d}$
Unless otherwise stated. Default

34.2.2. 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, PROC8b, PROC13)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled 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
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 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

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 at the 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 1		Release r	ate	Release esti		timation method
Water-based process							waste water from process. Recycle al as far as possible. water may be e. cleaning)
Industrial:Fertilizer					Indoor. Can be recycled. Waste treatment		
Indoor or outdoor use					Profession	al use	
Protection target	Unit	Exposu estimati		PNEC	RC	R	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 at the 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/m ³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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 us	se		ES Ref.: GES 2	ZnSO4-7	Author: Soydan Yalçın
			ES Type		Date of issue: 25/04/2018
			Ver	rsion: 0.0	
Environment					
CS1	Contributing scenario controlling en The Industrial and professional use polymerised substrates containing u			istes and	
Worker					
CS2	Contributing scenario co Industrial and professior polymerised substrates c	nal use of dis	spersions, pastes and	PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13	
proces follow • Reco • Proc • Fina		scenario covers both the industrial scale processes and professional use. In the described ss, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the ving steps: eption/unpacking of material duction and/or formulation/mixing of the end product or article al application, spraying, embedding ssional use			r processed, involvingpotentially the
Assessment method EUSE					
35.2. Conditions of use af	ffecting exposure				
35.2.1. Control of environmenta dispersions, pastes and polymer				e (1): The	Industrial and professionaluse of
ERC8c Widespread use leading to inclusion into/			nto article (indoor)		
ERC8f	Widespread use leading to inclu	usion into/or	nto article (outdoor)		
Assessment method	EUSES				
Product (article) characteristic	cs				
Physical form of product		Solid			
Concentration of substance in product		<= 30 %			
Amount used, frequency and d	duration of use (or from service	e life)			
		<= 50 T Professional. (typical)			
Annual amount per site		<= 500 T	. (gpicul)		
7nSO4 0/ in minture		Industrial <= 30			
ZnSO4,% in mixture Continuous		<= 30 Worst case assumption			
Continuous		worst case a	assumption		

Technical and organisational conditions and measures

		1	
Onsite wastewater treatment required. Treat onsite wastewater			
discharge) to provide the required removal efficiency of. 90 - 9	99.98%. precipitation.		
Sedimentation. Filtration	X X		
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	t		
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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
Waste Fraction	58 %
	Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current	
legislation	
Other conditions offecting environmental evacuum	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m ³ /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 processIndustrial useFertilizer,Wet formulationenclosed. Working areaIndoor or outdoor useProfessional 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 at the 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 rat	e		Release est	imation method
Water-based process							waste water from process. Recyclethe far as possible. water may be cleaning)
Industrial:Fertilizer						Indoor. Can be recycled. Waste treatment	
Indoor or outdoor use					Professional use		
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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 at the 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/m ³	<= 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 us	se			ZnSO4-7 : Worker rsion: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018	
Environment						
CS1	The Industrial and profe	essional use	vironmental exposure(1): of dispersions, pastes and p to 30% w/w of ZnSO4.	ERC8c	, ERC8f	
Worker						
CS2	Industrial and professio	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 cove	s scenario covers both the industrial scale processes and professional use. In the described cess, the ZnSO4 containing preparation/mixture is further processed, involvingpotentially the owing steps: eception/unpacking of material oduction and/or formulation/mixing of the end product or article nal application, spraying, embedding fessional use					
Assessment method	EUSES	5				
36.2. Conditions of use a	ffecting exposure					
36.2.1. Control of environmenta dispersions, pastes and polymer				(1): The	Industrial and professionaluse of	
ERC8c	Widespread use leading to inc	lusion into/o	nto article (indoor)			
ERC8f	Widespread use leading to inc	lusion into/o	nto article (outdoor)			
Assessment method	essment 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	Annual amount per site		<= 500 T Industrial			
ZnSO4,% in mixture						

Technical and organisational conditions and measures

Continuous

-		
Onsite wastewater treatment required. Treat onsite wastewater		
discharge) to provide the required removal efficiency of. 90 - 9	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
L.		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	t	
Size of the sewage treatment plant (STP)	2000 m ³ /d	
Unless otherwise stated. Default		
Conditions and measures related to treatment of waste (inc	luding article waste)	
Waste Fraction. Zinc. Produced	3.1 %	
(estimated value)		

Worst case assumption

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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
Waste Fraction	58 %
	Can be recycled. (estimated value). Professional
Recycle or dispose of in compliance with current	
legislation	
Other conditions offecting environmental exposure	

Other conditions affecting environmental exposure

Flow rate of receiving water at least:	18000 m ³ /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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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		

Professional use

Indoor or outdoor 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 at the 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						waste water from process. Recycle l as far as possible. water may be . cleaning)	
Industrial:Fertilizer					Indoor. Can be recycled. Waste treatment		
Indoor or outdoor use					Professional use		
Protection target	Unit	Exposu estimati		PNEC	RCI	R	Assessment method
Freshwater	mg/l	0.0039	0.0039		0.19		
Freshwater sediment	mg/kg dwt	101	101		0.43		
Sewage treatment plant	mg/l	0.014	0.014		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.

derivation of reeks, please forer to the edit.						
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/m ³	<= 0.2	MEASE			
Sum RCR - Long-term - systemic effects		<= 0.258				

	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 us	se		ES Ref.: GES		Author: Soydan Yalçın Date of issue: 25/04/2018
			ES Type: Worker Version: 0.0		Date of issue. 23/04/2018
Environment					
CS1	The Industrial and prof	vironmental exposure(1): of dispersions, pastes and p to 30%w/w of ZnSO4.	ERC8c	, ERC8f	
Worker					
CS2	Industrial and profession	onal use of di	orker exposure (2): The spersions, pastes and p to 30% w/w of ZnSO4.	PROC4	4, PROC8a
Processes, tasks, activities cover	This so proces follow • Rece • Prod • Final Profes	s, the ZnSO4 ing steps: ption/unpack uction and/or application, sional use		re is furth	l professional use. In the described er processed, involvingpotentially the or article
Assessment method	EUSE	S			
37.2. Conditions of use af	ffecting exposure				
	al exposure: Contributing scen				e Industrial and professionaluse of
ERC8c	RC8c Widespread use leading to inclusion into/onto article (indoor)				
ERC8f Widespread use leading to inclusion into/onto article (ou			nto article (outdoor)		
Assessment method EUSES					
Product (article) characteristic	cs				
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</td> 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 - 9	9.98%. 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	
Ĩ		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 %			
Waste code		(estimated value) See section 13 of the SDS			
Dispose of in accordance with relevant local		2008/98/EC, 2000/76/EC, 1999/31/EC			
regulations					
Waste Fraction		58 % Can be recycled. (estimated value). Profe	ssional		
Recycle or dispose of in compli	ance with current	Can be recycled. (estimated value). I fore	55101141		
legislation	• • • • • • • • •				
Other conditions affecting env	-	10000 2/1			
Flow rate of receiving water at	least:	18000 m ³ /d Unless otherwise stated. Default			
37.2.2. Control of worker expos pastes and polymerised substra	sure: Contributing scenario c ates containing up to 30%w/w	ontrolling worker exposure (2): The Inde of ZnSO4. (PROC4, PROC8a)	ustrial and professional use ofdispersions,		
PROC4	Chemical production where o	opportunity for exposure arises			
PROC8a	Transfer of substance or mixt	ture (charging and discharging) at non-dedi	cated facilities		
Droduct (article) characteristi					
Product (article) characteristi		Solid			
Physical form of product	no du ot				
Concentration of substance in p		<= 30 %			
Concentration of substance in p	roduct	Solution, Pastes			
Dustiness		Solid, low dustiness			
Amount used (or contained in	articles), frequency and dura	ation of use/exposure			
Annual site tonnage		50 t/yr			
Maximum daily site tennage		(typical). Professional. Industrial 0.15 T			
Maximum daily site tonnage Maximum daily site tonnage		0.15 T			
Waxiniuni dany site toiniage		End of shift			
Annual site tonnage		1 (estimated value). Professional	1 (estimated value). Professional		
Exposure duration		8 h/day End of shift. Worst case assumption			
Technical and organisational	conditions and measures	r			
Technical conditions and measu		prevent release	Do not allow product to spread into the		
Handle product within a closed	system Measures in case of d	ust release. Local exhaust ventilation.	environment. Outdoor use		
Measures to be taken in case of accidental spillage or accident					
contain spill Local exhaust ventilation - efficiency of at least			94		
Local exhaust ventilation - effic	ciency of at least		84 (%)		
Air cyclones for dust collection	. Efficiency of at least:		70		
	. 1 .		(%)		
Use a dust filter. Efficiency of a	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 rela	ted to personal protection. hv	giene and health evaluation	eterming of equipment, work and and cronning		
Protective clothing. Efficiency of			>= 90 %		
C J			Mandatory		
Protective gloves		- Descinctores construction	Avoid any direct contact with the product		
The product is stable at normal handling and storage condition equipment not absolutely necessary		s. Respiratory protection	If the occupational exposure limit is exceeded:Use recommended respiratory protection		
Use a dust filter. Half-mask. Efficiency of at least:			>= 75 %		
Use a dust filter. Half-mask. Efficiency of at least:			Filter type: P1 >= 90 %		
	-		Filter type: P2		
Use a dust filter. Half-mask. Ef	ficiency 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 at the 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.

Water-based process					Release to w	aste water from process. Recyclethe
						ar as possible. water may be
Industrial:Fertilizer					Indoor. Can	be recycled. Waste treatment
Indoor or outdoor use					Professional	use
Protection target Ur		xposuro stimatio		RCI	R I	Assessment method
Freshwater mg	g/l 0.	.0039	0.0206	0.19		
Freshwater sediment mg	g/kg dwt 10	01	117.8	0.43		
Sewage treatment plant mg	g/l 0.	.014	0.1	0.13		
Soil mg	g/kg dwt 4	1	35.6	0.39		
7.3.2. Worker exposure Contrib olymerised substrates containin Information for contributing ex	g up to 30%w/w of Z			dustrial and p	rofessional us	e of dispersions,pastes and

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), 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/m ³	<= 0.2	MEASE			
Sum RCR - Long-term - systemic effects		<= 0.258				

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				ZnSO4-7 e: Worker ersion: 0.0	Author: Soydan Yalçın Date of issue: 25/04/2018
Environment					
CS1	The Industrial and profe	Contributing scenario controlling environ The Industrial and professional use of dis polymerised substrates containing up to 3		ERC8c, ERC	8f
Worker					
CS2	Industrial and profession	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.			DC8a
Processes, tasks, activities cover	This sc process followi • Recep • Produ • Final Profess	s, the ZnSO4 ng steps: ption/unpack action and/or application, ional use	rs both the industrial scale pro d containing preparation/mixtu king of material r formulation/mixing of the en spraying, embedding	re is further proc	cessed, involvingpotentially the
Assessment method EUSES					
38.2. Conditions of use al	ffecting exposure				
38.2.1. Control of environmenta dispersions, pastes and polymer	al exposure: Contributing scen				strial and professionaluse of
ERC8c	Widespread use leading to incl	lusion into/o	nto article (indoor)		
ERC8f	Widespread use leading to incl	nto article (outdoor)			
Assessment method EUSES					
Product (article) characteristic	cs				
Physical form of product Solid		Solid			
Concentration of substance in product <= 30 %					
Amount used, frequency and d	duration of use (or from servic	e 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 westewater treatment required. Treat engite westewater	(miner to receiving water	1		
Onsite wastewater treatment required. Treat onsite wastewater				
discharge) to provide the required removal efficiency of. 90 - 9	9.98%. 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	t			
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 %			
Waste code		(estimated value) See section 13 of the SDS			
Dispose of in accordance with 1	relevant local	2008/98/EC, 2000/76/EC, 1999/31/EC			
regulations					
Waste Fraction		58 % Can be recycled. (estimated value). Profe	scional		
Recycle or dispose of in compli	iance with current	Can be recycled. (estimated value). Flore	SSIOIR		
Other conditions affecting en	vironmontal ovnosuro				
Flow rate of receiving water at	-	18000 m ³ /d			
Flow fate of fecerving water at	icast.	Unless otherwise stated. Default			
	ates containing up to 30%w/w	of ZnSO4. (PROC4, PROC8a)	ustrial and professional use ofdispersions,		
PROC4	Chemical production where o	pportunity for exposure arises			
PROC8a	Transfer of substance or mixt	ure (charging and discharging) at non-dedi	cated facilities		
Product (article) characteristi	ics				
Physical form of product		Solid			
Concentration of substance in p	roduct	<= 30 %			
Concentration of substance in p		Solution, Pastes			
Dustiness	ilouuci	Solid, low dustiness			
		,			
Amount used (or contained in	articles), frequency and dura	tion of use/exposure			
Annual site tonnage		50 t/yr			
Maximum daily site tonnage		(typical). Professional. Industrial 0.15 T			
Maximum daily site tonnage		0.05 T			
		End of shift			
Annual site tonnage		l (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 c Measures to be taken in case of accidental spillage or accident					
contain spill					
Local exhaust ventilation - effic	ciency of at least		84 (%)		
Air cyclones for dust collection	. Efficiency of at least:		70		
			(%)		
Use a dust filter. Efficiency of a	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 rela	ted to personal protection. hv	giene and health evaluation			
Protective clothing. Efficiency		6	>= 90 %		
Protective gloves			Mandatory Avoid any direct contact with the product		
The product is stable at normal	handling and storage condition	s. Respiratory protection	If the occupational exposure limit is exceeded:Use		
equipment not absolutely neces	sary		recommended respiratory protection		
Use a dust filter. Half-mask. Ef	ficiency 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 %		
Use a dust filter. Full face mask	x. Efficiency of at least:		Filter type: P3 >= 75 % Eiker type: P1		
Use a dust filter. Full face mask	c. Efficiency of at least:		Filter type: P1 >= 90 %		
Use a dust filter. Full face mask	x. Efficiency of at least:		Filter type: P2 >= 97.5 %		
Safety glasses			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 at the 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			rate		Release estimation method
Water-based process					Release to waste water from process. Recycleth 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	RCI	R 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)

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/m ³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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 us	ie	ES Ref.: GES ES Typ	ZnSO4-7 e: Worker	Author: Soydan Yalçın Date of issue: 25/04/2018
		Ve	ersion: 0.0	
Environment				
CS1	Contributing scenario controlling en The Industrial and professional use polymerised substrates containing u	of dispersions, pastes and	ERC8a, ER	C8d
Worker				
CS2	Contributing scenario controlling we Industrial and professional use of di polymerised substrates containing u	spersions, pastes and	PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15	
Processes, tasks, activities cover	This scenario cover process, the ZnSO4 following steps: • Reception/unpack • Production and/or		re is further pro	ocessed, involvingpotentially the
Assessment method EUSES				
39.2. Conditions of use af	fecting exposure			
	l exposure: Contributing scenario control ised substrates containing up to 30%w/w			ustrial and professionaluse of
ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor))
ED C0 1				

Product (article) shows at arising		
Assessment method	EUSES	
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)	
	I G C C C C C C C C C C C C C C C C C C	

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				
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 (incl				
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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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: 1800 Unle	
---	--

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

Professional use

Indoor or outdoor 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 at the 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	route Release rate			Release estimation method			
Water-based process			Release to waste water from process. the material as far as possible. water r created (i.e. cleaning)		al as far as possible. water may be		
Industrial:Fertilizer					Indoor. Can be recycled. Waste treatment		
Indoor or outdoor use					Profession	al use	
Protection target	Unit	Exposure estimation		PNEC	RCI	R	Assessment method
Freshwater	mg/l	0.0039	0.0039		0.19		
Freshwater sediment	mg/kg dwt	101	101		0.43		
Sewage treatment plant	mg/l	0.014	0.014		0.13		
Soil	mg/kg dwt	41	41		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.

derivation of receive refer to the contra				
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/m ³	<= 0.2	MEASE	
Sum RCR - Long-term - systemic effects		<= 0.258		

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		Author: Soydan Yalçın
			ES 1	Гуре: Worker	Date of issue: 25/04/2018
				Version: 0.0	
Environment					
CS1	Wide dispersiv	ve use (Zn)		ERC8a,	ERC8d
Processes, tasks, activities covered		Wide dispersive us	e (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-react	ive processing aid (no inclusion into or onto article, outdoor)		
Product (article) characteristic	cs			
Physical form of product		Solid		
Concentration of substance in pr	roduct	<= 100 %		
Concentration of substance in pr	roduct	Variable		
Amount used, frequency and d	luration of use (or from serv	ice life)		
Not relevant	Not relevant Sewage treatment plant. measured data			
Wide dispersive use		365 days/yr		
Conditions and measures relat	ted to sewage treatment plan	t		
Municipal sewage treatment plant is assumed.				
Estimated substance removal from wastewater via municipal sewage treatment		80 %		
Size of the sewage treatment plant (STP)		2000 m ³ /d EUSES. Default		
Other conditions affecting environmental exposure				
Local freshwater dilution factor:		10		

Local freshwater dilution factor:

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 esti	mation method
Indoor or outdoor use						Consumer products ending up ain after use. No intended release	
Protection target	Unit	Exposu estimati		PNEC	RCH	ł	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 us	se		ES Ref.: GES	ZnSO4-7	Author: Soydan Yalçın	
			ES Type: Worker		Date of issue: 25/04/2018	
			Ve	ersion: 0.0		
Environment				· · ·		
CS1	Contributing segmenia agr	nteolling on	vincemental even cours(1).	ERC8b		
CSI	Contributing scenario cor The Industrial and profes	ntrolling en sional use o	of dispersions pastes and	EKC80		
	polymerised substrates co					
	r J	5.				
Worker						
CS2	Contributing scenario con	ntrolling we	orker exposure (2). The	PROC5, PROC8a, PROC8b, PROC9,		
652	Industrial and professiona			PROC11		
	polymerised substrates co					
Processes, tasks, activities cove	ered CS1					
Flocesses, tasks, activities cove		nario cover	s both the industrial scale pro	cesses and pr	ofessional use. In the described	
					processed, involvingpotentially the	
	followin			1		
	• Recept	tion/unpack	ing of material			
			formulation/mixing of the en	d product or a	article	
			spraying, embedding			
	Professio	onal use				
Assessment method	EUSES					
41.2. Conditions of use a	ffecting exposure					
41.2.1. Control of environment	al exposure: Contributing scena	rio control	lling environmental exposur	e (1): The In	dustrial and professionaluse of	
dispersions, pastes and polyme	rised substrates containing up to	o 30%w/w	of ZnSO4. (ERC8b)			
ERC8b	Widespread use of reactive proc	cessing aid	(no inclusion into or onto artic	cle, indoor)		
Assessment method	EUSES	-				
Due de et (entiele) et eur et eriet	 •					
Product (article) characteristi		7 1.1				
Physical form of product		Solid				
Concentration of substance in p	oroduct <	<= 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 Continuous		<= 30 Worst case assumption				
		noisi case assumption				
Technical and organisational	conditions and measures					
	quired. Treat onsite wastewater (pr					
	red removal efficiency of. 90 - 99.9	98%. precip	bitation.			
Sedimentation. Filtration				Eve	astimation	
Additional information Treat air emissions.				Exposure Wet scrub	ber for dust elimination of waste	
ricat an ennissions.				gases	ber for dust eminimation of waste	
Control the emission of particle	es			U	eratives are trained to minimise	
					Handle in accordance with good	

Treat air emissions.

SEVESO 2

Compliance with applicable regulations Conditions and measures related to sewage treatment plant 2000 m³/d Unless otherwise stated. Default Size of the sewage treatment plant (STP) Conditions and measures related to treatment of waste (including article waste) Waste Fraction. Zinc. Produced 3.1 % (estimated value)

industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing Ensure all national/local regulations are

observed.

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	If the occupational exposure limit is exceeded:
equipment not absolutely necessary	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 at the 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. Car	be recycled. Waste treatment	
Indoor or outdoor use				Professional use			
Protection target	Unit	Exposure estimation		PNEC	RCI	R	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 at the 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/m ³	<= 0.2	MEASE
Sum RCR - Long-term - systemic effects		<= 0.258	

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		Author: Soydan Yalçın
			ES Type: Worker		Date of issue: 25/04/2018
			Versi	ion: 0.0	
Environment					
CS1	Wide dispersive use (Zn)			ERC8b	
Processes, tasks, activities covered	Wide dispe	rsive use (Zn)			
	Professiona	l 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	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 serv	rice life)		
Not relevant	Sewage treatment plant. measured data		
Wide dispersive use	365 days/yr		
Conditions and measures related to sewage treatment plan	ıt		
Municipal sewage treatment plant is assumed.			
Estimated substance removal from wastewater via municipal sewage treatment	80 %		
Size of the sewage treatment plant (STP)	2000 m ³ /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						Consumer products ending up ain after use. No intended release	
Protection target	Unit	Exposu estimati		PNEC	RCF	Ł	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	е		ES Ref.: GES ZnSO4-7 ES Type: Worker		Author: Soydan Yalçın Date of issue: 25/04/2018	
			V	ersion: 0.0		
Environment						
CS1	Contributing scenario con	ntrolling en	vironmental exposure(1):	ERC8e		
			of dispersions, pastes and			
	polymerised substrates co	ontaining u	p to 30% w/w of ZnSO4.			
Worker						
CS2	Contributing soonario oo	ntrolling w	orker exposure (2). The	DPOC5 DPOC		
C32	Contributing scenario con Industrial and profession			PROC5, PROC	Loa, PROCII	
	polymerised substrates co	ontaining u	p to 30% w/w of ZnSO4.			
Processes, tasks, activities covered	ed CS1					
· · · · · · · · · · · · · · · · · · ·	This sce		s both the industrial scale pro			
			containing preparation/mixtu	are is further proce	essed, involvingpotentially the	
	followin • Recent		ing of material			
	Produce	ction and/or	formulation/mixing of the en	d product or articl	le	
			spraying, embedding	•		
	Professio	onal use	nal use			
Assessment method	EUSES					
43.2. Conditions of use aff	fecting exposure					
43.2.1. Control of environmental dispersions, pastes and polymeri				re (1): The Indust	trial and professionaluse of	
ERC8e	Widespread use of reactive proc			cle, outdoor)		
Assessment method	EUSES	0	`	. ,		
Product (article) characteristics	s					
		0_1:J				
Physical form of product		Solid				
Concentration of substance in pro	oduct <	<= 30 %				
Amount used, frequency and du	uration of use (or from service	life)				
Annual amount per site		<= 50 T				
A		Professional. (typical)				
Annual amount per site		<= 500 T Industrial				
ZnSO4,% in mixture		<= 30				
Continuous Worst case assumption			assumption			
Technical and organisational co	onditions and measures					
Onsite wastewater treatment requ		rior to rece	iving water			
discharge) to provide the required						
Sedimentation. Filtration Additional information				Exposure actin	aation	
Treat air emissions.				Exposure estin	for dust elimination of waste	
from an emissions.				gases	or dust eminiation of waste	
Control the emission of particles					ves are trained to minimise	
				exposures Har	ndle in accordance with good	
					ene and safety practice. Regular	

Treat air emissions.

SEVESO 2

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)			

Ensure all national/local regulations are observed. Compliance with applicable regulations

Waste Fraction. Zn and compou	inds	0.056 % (estimated value)					
Waste Fraction. Downstream user		0.3 %					
Waste code		(estimated value)	See section 13 of the SDS				
Dispose of in accordance with r	elevant local	2008/98/EC, 2000/76/EC, 1999/31/EC					
regulations Waste Fraction		58 %					
		Can be recycled. (estimated value). Profe	essional				
Recycle or dispose of in compli legislation	ance with current						
Other conditions affecting env	vironmental exposure						
Flow rate of receiving water at 1	least:	18000 m ³ /d Unless otherwise stated. Default					
43.2.2. Control of worker expos pastes and polymerised substra	sure: Contributing scenario c tes containing up to 30%w/w	ontrolling worker exposure (2): The Ind of ZnSO4. (PROC5, PROC8a, PROC1	lustrial and professional use ofdispersions, 1)				
PROC5	Mixing or blending in batch						
PROC8a		ture (charging and discharging) at non-ded	icated facilities				
PROC11	Non industrial spraying	, , , , , , , , , , , , , , , , , , ,					
Product (article) characteristi	cs						
Physical form of product		Solid					
Concentration of substance in p	roduct	<= 30 %					
Concentration of substance in pa	roduct	Solution, Pastes					
Dustiness		Solid, low dustiness					
Amount used (or contained in	articles), frequency and dura	ation 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 measu	res at process level (source) to	prevent release	Do not allow product to spread into the environment. Outdoor use				
Handle product within a closed Measures to be taken in case of contain spill		ust release. Local exhaust ventilation. al leakage. Dike and					
Local exhaust ventilation - effic	eiency of at least		84				
Air cyclones for dust collection.	. Efficiency of at least:		(%) 70				
Use a dust filter. Efficiency of a	t least:		(%) 50				
			(%)				
Ensure operatives are trained to	minimise exposures		Keep good industrial hygiene. Regular cleaning of equipment, work area and clothing				
Conditions and measures rela	ted to personal protection, hy	giene and health evaluation					
Protective clothing. Efficiency of	of at least:		>= 90 % Mandatory				
Protective gloves			Avoid any direct contact with the product				
The product is stable at normal equipment not absolutely necess		s. Respiratory protection	If the occupational exposure limit is exceeded:Use recommended respiratory protection				
Use a dust filter. Half-mask. Eff			>= 75 %				
Use a dust filter. Half-mask. Eff	ficiency of at least:		Filter type: P1 >= 90 % Filter type: P2				
Use a dust filter. Half-mask. Eff	ficiency of at least:		Filter type: P2 >= 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 %				
L	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 at the 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 est	imation method
Water-based process						material as	vaste water from process. Recyclethe far as possible. water may be
						created (i.e.	5
Industrial:Fertilizer			Indoor. Can be recycled. Waste t		be recycled. Waste treatment		
Indoor or outdoor use					Professiona	l use	
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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 at the 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.

, r, r, r, r, r, r						
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/m ³	<= 0.2	MEASE			
Sum RCR - Long-term - systemic effects		<= 0.258				

43.4.1. Environment	onment		4.1	3.4	4
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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		nSO4-8	Author: Soydan Yalçın	
			ES Type: Worker		Date of issue: 25/04/2018		
				Vers	ion: 0.0		
Environment							
CS1	Wide dispersive u	ise (Zn)			ERC8e		
Processes, tasks, activities covered	V	Wide dispersive use	e (Zn)				
	F	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	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 se	rvice life)				
Not relevant	Sewage treatment plant. measured data				
Wide dispersive use	365 days/yr				
Conditions and measures related to sewage treatment pla	int				
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						Consumer products ending up rain after use. No intended release	
Protection target	Unit	Exposu estimati		PNEC	RCR	2	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		Author: Soydan Yalçın	
		ES Type: Worker		Date of issue: 25/04/2018	
		Vers	sion: 0.0		
Environment					
CS1	Contributing scenario controlling en The Industrial and professional use polymerised substrates containing u	of dispersions, pastes and	ERC1, ERC8a, ERC8b, ERC8d, ERC8e		
Worker					
CS2	Contributing scenario controlling w Industrial and professional use of di polymerised substrates containing u	spersions, pastes and	PROC8a, PROC19		
Processes, tasks, activities covered		e is furthe	professional use. In the described er processed, involvingpotentially the or article		
	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 - 9	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		

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	2008/98/EC, 2000/76/EC, 1999/31/EC	
regulations		
Waste Fraction	58 %	
	Can be recycled. (estimated value). Professional	
Recycle or dispose of in compliance with current		
legislation		

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

	r exposure: Contributing scenario controlling worker exposure (2): The Industrial and professional use of dispersions, pastes and 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	
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

$\label{eq:constrained} \mbox{Amount used (or contained in articles), frequency and duration of use/exposure}$

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

$\label{eq:conditions} \mbox{ Conditions and measures related to personal protection, hygiene and health evaluation}$

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 at the 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 est	imation method
Water-based process							waste water from process. Recyclethe far as possible. water may be cleaning)
Industrial:Fertilizer	dustrial:Fertilizer Indoor. Can be recycled. W		be recycled. Waste treatment				
Indoor or outdoor use						Professiona	l use
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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 at the 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/m ³	<= 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.: GI	ES ZnSO4-8	Author: Soydan Yalçın
			ES Type: Worker		Date of issue: 25/04/2018
				Version: 0.0	
Environment					
CS1	Wide dispersiv	ve use (Zn)		ERC1,	ERC8a, ERC8b, ERC8d, ERC8e
Processes, tasks, activities covered Wide dis		Wide dispersive us	e (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)

Conditions and measures valated to sources tweetment plant					
Wide dispersive use 365 days/yr					
Not relevant Sewage treatment plant. measured data					

Continuous and measures related to sewage deatment 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 m ³ /d EUSES. Default			

Other conditions affecting environmental exposure

Local freshwater dilution factor:

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)	46.3.1.	Environmental	release and exposure	Wide dispersive	e use (Zn) (ERC1	, ERC8a, ERC8b	, ERC8d, ERC8e)
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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							Consumer products ending up down er use. No intended release
Protection target	Unit	Exposu estimati		PNEC	RCF	Ł	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: Professiona	l use			E	ES Ref.: GES Z ES Type: Ver		Author: Soydan Yalçın Date of issue: 25/04/2018
Environment							
CS1	Wide di	spersive use (Zn)				ERC8a, E	RC8c
Processes, tasks, activities co	overed	Wide disp Profession	ersive use (1al use	Zn)			
47.2. Conditions of use	affecting expos	sure					
47.2.1. Control of environme	ental exposure: Wie	de dispersive use ((Zn) (ERC	Ba, ERC8c)			
ERC8a	Widespread us	e of non-reactive p	rocessing a	id (no inclusion	into or onto	article, indo	or)
ERC8c	Widespread us	e leading to inclusi	on into/onte	o article (indoor)			
Product (article) character	istics						
Physical form of product		So	lid				
Concentration of substance i	n product	<=	= 100 %				
Concentration of substance i	-	Va	riable				
Amount used, frequency an	d duration of use ((or from service li	fe)				
Not relevant				nent plant. measu	ured data		
Wide dispersive use			5 days/yr				
Conditions and measures r	elated to sewage tr	eatment plant					
Municipal sewage treatment	plant is assumed.						
Estimated substance remova municipal sewage treatment	from wastewater v	ia 80	%				
Size of the sewage treatment plant (STP)			00 m³/d JSES. Defa	ult			
Other conditions affecting	environmental exp	osure					
Local freshwater dilution fac	-	10	1				
72 Emponyo ostimo	tion and notano	naa ta ita aann	20				
7.3. Exposure estima	tion and refere	nce to its source	ce				
7.3.1. Environmental relea Information for contributi			e (Zn) (ERG	C8a, ERC8c)			
	•		nd operatio	nal conditions ((OCs) are o	bserved ex	posure of workers and indirect human
							ion ratios are expected to be less than
This information is based or compilation (cfr Revision da						, as far as t	he information is available at the time of
Release route		Re	Release rate			Release estimation method	
Indoor or outdoor use							y. Consumer products ending up drain after use. No intended release
Protection target	Unit	Exposure estimation		PNEC	RCF		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		

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	Author: Soydan Yalçın
			ES Type	e: Worker	Date of issue: 25/04/2018
			Ve	ersion: 0.0	
Environment					
CS1	Wide dispersi	Wide dispersive use (Zn)		ERC8c, EF	RC8f
Processes, tasks, activities covered		Wide dispersive use	e (Zn)		
		Professional use			
		•			
48.2. Conditions of use affecting	ng exposure				

48.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8c, ERC8f)			
ERC8c	Widespread use leading to in	clusion into/onto article (indoor)	
ERC8f	Widespread use leading to in	clusion into/onto article (outdoor)	
Product (article) characteristi	cs		
Physical form of product		Solid	
Concentration of substance in p	roduct	<= 100 %	
Concentration of substance in p	roduct	Variable	
Amount used, frequency and	duration of use (or from servi	ice 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 pla	Municipal sewage treatment plant is assumed.		
Estimated substance removal from wastewater via municipal sewage treatment		80 %	
Size of the sewage treatment plant (STP)		2000 m ³ /d	
		EUSES. Default	
Other conditions affecting environmental exposure			

Local freshwater dilution factor:

ocal neshwater dilution factor.

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 esti	mation method
Indoor or outdoor use					Consumer products ending up ain after use. No intended release		
Protection target	Unit	Exposu estimati		PNEC	RCF	Ł	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

10

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		Author: Soydan Yalçın
				Date of issue: 25/04/2018
		Ver	sion: 0.0	
Environment				
CS1	Contributing scenario controlling environmental exposure (1): The Industrial and professional use of solid substrates containing less than 25% w/w of ZnSO4.		ERC80	, 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.			5, PROC6, PROC8b, PROC9, 10, PROC13, PROC19, PROC26
process, the ZnSO4 following steps: • Reception/unpack		4 containing preparation/mixtu	re is furth	l professional use. In the described er processed, involvingpotentially the end product or article.
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 discharge) to provide the required removal efficiency of . 90 - 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 plan	t	
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)
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 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	
Other conductions are complexible exposure	
Exposed skin surface assumed:face	
Exposed skin surface assumed:face	

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 recy	cled		
Protection target	Unit	Exposu estimati		PNEC	RCI	R	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:

40.4.4 E

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), 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/m ³	<= 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 Z	InSO4-6	Author: Soydan Yalçın
			ES Type:	: Worker	Date of issue: 25/04/2018
			Ver	sion: 0.0	
Environment					
CS1	Contributing scenario controlling environmental exposure (1): The Industrial and professional use of solid substrates containing less than 25% w/w of ZnSO4.			ERC80	;, 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.				4, PROC5, PROC6, PROC8b, PROC9, 10, PROC13, PROC19, PROC26
Processes, tasks, activities covered	process, the ZnS following steps: • Reception/unp	SO4 : pack ion,	containing preparation/mixtu	re is furth	I professional use. In the described er processed, involvingpotentially the nd product or article.
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 discharge) to provide the required removal efficiency of. 90 - 9 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 plan	t	
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 %
waster ration	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 m ³ /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

$\label{eq:constant} \textbf{Amount used (or contained in articles), frequency and duration of use/exposure}$

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 rat	e		Release est	imation method	
Dry processes						water may l	be created (i.e. cleaning)
Indoor					Can be recycled		
Protection target	Unit	Exposur estimati		PNEC	RCI	R	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 substrates containing 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 at the 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/m ³	<= 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

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.: G	ES ZnSO4-8	Author: Soydan Yalçın
			ES T	ype: Worker	Date of issue: 25/04/2018
				Version: 0.0	
Environment					
CS1	Wide dispersiv	ve use (Zn)		ERC8a	a, ERC8c, ERC8d, ERC8f
Processes, tasks, activities covered		Wide dispersive us	e (Zn)		
		Professional use			
51.2 Conditions of use affectiv					

51.2.1. Control of environmental exposure: Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)						
ERC8a	Widespread use of non-react	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)				
ERC8c	Widespread use leading to in	clusion into/onto article (indoor)				
ERC8d	Widespread use of non-react	ive processing aid (no inclusion into or onto article, outdoor)				
ERC8f	Widespread use leading to in	clusion into/onto article (outdoor)				
Product (article) characterist	ics					
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 rela	ited to sewage treatment plan	t				
Municipal sewage treatment plant is assumed.						
Estimated substance removal from wastewater via municipal sewage treatment		80 %				
Size of the sewage treatment plant (STP)		2000 m ³ /d				
EUSES. Default Other conditions affecting environmental exposure						

Other conditions affecting environmental exposu

Local freshwater dilution factor:

51.3. Exposure estimation and reference to its source

51.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8c, ERC8d, ERC8f)

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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 est	imation method	
Indoor or outdoor use			Probability. down the di	Consumer products ending up rain after use. No intended release			
Protection target	Unit	Exposu estimati		PNEC	RCF	ł	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

Guidance - Environment No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system- evaluation-substances	Guidance - Environment	

Guidance - H	ealth
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52. GES ZnSO4-6: PW-15: Professional use

2.1. Title section		ES Ref.: GES Zr	nSO4-6	Author: Soydan Yalçın
PW-15: Professional use		ES Type: Worker Version: 0.0		Date of issue: 25/04/2018
Environment				
CS1	Contributing scenario controlling er The Industrial and professional use containing less than 25% w/w of ZnS	of solid substrates	ERC8a, ERC	8b, 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.			C2, PROC8a, PROC8b, C10, PROC13
Processes, tasks, activities covered	process, the ZnSO4 following steps: • Reception/unpack	This scenario covers both the industrial scale processes and professional use. In the descrit process, the ZnSO4 containing preparation/mixture is further processed, involvingpotentia		essed, involvingpotentially the
	Professional use	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 massures role	ted to cowage treatment	nlont			
Conditions and measures related to sewage treatment Size of the sewage treatment plant (STP)		plant 2000 m ³ /d			
Size of the sewage treatment pr		Unless otherwise stated. Default			
Conditions and measures rela	ted to treatment of waste (in	cluding article waste)			
Waste Fraction. Zinc. Produced		3.1 % (estimated value)			
Waste Fraction. Zn and compose	unds	0.056 %	0.056 %		
Waste Fraction. Downstream us		(estimated value) 0.3 %			
waste Fraction. Downstream us	ser	0.3 % (estimated value)			
Waste code	1 (1 1	See section 13 of the SDS	See section 13 of the SDS		
Dispose of in accordance with regulations	elevant local	2008/98/EC, 2000/76/EC, 1999/31/EC			
Waste Fraction		58 % Can be recycled. (estimated value)			
Water-based process. Recycle of	or dispose of in compliance	Can be recycled. (estimated value)			
with current legislation. Recycl	ing is				
preferred to disposal or incinera Other conditions affecting en					
Flow rate of receiving water at	•	18000 m ³ /d			
1.6., fute of feeerving water at		Unless otherwise stated. Default			
			ustrial and professional use of solidsubstrates		
		PROC8a, PROC8b, PROC9, PROC10, P			
PROC1	Chemical production or refi containment conditions	nery in closed process without likelihood of	exposure or processes with equivalent		
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with 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		xture into small containers (dedicated filling	line, including weighing)		
PROC10	Roller application or brushi				
PROC13 Treatment of articles by dipping and pouring					
Product (article) characteristi	cs				
Physical form of product		Solid			
Concentration of substance in p Concentration of substance in p		< 25 %	et to 25 %		
Dustiness	roduct	Limit the substance content in the product to 25 % Solid, low dustiness, Worst case assumption, Solid, medium dustiness			
Amount used (or contained in Maximum daily site tonnage	articles), frequency and du	0.15 T			
Maximum daily site tonnage		0.05 T			
Annual site tonnage		End of shift 50 t/yr			
Exposure duration		(typical). Professional. Industrial 8 h/day			
Exposure duration		End of shift. Worst case assumption			
Technical and organisational					
-	•	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 rela	ted to personal protection, h	ygiene 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 and professional use of solid substrates containing less than 25% w/w of ZnSO4. (ERC8a, ERC8b, ERC8b, 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 PNEC estimation		PNEC	RCI	R	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/m ³	<= 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

Guidance - Environment No additional information available.			
52.4.2. Health			
Guidance - Health	No additional information available.		

53. GES ZnSO4-7: PW-15: Professional use

PW-15: Professional use ES Ref.: GES ZnSQ4-7 ES Type: Worker Author: Soydan Yalçın Date of issue: 25/04/2018 Environment Versior: 0.0 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 ZnSQ4. ERC8a, ERC8b, ERC8c, ERC8d Worker E 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 ZnSQ4. 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 ZnSQ4 containing preparation/mixture is further processed, involvingpotentially the following steps: • Reception/upacking of material • Production and/or formulation/mixing of the end product or article • Final application, spraying, embedding Professional use Final application, spraying, embedding Professional use	53.1. Title section				
Environment 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	PW-15: Professional use		ES Ref.: GES Z	nSO4-7	Author: Soydan Yalçın
Environment			ES Type:	Worker	Date of issue: 25/04/2018
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 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 Final application, spraying, embedding			Vers	sion: 0.0	
The Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30% w/w of ZnSO4. No. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10	Environment				
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 	CS1	The Industrial and professional use of dispersions, pastes and		ERC8a	, ERC8b, ERC8c, ERC8d
Industrial and professional use of dispersions, pastes and polymerised substrates containing up to 30% w/w of ZnSO4. 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	Worker				
 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 	CS2	Industrial and professional use of dispersions, pastes and			
	Processes, tasks, activities covered	This scenario cove process, the ZnSO following steps: • Reception/unpac • Production and/c • Final application	ZnSO4 containing preparation/mixture is further processed, involvingpotentially the eps: /unpacking of material and/or formulation/mixing of the end product or article cation, spraying, embedding		r processed, involvingpotentially the
Assessment method EUSES	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) $% \label{eq:life} \begin{tabular}{ll} \end{tabular} \end{tabular} \begin{tabular}{ll} \end{tabular} \end{tabular} \begin{tabular}{ll} \end{tabular} \end{tabular} \end{tabular} \begin{tabular}{ll} \end{tabular} \end{tabular} \end{tabular} \begin{tabular}{ll} \end{tabular} \end{tabular} \end{tabular} \end{tabular} \begin{tabular}{ll} \end{tabular} \end{tabular} \end{tabular} \end{tabular} \begin{tabular}{ll} \end{tabular} \end{tabular} \end{tabular} \end{tabular} \end{tabular} \end{tabular} \begin{tabular}{ll} \end{tabular} \end{tab$

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	2008/98/EC, 2000/76/EC, 1999/31/EC
regulations	
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 processes with 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	If the occupational exposure limit is exceeded:Use
equipment not absolutely necessary	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 at the 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 est	imation method
Water-based process							waste water from process. Recyclethe far as possible. water may be . cleaning)
Industrial:Fertilizer						Indoor. Car	n be recycled. Waste treatment
Indoor or outdoor use					Professiona	ıl use	
Protection target	Unit	Exposu estimati		PNEC	RCI	ł	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 at the 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/m ³	<= 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

Guidance - Environment	No additional information available.
242 Haalth	

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		ZnSO4-8	Author: Soydan Yalçın
				ES Type: Worker		Date of issue: 25/04/2018
				Ver	sion: 0.0	
Environment						
CS1	Wide dispersiv	ve use (Zn)			ERC8a	, ERC8b, ERC8c, ERC8d
Processes, tasks, activities covered		Wide dispersive us	e (Zn)			
		Professional use				

54.2. Conditions of use affecting exposure

54.2.1. Control of environmenta	al exposure: Wide dispersive	use (Zn) (ERC8a, ERC8b, ERC8c, ERC8d)				
ERC8a	Widespread use of non-react	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)				
ERC8b	Widespread use of reactive p	processing aid (no inclusion into or onto article, indoor)				
ERC8c	Widespread use leading to ir	aclusion into/onto article (indoor)				
ERC8d	Widespread use of non-react	ive processing aid (no inclusion into or onto article, outdoor)				
Product (article) characteristi	cs					
Physical form of product		Solid				
Concentration of substance in pr	roduct	<= 100 %				
Concentration of substance in product		Variable				
Amount used, frequency and o	duration of use (or from serv	ice life)				
Not relevant		Sewage treatment plant. measured data				
Wide dispersive use		365 days/yr				
Conditions and measures rela	ted to sewage treatment plan	t				
Municipal sewage treatment pla	nt is assumed.					
Estimated substance removal from wastewater via municipal sewage treatment		80 %				
Size of the sewage treatment pla	ant (STP)	2000 m ³ /d EUSES. Default				
Other conditions affecting environmental exposure						

Local freshwater dilution factor:

54.3. Exposure estimation and reference to its source

54.3.1. Environmental release and exposure Wide dispersive use (Zn) (ERC8a, ERC8b, ERC8c, ERC8d)

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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 est	imation method
Indoor or outdoor use					Probability. Consumer products ending up down the drain after use. No intended release		
Protection target	Unit	Exposu estimati		PNEC	RCF	ł	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

Guidance - Environment	No additional information available. https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-
	evaluation-substances

Guidance - H	ealth
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55.1. Title section									
C-1: Consumer use				ES Ref.: GES Zr	ES Ref.: GES ZnSO4-8				
				ES Type: C		Date of issue: 25/04/2018			
				Ve	rsion: 0.0				
Environment									
CS1		Wide dispersiv	ve use (Zn)		ERC8a, ERC8c	, ERC8d, ERC8f			
Processes, tasks, activities co	vered		Wide dispersive	use (Zn)	1				
			Consumer use						
55.2 Com 1 '4' and a famous	- 66 4*								
55.2. Conditions of use		<u> </u>							
		-		ERC8a, ERC8c, ERC8d, ERC8	·				
ERC8a		-	-	ing aid (no inclusion into or onto	article, indoor)				
ERC8c		1	8	o/onto article (indoor)					
ERC8d			-	ing aid (no inclusion into or onto	article, outdoor)				
ERC8f	Wid	espread use leadi	ng to inclusion into	o/onto article (outdoor)					
Product (article) characteri	stics								
Physical form of product			Solid	Solid					
Concentration of substance in	product		<= 100 %	<= 100 %					
Concentration of substance in	product		Variable	Variable					
Amount used, frequency an	d durati	on of use (or fro	m service life)						
Annual site tonnage: ,Not rele	evant		0	Sewage treatment plant. measured data					
Wide dispersive use			365 days	365 days/yr					
Other conditions affecting e	nvironn	ental exposure							
Local freshwater dilution factor:10			10						
55.3. Exposure estimat	ion and	d reference t	o its source						
•				(ERC8a, ERC8c, ERC8d, ERC	8f)				
Information for contributin		•		(21100m) 211000, 21100m, 2110					
	•		(RMMs) and one	erational conditions (OCs) are	observed exposur	e of workers and indirect human			
						tios are expected to be less than			

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 esti	mation method
Indoor or outdoor use							Consumer products ending up down er use. No intended release
Protection target	Unit	Exposu estimati		PNEC	RCF	Ł	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

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 dispersi	ive use (Z	(n)			ERC8a			
Processes, tasks, activities covered Wide d			dispersive use	e (Zn)						
Consu			mer use							
			1							
56.2. Conditions of use										
56.2.1. Control of environme	-		-							
ERC8a	Wides	spread use of n	ion-reacti	ve processing	aid (no inclusion	into or onto a	article, indo	por)		
Product (article) character	istics									
Physical form of product				Solid						
Concentration of substance i	n product			<= 100 %						
Concentration of substance i	n product			Variable						
Amount used, frequency a	nd duratio	n of use (or fr	om servi	ce life)						
Annual site tonnage: ,Not re	levant				tment plant. meas	ured data				
Wide dispersive use				365 days/yr						
Other conditions affecting	environme	ental exposure	e							
Local freshwater dilution fac	ctor:			10						
F6 2 Exposure estin	notion o	nd referer		ite couro						
56.3. Exposure estin										
56.3.1. Environmental releas	<u> </u>		spersive	use (Zn) (ER	RC8a)					
Information for contributi				<u> </u>		(0.0.)				
								xposure of workers and indirect human tion ratios are expected to be less than		
1,REACH Disclaimer:		-		-		-		-		
							, as far as t	the information is available at the time of		
Release route		sion number),	i or the ut	Release rat	vation of RCRs, please refer to the CSR.			Release estimation method		
Indoor or outdoor use								y. Consumer products ending up		
							down the	drain after use. No intended release		
Protection target	Unit		Exposu estimati		PNEC	RCR	Ł	Assessment method		
Freshwater	mg/l		0.0064		0.0206	0.78				
Freshwater sediment	mg/kg d	wt	73.4		117.8	0.62				
Sewage treatment plant	mg/l		0.0776		0.1	0.19				
Soil	mg/kg d	wt	55		35.6	0.11				
56 1 Guidance to De	wnstro	am Usor t	o oval	uato who	hor ho work	s inside (the how	ndaries set by the ES		
56.4.1. Environment	wiistie	ani User t	orevall			sinside	ine bou			
		Lee								
Guidance - Environment			onal info		able. https://ec.euro	opa.eu/jrc/en	/scientific-t	tool/european-union-system-		

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			O4-8	Author: Soydan Yalç	n
						ES Typ	pe: Co	onsumer	Date of issue: 25/04/201	8
							Vers	sion: 0.0		
Environment										
CS1	V	Vide dispers	sive use (Zn)					ERC8a, E	RC8b, ERC8d, ERC8e, ERC9b	
Processes, tasks, activities cor	vered		Wide disp	ersive use	e (Zn)					
Consu			Consumer	r use						
57.2 Conditions of use	- ff 4									
57.2. Conditions of use		_					DCO	EDCOL		
57.2.1. Control of environmer ERC8a	_		-							
ERC8b	-		-	-	aid (no inclusio				007)	
	-		-	-	(no inclusion in					
ERC8d	-		-	-	aid (no inclusio					
ERC8e	-		-	-	(no inclusion in	to or onto a	artici	e, outdoor)		
ERC9b	widesp	read use of	functional flui	ia (outaoo	r)					
Product (article) characteris	stics									
Physical form of product				olid						
Concentration of substance in				= 100 %						
Concentration of substance in	product		Va	ariable						
Amount used, frequency and	d duration	of use (or fi	rom service li	ife)						
Annual site tonnage: ,Not rele	evant				tment plant. me	easured dat	a			
Wide dispersive use			36	365 days/yr						
Other conditions affecting en	nvironmen	tal exposur	e							
Local freshwater dilution factor	or:		10	10						
57.3. Exposure estimat	ion and r	eference	to its sour	ce						
-					DC9a EDC9h	EDC94 E		e EDCOb		
57.3.1. Environmental releas			dispersive use	e (Zn) (E1	КСба, ЕКС6 0,	EKCôû, E		e, EKC90))	
Information for contributin	•			1 4	• 1 1	(00)		1	C 1 1'1' / 1	
									posure of workers and indirect huma ion ratios are expected to be less that	
1, REACH Disclaimer:		•	-						-	
								, as far as t	he information is available at the time	of
Release route		on number),		rivation of RCRs, please refer to the CSR. Release rate Release est			stimation method			
Indoor or outdoor use								Probability	y. Consumer products ending up drain after use. No intended release	
Protection target	Unit		Exposure estimation		PNEC]	RCR		Assessment method	
Freshwater	mg/l				0.0206	(0.78		1	
Freshwater sediment	mg/kg dwt 73.4		73.4		117.8	(0.62			
Sewage treatment plant	mg/l 0.0776		0.0776		0.1	(0.19			
Soil	mg/kg dwt 55			35.6 0.11						
		ГТ .	1					1	-4 l 4l T-C	
57.4. Guidance to Down 57.4.1. Environment	nsuream	User to e	valuate wh	letner h	e works ins	lae the b	Jour	idaries se	et by the ES	
Guidance - Environment			ional informat		ible. https://ec.e	uropa.eu/jr	rc/en/	scientific-to	ool/european-union-system-	
57.4.2. Health										

No additional information available.

Guidance - Health

58.1. Title section								
C-4: Consumer use				ES Ref.: GES ZnSO4-8 Author: Soyu ES Type: Consumer Date of issue: 25 Version: 0.0				
Environment								
CS1	Wide dispersive use (Zn)					ERC8c, E	ERC8f	
Processes, tasks, activities covered Wide dispersiv Consumer use				e (Zn)				
58.2. Conditions of use a	iffecting expos	sure						
58.2.1. Control of environmen			se (Zn) (ER	C8c, ERC8f)				
ERC8c	-			nto article (indoor)			
ERC8f	Widespread us	e leading to inclu	usion into/o	nto article (outdoo	or)			
Product (article) characterist	tics							
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	e life)					
Annual site tonnage: ,Not relev		· · · · · · · · · · · · · · · · · · ·	Sewage treatment plant. measured data					
Wide dispersive use			365 days/yr					
Other conditions affecting en	vironmental exp	osure						
Local freshwater dilution facto	r:		10					
58.3. Exposure estima	ation and ref	erence to h	s sourc	8				
58.3.1. Environmental release		-	se (Zn) (ER	C8c, ERC8f)				
Information for contributing								
exposure via the environment 1,REACH Disclaimer:	t is not expected current knowledge	to exceed the period to exceed to exceed the period to exceed the period to exceed the period to exceed to exceed the period to exceed to exceed the period to exceed the period to exceed the period to exceed the period to exceed	predicted D	NELs and the res	sulting risk c	haracterisat	posure of workers and indirect human tion ratios are expected to be less than the information is available at the time of	
Release route			Release rat	e		Release e	stimation method	
Indoor or outdoor use							y. Consumer products ending up drain after use. No intended release	
Protection target	Unit	Exposure estimation			RCF		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 Dov 58.4.1. Environment	vnstream Us	er to evalu	ate whet	ther he work	s inside t	the bou	ndaries set by the ES	

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: Co	onsumer	Date of issue: 25/04/2018		
			Ver	sion: 0.0		
Environment						
CS1	Wide dispersive use (Z	Zn)		ERC8a, ERC8a	c, ERC8d, ERC8f	
Processes, tasks, activities cover	red Wide	dispersive use	e (Zn)			
	Consu	imer use				
59.2. Conditions of use af						
59.2.1. Control of environmenta						
ERC8a	Widespread use of non-reacti	ive processing	aid (no inclusion into or onto a	article, indoor)		
ERC8c	Widespread use leading to in-	nclusion into/onto article (indoor)				
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)					
ERC8f	Widespread use leading to in-	clusion into/or	nto article (outdoor)			
Product (article) characteristic	cs					
Physical form of product		Solid				
Concentration of substance in pa	roduct	<= 100 %				
Concentration of substance in pa	roduct	Variable				
Amount used, frequency and o	duration of use (or from servi	ce life)				
Annual site tonnage: ,Not releva	ant	Sewage treatment plant. measured data				
Wide dispersive use		365 days/yr				
Other conditions affecting env	vironmental exposure					
Local freshwater dilution factor	10					
50.2 Euroanne estimatio	n and reference to ite e					
59.3. Exposure estimatio	in and reference to its so	Jurce				
59.3.1. Environmental release	and exposure Wide dispersive	e use (Zn) (El	RC8a, ERC8c, ERC8d, ERC8	Sf)		

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 est	imation method
Indoor or outdoor use							Consumer products ending up down ter use. No intended release
Protection target	Unit	Exposu estimati		PNEC	RCR	2	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
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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.				

50.1. Title section								
SL-1: Lubricants, g	reases, releas	e products	E	S Ref.: GES ZnSO4-8	Author: Soydan Yalçın			
		-		ES Type: Worker	Date of issue: 25/04/2018			
				Version: 0.0				
Environment								
CS1	Wide d	ispersive use (Zn)		ERC11	a			
Processes, tasks, activities co	vered	Wide dispersive use	e (Zn)					
		Industrial use						
		Professional use						
0.2. Conditions of use	affecting expo	sure						
0.2.1. Control of environmen	<u> </u>		C11a)					
ERC11a	-	se of articles with low release						
Product (article) characteris								
Physical form of product	5405	Solid						
Concentration of substance in	product	<= 100 %						
Concentration of substance in	1	Variable						
Amount used, frequency and	d duration of use	(or from sorvice life)						
Not relevant	u uuration or use	, ,	tment plant. measu	ured data				
Wide dispersive use		365 days/yr	1					
Conditions and measures re	lated to sewage t	reatment plant						
Municipal sewage treatment p	Ű							
Estimated substance removal		via 80 %	80 %					
municipal sewage treatment	1 (0775)	2000 1/1						
Size of the sewage treatment	plant (STP)	2000 m ³ /d EUSES. De	EUSES. Default					
Other conditions affecting e	nvironmental exp	oosure						
Local freshwater dilution fact	-	10						
	• 1 0							
0.3. Exposure estimat	ion and refere	ence to its source						
0.3.1. Environmental releas	e and exposure V	Vide dispersive use (Zn) (El	RC11a)					
Information for contributin								
					exposure of workers and indirect human sation ratios are expected to be less than			
1,REACH Disclaimer:	int is not expected	to exceed the predicted D	NELS and the rest	inting fisk characteris	sation ratios are expected to be less than			
					s the information is available at the time of			
compilation (cfr Revision dat Release route	e and Version nur	Release rat	*					
Indoor or outdoor use		Kelease rat	e		Release estimation method Probability. Consumer products ending up			
Indoor of outdoor use				down th	e 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				
8		55	35.6 0.51					
Soil	-00							
Soil								
0.4. Guidance to Dow	nstream User	to evaluate whether h	e works inside	the boundaries	set by the ES			
	nstream User	to evaluate whether h	e works inside	the boundaries	set by the ES			

	evaluation-substances
60.4.2. Health	
Guidance - Health	No additional information available.

61.1. Title section								
SL-1: Lubricants,	greases, re	elease pr	oducts		E.	S Ref.: GES Zn ES Type: C Ver		Author: Soydan Yalçın Date of issue: 25/04/2018
Environment								
CS1	W	ide dispersi	ive use (Zn)				ERC11a	
Processes, tasks, activities	covered		Wide disp	ersive use (2	Zn)		•	
			Consumer	use				
61.2. Conditions of us	e affecting o	exposure	1					
1.2.1. Control of environn		-		(Zn) (ERC1	1a)			
ERC11a			rticles with lo					
Product (article) characte	ristics							
Physical form of product			Sc	olid				
Concentration of substance	in product		<=	= 100 %				
Concentration of substance	Concentration of substance in product			ariable				
Amount used, frequency a	and duration o	of use (or fr	om service li	ife)				
Annual site tonnage: ,Not r				·	ent plant. mea	sured data		
Wide dispersive use 365 d				365 days/yr				
Other conditions affecting	g environment:	al exposure	e					
Local freshwater dilution fa	actor:		10)				
61.3. Exposure esti	mation and	d roforor	nco to its	source				
51.3.1. Environmental relea	_		ispersive use	(Zn) (ERC	11a)			
Information for contribut	e .					(00-)	1	
								xposure of workers and indirect human tion ratios are expected to be less than
1,REACH Disclaimer:	-		-			-		-
This information is based compilation (cfr Revision of							l, as far as	the information is available at the time of
Release route		,in number),i		Release rate			Release estimation method	
Indoor or outdoor use							Probabili	ty. Consumer products ending up
-							down the	drain after use. No intended release
Protection target	Unit		Exposure estimation		PNEC	RCF	ł	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		
1 1 Guidanaa te D	ownetroer	nllcort		owboth	or howord	c incide	tha haw	induring sot by the ES
51.4. Guidance to D	ownstream	n oser t	oevaluat	e wheth	er ne worl		me bou	ndaries set by the ES
		,						
Guidance - Environment			onal information		e. https://ec.eu	ropa.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			Author: Soydan Yalçın	
						ES Type	: Worker rsion: 0.0	Date of issue: 25/04/2018	
						vei			
Environment		XX7' 1 1'					EDCIO	ED 011	
CS1		Wide dispers	T				ERC10a,	ERCIIa	
Processes, tasks, activities co	vered		Wide disper		e (Zn)				
			Industrial us Manufactur		lation				
			Manufactur	eromu	nation				
62.2. Conditions of use	affectir	ng exposure	ļ						
62.2.1. Control of environmen	ntal expo	sure: Wide di	spersive use (Z	Zn) (ER	C10a, ERC11a)				
ERC10a	Wide	espread use of a	urticles with lov	v releas	e (outdoor)				
ERC11a	Wide	espread use of a	articles with low	v releas	e (indoor)				
Product (article) characteris	stics								
Physical form of product			Soli	d					
Concentration of substance in	product		<= 1	100 %					
Concentration of substance in	product		Vari	iable					
Amount used, frequency and	d duratio	on of use (or fr	om service life	e)					
Not relevant					atment plant. mea	sured data			
Wide dispersive use				days/yı	r				
Conditions and measures re	lated to s	sewage treatm	ent plant						
1 0 1	Municipal sewage treatment plant is assumed.								
Estimated substance removal municipal sewage treatment	from was	stewater via	80 %	80 %					
Size of the sewage treatment	plant (ST	P)	200	2000 m³/d					
				SES. De	efault				
Other conditions affecting e		ental exposur							
Local freshwater dilution fact	or:		10						
62.3. Exposure estimat	ion and	l reference	to its source	e					
62.3.1. Environmental releas	se and ex	posure Wide d	lispersive use ((Zn) (E	RC10a, ERC11a	l)			
Information for contributin	g exposu	re scenario							
								sposure of workers and indirect human	
exposure via the environmen 1,REACH Disclaimer:	nt is not	expected to ex	ceed the predi	icted D	NELs and the re	esulting risk o	characterisa	tion ratios are expected to be less than	
This information is based on							l, as far as t	the information is available at the time of	
compilation (cfr Revision dat	e and Ve	rsion number),			1	to the CSR.			
Release route			Rele	ease rat	te			stimation method	
Indoor or outdoor use								y. Consumer products ending up drain after use. No intended release	
Protection target	Unit		Exposure estimation		PNEC	RCF	R	Assessment method	
Freshwater	mg/l		0.0064		0.0206	0.78			
Freshwater sediment	mg/kg o	g/kg dwt 73.4			117.8	0.62			
Sewage treatment plant	mg/l 0.0776					0.19			
Soil mg/kg dwt 55			55	35.6 0.51					
62.4. Guidance to Dow	nstrear	n User to e	valuate whe	ther l	he works insid	de the bour	ndaries s	et by the ES	
62.4.1. Environment									
Guidance - Environment		No addit	onal informatic	on avail	able, https://ec.eu	ropa.eu/irc/en	/scientific-t	tool/european-union-system-	
			on-substances			parea jie, en		opean amon system	
62.4.2. Health									

Guidance - Health	No additional information available.

63.1. Title section									
SL-3: Manufacture o	of textiles, lear	ther, fur			ES Ref.: GES 2	ZnSO4-8	Author: Soydan Yalçın		
	,	,				: Worker	Date of issue: 25/04/2018		
					Vei	rsion: 0.0			
Environment									
CS1	Wide disp	persive use (Zn)	ERC10a, ERC11a					
Processes, tasks, activities cov	ered	Wide di	ispersive use (Zn)					
		Industri	al use						
		Professi	ional use						
53.2. Conditions of use a	<u> </u>								
53.2.1. Control of environmen	tal exposure: Wid	e dispersive us	se (Zn) (ERC	10a, ERC11a)					
ERC10a	Widespread use	of articles with	n low release (outdoor)					
ERC11a	Widespread use	of articles with	n low release (indoor)					
Product (article) characterist	tics								
Physical form of product			Solid						
Concentration of substance in	product		<= 100 %						
Concentration of substance in product			Variable						
Amount used frequency and	Amount used, frequency and duration of use (or from set								
Not relevant	duration of use (0			nent plant. mea	sured data				
Wide dispersive use			365 days/yr	nent plunt. meu	surva autu				
Conditions and measures related to sewage treatment pla									
	<u> </u>								
Municipal sewage treatment plant is assumed. Estimated substance removal from wastewater via			80 %						
municipal sewage treatment	ioni waste water vit								
Size of the sewage treatment p	lant (STP)		2000 m ³ /d						
	•		EUSES. Default						
Other conditions affecting en			10						
Local freshwater dilution facto	r:		10						
3.3. Exposure estimation	on and referen	ce to its sou	irce						
3.3.1. Environmental release				710a FDC11a)				
Information for contributing				10a, EKC11a)				
			and operatio	nal conditions	(ΩC_{s}) are o	heerved ev	posure of workers and indirect human		
							ion ratios are expected to be less than		
1,REACH Disclaimer:									
This information is based on a compilation (cfr Revision date						l, as far as th	ne information is available at the time of		
Release route	and version nume		Release rate	rts, pieuse ierei	to the CDIC	Release es	timation method		
Indoor or outdoor use							7. Consumer products ending up		
						down the d	lrain after use. No intended release		
Protection target	Unit	Exposure		PNEC	RCF	2	Assessment method		
Frashwatar	mg/1	estimation	ш	0.0206	0.79				
Freshwater	mg/l	0.0064			0.78				
Freshwater sediment	mg/kg dwt	73.4		117.8	0.62				
Sewage treatment plant	mg/l 0.0776 mg/kg dwt 55		0.1 0.19						
Soil	55		35.6	0.51					
3.4. Guidance to Down	stream <u>User to</u>	o eval <u>uate v</u>	vheth <u>er he</u>	work <u>s insi</u>	le the bou	ndar <u>ies se</u>	et by the ES		
3.4.1. Environment									
Guidance - Environment	N	dditionalinform	nation availab	le https://aa.co	rona aulinala-	(cojontific to	ool/european-union-system-		
Guidance - Environment		aditional inform		ie. nups://ec.eu	ropa.eu/jrc/en	scientific-to	ooreuropean-union-system-		
3.4.2. Health	1 - 1 444								

Guidance - Health	No additional information available.

4.1. Title section SL-3: Manufactur	e of textiles, le	ather, fur	ESI	Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0			
Environment							
CS1	Wide d	lispersive use (Zn)		ERC	10a, ERC11a		
Processes, tasks, activities	covered	Wide dispersive u Consumer use	ise (Zn)				
4.2. Conditions of us	e affecting expo	osure					
		ide dispersive use (Zn) (E	RC10a, ERC11a)				
ERC10a		se of articles with low relea					
ERC11a	Widespread u	se of articles with low relea	ise (indoor)				
Product (article) characte	eristics						
Physical form of product		Solid					
Concentration of substance	in product	<= 100 %					
Concentration of substance	I	Variable					
Amount used, frequency a	and duration of use	(or from service life)					
Annual site tonnage: ,Not r			eatment plant. measu	red data			
Wide dispersive use	<u> </u>	365 days/yr					
Other conditions affecting	g environmental ex	posure					
Local freshwater dilution fa		10					
4.3. Exposure esti	mation and re	terence to its sour	ce				
4.3.1. Environmental relea	ase and exposure W	Vide dispersive use (Zn) (H	ERC10a, ERC11a)				
Information for contribut	· ·						
exposure via the environm 1,REACH Disclaimer:	nent is not expected on current knowledg	to exceed the predicted ge. Consistency of data in	DNELs and the resute the SDS with CSR is	ulting risk characte s considered, as far	I, exposure of workers and indirect human risation ratios are expected to be less than as the information is available at the time of		
Release route		Release r	ate	Relea	Release estimation method		
Indoor or outdoor use					bility. Consumer products ending up 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			
A A Quidance (
4.4. Guidance to D 4.4.1. Environment	ownstream U	ser to evaluate who	ether he works	s inside the b	oundaries set by the ES		
a a b b b a b b b b b b b b b b b b b b							

	evaluation-substances
64.4.2. Health	
Guidance - Health	No additional information available.

5.1. Title section								
SL-4: Washing and	ducts		ES Ref.: GES ZnSO4-8 Author: Soydan ES Type: Worker Date of issue: 25/04 Version: 0.0					
Environment								
CS1	Wide di	ispersive use (Zn)				ERC11b		
Processes, tasks, activities	covered	Wide dis	persive use	(Zn)				
, ,		Industria	-	~ /				
		Professio	onal use					
55.2. Conditions of us								
5.2.1. Control of environn								
ERC11b	Widespread us	se of articles with	high or inter	nded release (indo	oor)			
Product (article) characte	ristics							
Physical form of product		S	olid					
Concentration of substance	Concentration of substance in product							
Concentration of substance in product			ariable					
Amount used, frequency a	and duration of use	(or from service	life)					
Not relevant		-	ment plant. measu	ured data				
Wide dispersive use		3	65 days/yr					
Conditions and measures	related to sewage tr	reatment plant						
Municipal sewage treatmen	t plant is assumed.							
Estimated substance remov municipal sewage treatmen		via 8	80 %					
Size of the sewage treatmen	nt plant (STP)		2000 m ³ /d EUSES. Default					
Other conditions affecting	g environmental exp	oosure						
Local freshwater dilution fa	actor:	1	0					
5.2 Europauno patim	tion and votava		100					
5.3. Exposure estimation								
5.3.1. Environmental rele	•	•	se (Zn) (ER	C11b)				
Information for contribut								
exposure via the environm 1,REACH Disclaimer:	nent is not expected	to exceed the pr	edicted DN	ELs and the resu	ulting risk c	haracterisati	posure of workers and indirect human on ratios are expected to be less than the information is available at the time of	
compilation (cfr Revision of	late and Version num			-	o the CSR.			
Release route		R	Release rate				timation method	
Indoor or outdoor use						down the d	. Consumer products ending up rain after use. No intended release	
Protection target	Unit	Exposure estimation		PNEC	RCF	2	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			

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	l cleaning	product	ts					Author: Soydan Yalçın Date of issue: 25/04/2018		
Environment										
CS1	W	/ide dispersi	ive use (Zn	l)	ERC11b					
Processes, tasks, activities c	overed		Wide d Consun	ispersive use (ner use	Zn)					
66.2. Conditions of use	e affecting	exposure								
66.2.1. Control of environm				se (Zn) (ERC	11b)					
ERC11b	ERC11b Widespread use of articles with high or in				ded release (ind	oor)				
Product (article) character	istics									
Physical form of product Solid				Solid						
Concentration of substance in product				<= 100 %						
Concentration of substance in product				Variable						
Amount used, frequency a	nd duration o	of use (or fr	om servic	e life)						
Annual site tonnage: ,Not re				,	nent plant. meas	sured data				
Wide dispersive use	10 (111 (365 days/yr	ione planet moas	urea auta				
Other conditions affecting	environment	al exposure								
Local freshwater dilution fac		ur en posur e	r	10						
66.3. Exposure estin	nation and	d referer	nce to it	ts source						
66.3.1. Environmental relea	se and exposi	ure Wide di	ispersive u	se (Zn) (ERC	(11b)					
Information for contribut	ing exposure	scenario								
exposure via the environm 1,REACH Disclaimer:	ent is not exp on current kno	pected to ex wledge. Co	nsistency of	predicted DNI	ELs and the res	sulting risk c	haracterisa	xposure of workers and indirect human tion ratios are expected to be less than the information is available at the time of		
Release route				Release rate			Release estimation method			
Indoor or outdoor use								y. Consumer products ending up		
Protection target	Unit		Exposure	<u> </u>	PNEC	RCF		drain after use. No intended release Assessment method		
Trottenon target	Omt		estimatio		INEC	KCI	•	Assessment memou		
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				
		••• []_•••••		ata what			the here			
	ownstream	n User t	o evalu	ate wheth	er ne work	s inside i	ine bou	ndaries set by the ES		
66.4.1. Environment										
Guidance - Environment			onal inforr		le. https://ec.eur	opa.eu/jrc/en	/scientific-1	cool/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			Author: Soydan Yalçın		
					ES Type: Worker Version: 0.0		Date of issue: 25/04/2018		
					ve	ISIOII: 0.0			
Environment									
CS1	Wide	dispersive use	(Zn)	ERC10a					
Processes, tasks, activities				e (Zn)					
			ustrial use						
		Pro	fessional use						
67.2. Conditions of us	e affecting exr	osure							
67.2.1. Control of environn			e use (Zn) (EB	C10a)					
ERC10a	-	-	with low release						
	-	use of articles	with low releas	e (outdoor)					
Product (article) characte	ristics		Solid						
	Physical form of product Concentration of substance in product								
Concentration of substance	1		<= 100 % Variable						
	1	(9							
Amount used, frequency a	and duration of us	se (or from ser							
Not relevant Wide dispersive use			365 days/y	atment plant. measu r	ared data				
-	1.4.14	4 4		•					
Conditions and measures	, j	-							
Municipal sewage treatmen Estimated substance remov			80.0/	80 %					
municipal sewage treatmen		Vla	80 %	80 70					
Size of the sewage treatment	nt plant (STP)		2000 m ³ /d	2000 m ³ /d EUSES. Default					
04			EUSES. D	EUSES. Detaut					
Other conditions affecting	-	xposure	10						
Local freshwater dilution fa	ictor:		10						
67.3. Exposure estimation	ation and refe	rence to its	source						
67.3.1. Environmental rele	ase and exposure	Wide dispers	ve use (Zn) (E	RC10a)					
Information for contribut	•		() (,					
			Ms) and opera	tional conditions ((OCs) are o	bserved, e	exposure of workers and indirect human		
exposure via the environn							ation ratios are expected to be less than		
1,REACH Disclaimer: This information is based of	on current knowled	lge. Consisten	cy of data in th	e SDS with CSR is	s considered	1. as far as	the information is available at the time of		
compilation (cfr Revision c									
Release route			Release ra	Release rate			estimation method		
Indoor or outdoor use							ty. Consumer products ending up drain after use. No intended release		
Protection target	Unit	Expos	ure	PNEC	RCI		Assessment method		
0		estima							
Freshwater	mg/l	0.0064		0.0206	0.78				
Freshwater sediment	mg/kg dwt			117.8	17.8 0.62				
Sewage treatment plant mg/l 0.0776 Soil mg/kg dwt 55		<u>.</u>	0.1 0.1		0.19				
Soil	mg/kg dwt		35.6 0.51						
67.4. Guidance to Do	wnstream Use	r to evalua	te whether l	ne works inside	e the bou	ndaries	set by the ES		
67.4.1. Environment									
		1.11.1	c	11 12 11		/			
Guidance - Environment		lo additional in valuation-subs		able. https://ec.euro	opa.eu/jrc/er	1/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 ZnS ES Type: Co Ver		Author: Soydan Yalçın Date of issue: 25/04/2018
Environment							
CS1	Wide dispersi	ive use (Zı	1)			ERC10a	
Processes, tasks, activities covered	·		lispersive use ner use	(Zn)			
68.2. Conditions of use affec	ting exposure	ļ.					
68.2.1. Control of environmental ex			se (Zn) (ERO	C10a)			
	idespread use of a						
Product (article) characteristics				· · ·			
Physical form of product Solid							
Concentration of substance in product		<= 100 %					
Concentration of substance in produ			Variable				
Amount used, frequency and dura		com sorvia					
Annual site tonnage: ,Not relevant	tuon of use (of fi			ment plant meas	sured data		
Wide dispersive use			Sewage treatment plant. measured data 365 days/yr				
Other conditions affecting environ	nmental exposure	e					
Local freshwater dilution factor:		-	10				
69.2 Expedite estimation	a and refere		10 0011700				
68.3. Exposure estimation							
68.3.1. Environmental release and o		ispersive ι	ıse (Zn) (ER	C10a)			
Information for contributing exp							
exposure via the environment is n 1,REACH Disclaimer:	not expected to exact the text of tex of text of tex of tex of text of text of text of tex	sceed the	predicted DN of data in the	ELs and the res	sulting risk c is considered	haracterisa	xposure of workers and indirect human tion ratios are expected to be less than the information is available at the time of
Release route			Release rate	•		Release e	stimation method
Indoor or outdoor use							ty. Consumer products ending up
Protection target Unit	t	Exposure estimatio		PNEC	RCF		drain after use. No intended release Assessment method
Freshwater mg/l		0.0064		0.0206	0.78		
Freshwater sediment mg/k	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 Downst	troom Ucort	o ovolu	ato what	hor howork	c incide	the here	ndarias sat by the ES
68.4.1. Environment	ireanr User t	o evalu	ate whet	ner ne work	s inside	me bou	nuaries set by the ES
Guidance - Environment	NT 1 11/2	onal !f.	mation :1 1	ala https://	······	lagiont:f:	tool/european-union-system-

	evaluation-substances
68.4.2. Health	
Guidance - Health	No additional information available.

69.1. Title section								
SL-6: Cosmetics, per	rsonal care p	roducts			ES Ref.: GES Z	Author: Soydan Yalçın		
	-				ES Type:		Date of issue: 25/04/2018	
					Ver	sion: 0.0		
Environment								
CS1	Wide di	spersive use (Z	Ľn)	ERC10a, ERC11a				
Processes, tasks, activities cov	vered	Wide	dispersive use	e (Zn)				
		Indust	rial use					
		Profes	sional use					
69.2. Conditions of use	<u> </u>							
69.2.1. Control of environmen								
ERC10a	Widespread us			· /				
ERC11a	Widespread us	se of articles wi	th low release	e (indoor)				
Product (article) characteris	stics							
Physical form of product			Solid					
Concentration of substance in	-		<= 100 %					
Concentration of substance in	product		Variable					
Amount used, frequency and	d duration of use	(or from servi	ce life)					
Not relevant				tment plant. meas	sured data			
Wide dispersive use			365 days/yr					
Conditions and measures re	lated to sewage tr	eatment plant						
Municipal sewage treatment p	blant is assumed.							
Estimated substance removal	from wastewater v	ria	80 %					
municipal sewage treatment Size of the sewage treatment	plant (STP)		2000 m ³ /d					
Size of the sewage treatment j	plant (STI)		EUSES. Default					
Other conditions affecting en	nvironmental exp	osure						
Local freshwater dilution fact	or:		10					
	• 1 0	. •.						
69.3. Exposure estimation	ion and refere	ence to its so	ource					
69.3.1. Environmental releas	e and exposure W	vide dispersive	e use (Zn) (El	RC10a, ERC11a))			
Information for contributin								
							posure of workers and indirect human	
1.REACH Disclaimer:	it is not expected	to exceed the	predicted Di	NELs and the re-	sulting risk c	naracterisat	ion ratios are expected to be less than	
						, as far as tl	he information is available at the time of	
compilation (cfr Revision dat	e and Version num	ber),For the de		· 1	to the CSR.	D 1		
Release route			Release rat	e			stimation method	
Indoor or outdoor use						down the c	y. Consumer products ending up Irain after use. No intended release	
Protection target	Unit	Exposur		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			0.19			
Soil mg/kg dwt 55				35.6	0.51			
	, 		1			1		
69.4. Guidance to Down	nstream User	to evaluate	whether h	e works insid	le the bour	idaries se	et by the ES	
69.4.1. Environment								
Guidance - Environment		additional info luation-substan		able. https://ec.eu	ropa.eu/jrc/en	/scientific-to	ool/european-union-system-	
69.4.2. Health	I							

Guidance - Health	No additional information available.

0.1. Title section SL-6: Cosmetics, p	personal care p	oroducts	ES	S Ref.: GES ZnS ES Type: Co Vers	Author: Soydan Yalçı Date of issue: 25/04/2018		
P				vers	ion: 0.0		
Environment	337.1 1	(7)			EDC10 ED	011	
CS1	Wide d	ispersive use (Zn)			ERC10a, ER	CIIa	
Processes, tasks, activities	covered	1	rsive use (Zn)				
		Consumer u	ise				
70.2. Conditions of us	se affecting expo	sure					
70.2.1. Control of environm			n) (ERC10a, ERC11a)				
ERC10a		se of articles with low					
ERC11a	Ĩ	se of articles with lov					
			(Indoor)				
Product (article) character Physical form of product	erisues	Soli	d				
Concentration of substance in product			100 %				
Concentration of substance	1		iable				
	1						
Amount used, frequency				114			
Annual site tonnage: ,Not r Wide dispersive use	relevant		Sewage treatment plant. measured data 365 days/yr				
L			(uy), yi				
Other conditions affecting Local freshwater dilution fa	-						
Local freshwater dilution is	actor:	10					
70.3. Exposure esti	mation and ret	ference to its s	source				
70.3.1. Environmental rele	ase and exposure W	ide dispersive use ()	Zn) (ERC10a, ERC11a)				
Information for contribu	-						
	0.		d operational conditions	(OCs) are ob	served, expos	sure of workers and indirect human	
exposure via the environr						ratios are expected to be less than	
1,REACH Disclaimer:	on aurrant knowledg	a Consistency of de	to in the SDS with CSP	is considered	on for an the	information is available at the time of	
compilation (cfr Revision					as fai as the l	information is available at the time to	
Release route		Rel	ease rate		Release estimation method		
Indoor or outdoor use						Consumer products ending up	
Ductaction tanget	Unit	Exposure	PNEC	RCR		n after use. No intended release Assessment method	
Protection target	Omt	estimation	FNEC	KUK		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	35.6	0.11					
	mg/kg dwt						
0.4. Guidance to D	ownstream Us	ser to evaluate	whether he work	ks inside t	he bound	aries set by the ES	
0.4.1. Environment							
		additional information					

	evaluation-substances
70.4.2. Health	
Guidance - Health	No additional information available.

71.1. Title section									
SL-7: Pharmaceutica	ls				ES Ref.: GES	Author: Soydan Yalçın			
						: Worker	Date of issue: 25/04/2018		
					Ve	rsion: 0.0			
Environment									
CS1	Wide dis	spersive use (Zn)				ERC10a,	ERC11a		
Processes, tasks, activities cove	ered	Wide disp	ersive us	e (Zn)					
		Industrial	use						
		Profession	sional use						
71.2. Conditions of use a	ffecting expos	niro.							
			(7 n) (FP						
ERC10a	71.2.1. Control of environmental exposure: Wide dispersive use ERC10a Widespread use of articles with log								
ERC11a	-	e of articles with lo							
	-	e of articles with le	w releas	e (indoor)					
Product (article) characterist	ics	0-	1: 4						
Physical form of product Concentration of substance in p		So	11d : 100 %						
Concentration of substance in p			riable						
-									
Amount used, frequency and	duration of use (1.1.				
Not relevant Wide dispersive use			Sewage treatment plant. measured data 365 days/yr						
-			5 duys/ y1						
Conditions and measures rela		eatment plant							
Municipal sewage treatment pl Estimated substance removal fi			0/						
municipal sewage treatment	rom wastewater via	a 80	80 %						
Size of the sewage treatment pl	lant (STP)	-	00 m³/d						
	• • • •	I	JSES. De	fault					
Other conditions affecting en									
Local freshwater dilution factor	r:	10							
71.3. Exposure estimation	on and referen	nce to its sourc	ce						
71.3.1. Environmental release	and exposure Wi	ide dispersive use	e (Z n) (E	RC10a, ERC11a)				
Information for contributing					,				
-	-		nd opera	tional conditions	(OCs) are o	bserved, ex	posure of workers and indirect human		
exposure via the environment							ion ratios are expected to be less than		
1,REACH Disclaimer: This information is based on a	urrent knowledge	Consistency of d	lata in th	e SDS with CSR	is considered	l as far as t	he information is available at the time of		
compilation (cfr Revision date						i, us iui us i	the information is available at the time of		
Release route		Re	elease rat	te		Release es	stimation method		
Indoor or outdoor use							y. Consumer products ending up		
Protection target Unit Exposu				PNEC	RCI		drain after use. No intended release Assessment method		
Trottenon unget	Cint	estimation		Inde	Kei		Assessment memor		
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				
74 4 ()	T T	·	. 41						
71.4. Guidance to Down	stream User t	o evaluate wh	ether h	ie works insic	le the bou	ndaries s	et 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: Pharmaceutio		ES	ES Ref.: GES ZnSO4-8 ES Type: Consumer Version: 0.0		Author: Soydan Yalçın Date of issue: 25/04/2018				
Environment									
CS1	W	/ide dispersive use (2	Zn)	ERC10a, ERC11a					
			dispersive use (Zn) Imer use						
72.2. Conditions of use	affecting	exposure							
72.2.1. Control of environme		-	use (Zn) (ER	C10a, ERC11a)					
ERC10a		ead use of articles w							
ERC11a	Widespr	ead use of articles w	ith low release	e (indoor)					
Product (article) character	istics								
Physical form of product			Solid						
Concentration of substance i	n product		<= 100 %						
Concentration of substance i	n product		Variable						
Amount used, frequency ar	nd duration o	of use (or from serv	ice life)						
Annual site tonnage: ,Not rel			Sewage treatment plant. measured data						
Wide dispersive use			365 days/yr						
Other conditions affecting	environment	al exposure							
Local freshwater dilution factor: 10									
72 3 Exposure estim	72.3. Exposure estimation and reference to its source								
72.3.1. Environmental releas			use (Zn) (EF	RC10a, ERC11a)					
Information for contributi			r \ 1	. 1 1	(00)	1 1			
exposure via the environme 1,REACH Disclaimer:	ent is not exp n current kno	wledge. Consistency	e predicted D	NELs and the res	sulting risk c	haracterisat	posure of workers and indirect human ion ratios are expected to be less than he information is available at the time of		
Release route			Release rate				stimation method		
Indoor or outdoor use						Probability. Consumer products ending up down the drain after use. No intended release			
Protection target	Unit	Exposu estimat		PNEC	RCR		Assessment method		
Freshwater	mg/l	0.0064		0.0206	0.78				
Freshwater sediment	mg/kg dwt			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 Do	72.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES								
72.4.1. Environment	Amotreal					ne boui			

Guidance - Environment	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			Author: Soydan Yalçın		
							: Worker	Date of issue: 25/04/2018		
						Vei	rsion: 0.0			
Environment										
CS1		Wide dispersi	ve use (Z	Ľn)		ERC10a, ERC11a				
Processes, tasks, activities covered Wide of			dispersive us	e (Zn)		•				
Industr			ial use							
Profes			sional use	ional use						
72.2 Conditions of use		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	•							
73.2. Conditions of use										
73.2.1. Control of environm	-		-							
ERC10a		pread use of a								
ERC11a	Wides	pread use of a	rticles wi	th low releas	e (indoor)					
Product (article) character	ristics									
Physical form of product				Solid						
Concentration of substance	in product			<= 100 %						
Concentration of substance	in product			Variable						
Amount used, frequency a	nd duration	n of use (or fro	om servi	ce life)						
Not relevant					atment plant. mea	sured data				
Wide dispersive use				365 days/yr						
Conditions and measures a	related to se	ewage treatme	ent plant							
Municipal sewage treatment	t plant is ass	umed.								
Estimated substance removal from wastewater via municipal sewage treatment			80 %							
Size of the sewage treatment plant (STP)			2000 m ³ /d EUSES. De	efault						
Other conditions affecting	environme	ntal exposure								
Local freshwater dilution factor:			10							
73.3. Exposure estima	tion and	reference t	o ite eo	urce						
						`				
73.3.1. Environmental relea			ispersive	e use (Zn) (E	RCI0a, ERCIIa	l)				
Information for contributi				<u> </u>						
								sposure of workers and indirect human tion ratios are expected to be less than		
							l, as far as t	the information is available at the time of		
compilation (cfr Revision da Release route	ate and Vers	sion number),F	for the de		• 1	to the CSR.	Delegan			
Indoor or outdoor use				Release rate			Release estimation method Probability. Consumer products ending up			
								drain after use. No intended release		
Protection target	Unit		Exposur estimation		PNEC	RCI	ł	Assessment method		
Freshwater	mg/l		0.0064		0.0206	0.78				
Freshwater sediment	mg/kg d	wt	73.4		117.8	0.62				
Sewage treatment plant	mg/l	ng/l 0.0776			0.1	0.19				
Soil	mg/kg dwt 55				35.6	0.51				
73.4. Guidance to Dov	vnetneen	Ucon to an	aluate	whother	no worka inci	do the hor	ndories	ot by the FS		
	viisurealii	r oser to ev	anuate	whether I	ite works mst	ie me bou	nuarries s			
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/Feedstu	ff			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		
			dispersive use (Zn) mer use						
74.2. Conditions of use	affecting exp	osure							
74.2.1. Control of environme			(Zn) (ERC	10a, ERC11a)					
ERC10a	Widespread	use of articles with lo	ow release ((outdoor)					
ERC11a	Widespread	use of articles with lo	ow release ((indoor)					
Product (article) characteri	stics								
Physical form of product		So	olid						
Concentration of substance in	n product	<=	= 100 %						
Concentration of substance in	n product	Va	ariable						
Amount used, frequency an	d duration of us	se (or from service li	ife)						
Annual site tonnage: ,Not rele			Sewage treatment plant. measured data						
Wide dispersive use			365 days/yr						
Other conditions affecting e	environmental e	xposure							
Local freshwater dilution fact	tor:	10)						
712 Exposure actim	otion and r	oforonoo to ito	0011700						
74.3. Exposure estim									
74.3.1. Environmental release		<u> </u>	(Zn) (ERC	C10a, ERC11a)					
Information for contributir	<u> </u>				(2.2.)				
exposure via the environme 1,REACH Disclaimer:	nt is not expected	ed to exceed the pre dge. Consistency of c	edicted DN	ELs and the res	sulting risk c	haracterisat	posure of workers and indirect human ion ratios are expected to be less than the information is available at the time of		
Release route		Re	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	2	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 / Guidanco to Do	whetroom	lear to avaluat	to whoth	or howork	s incide	the how	ndarias sat by the ES		
74.4. Guidance to Do 74.4.1. Environment	whstream	bser to evaluat	le wheth	ier ne work	s inside	me boul	ndaries set by the ES		
Cuidana Environment	T	lo additional informat							

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.				