

Exposure Scenario – INDUSTRIAL USE OF COPPER SULPHATE

1. Title	
Free short title: Industrial downstream use of Copper sulphate. Generic exposure scenario covering all applications.	
Systematic title based on use descriptors	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 17, 19, 20, 21, 22, 23, 24, 25, 26
Environmental Release Categories	2, 3, 4, 5, 6a, 6b, 6d, 7, 12a
Specific Environmental Release Category	SpERC F (Industrial formulation of metal compounds), U (Industrial use of metal compounds)
Processes, tasks, activities covered: All downstream use of Copper sulphate. All possible processes, tasks and activities described by the selected PROC and ERC use descriptors.	
Assessment Method: The 'Metals EASE' model (MEASE) is used to estimate worker exposure.	
Environment: Predicted exposures calculated using EUSES 2.0 model. Predicted (modelled) local concentrations are used for the calculation of the PECs.	

2. Operational conditions and risk management measures	
2.1. Control of environmental exposure	
GENERIC INFORMATION COMMON TO ALL CONTRIBUTING SCENARIOS	
<i>The information here applies to all contributing scenarios unless otherwise indicated in the contributing scenarios themselves.</i>	
Product characteristics: Solid (High, medium and low dustiness) and liquid (aqueous solution.)	
Frequency and duration of use: Continuous release. Emission days (days/year) 220	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Receiving surface water flow rate	1800m ³ /day
Other given operational conditions affecting environmental exposure: None	
Technical conditions and measures at process level (source) to prevent release: None	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil (unless otherwise stated in contributing scenarios));	
Waste water: At least one waste water treatment either onsite or offsite is required with an efficiency of 92%.	
Air: 0.4% emission assumed irrespective of ERC. This value is taken from the worst case metal spERCs (Use of metals and metal compounds in metallic coating v1.1). Due to negligible volatility of copper the default ERC values for air emissions are unreasonably high.	
Organisation measures to prevent/limit release from site: None	
Conditions and measures related to municipal sewage treatment: Default: 200l per capita (10000 capital per STP). 92% removal assumed. Sludge disposal to land assumed.	
Conditions and measures related to external treatment of waste for disposal: External treatment and disposal of waste should comply with applicable regulations. Waste should be taken to a controlled offsite location for incineration, disposal or recycling.	
Conditions and measures related to external recovery of waste: External recovery and recycling of waste should comply with applicable regulations.	
CONTRIBUTING SCENARIO E-GES-DU0	
<i>Contributing scenario description: ERC2 but without release to water.</i>	
Amounts used	
Annual site tonnage (tonnes/year) as copper	25 000
Environmental factors not influenced by risk management	

Local freshwater dilution factor	not applicable to scenario
Local marine water dilution factor	not applicable to scenario
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Waste water: no release to water.	
Air: 0.4% emission assumed irrespective of ERC. This value is taken from the worst case metal spERCs (Use of metals and metal compounds in metallic coating v1.1). Due to negligible volatility of copper the default ERC values for air emissions are unreasonably high.	
Conditions and measures related to municipal sewage treatment: Not applicable to scenario.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC2)	
<i>Contributing scenario description: ERC2 – Formulation of mixtures</i>	
Processes, tasks, activities covered: Mixing and blending of substances into chemical preparations in all types of formulating industries, such as paints and do-it-yourself products, pigment paste, fuels, household products (cleaning products), lubricants, etc.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	17
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 2 is assumed: 2% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC3)	
<i>Contributing scenario description: ERC3 – Formulation in materials</i>	
Processes, tasks, activities covered: Mixing or blending of substances which will be physically or chemically bound into or onto a matrix (material) such as plastics additives in master batches or plastic compounds. For instance a plasticizers or stabilizers in PVC master-batches or products, crystal growth regulator in photographic films, etc	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	170
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 3 is assumed: 2% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC4)	
<i>Contributing scenario description: ERC4 – Industrial use of processing aids</i>	
Processes, tasks, activities covered: Industrial use of processing aids in continuous processes or batch processes applying dedicated or multi-purpose equipment, either technically controlled or operated by manual interventions. For example, solvents used in chemical reactions or the 'use' of solvents during the application of paints, lubricants in metal working fluids, anti-set off agents in polymer moulding/casting.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	0.3
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 4 is assumed: 100% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC5)	
<i>Contributing scenario description: ERC5 – Industrial inclusion into or onto a matrix.</i>	
Processes, tasks, activities covered: Industrial use of substances as such or in preparations (nonprocessing aids), which will be physically or chemically bound into or onto a matrix (material) such as binding agent in paints and coatings or adhesives, dyes in textile fabrics and leather products, metals in coatings applied through plating and galvanizing processes. The category covers substances in articles with a particular function and also substances remaining in the article after having been used as processing aid in an earlier life cycle stage (e.g. heat stabilisers in plastic processing).	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	0.65
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 4 is assumed: 50% This value is not taking	

into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC6a)	
<i>Contributing scenario description: ERC6a – Industrial use of intermediates</i>	
Processes, tasks, activities covered: Use of intermediates in primarily the chemical industry using continuous processes or batch processes applying dedicated or multi-purpose equipment, either technically controlled or operated by manual interventions, for the synthesis (manufacture) of other substances. For instance the use of chemical building blocks (feedstock) in the synthesis of agrochemicals, pharmaceuticals, monomers, etc.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	17
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 6a is assumed: 2% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC6b)	
<i>Contributing scenario description: ERC6b – Industrial use of reactive processing aids</i>	
Processes, tasks, activities covered: Industrial use of reactive processing aids in continuous processes or batch processes applying dedicated or multi-purpose equipment, either technically controlled or operated by manual interventions. For example the use of bleaching agents in the paper industry.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	6.5
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 6b is assumed: 5% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC6d)	
<i>Contributing scenario description: ERC6d – Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers.</i>	
Processes, tasks, activities covered: Industrial use of chemicals (cross-linking agents, curing agents) in the production of thermosets and rubbers, polymer processing. For instance the use of styrene in polyester production or vulcanization agents in the production of rubbers.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	5000
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 6d is assumed: 0.005% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC7)	
<i>Contributing scenario description: ERC7 – Industrial use of substances in closed systems.</i>	
Processes, tasks, activities covered: Industrial use of substances in closed systems. Use in closed equipment, such as the use of liquids in hydraulic systems, cooling liquids in refrigerators and lubricants in engines and dielectric fluids in electric transformers and oil in heat exchangers. No intended contact between functional fluids and products foreseen and thus low emissions via waste water and waste air to be expected.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	6.5
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 7 is assumed: 5% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU1.1 (ERC12a)	
<i>Contributing scenario description: ERC12a – Industrial processing of articles with abrasive techniques (low release).</i>	
Processes, tasks, activities covered: Substances included into or onto articles and materials are released (intended or not) from the article matrix as a result of processing by workers. These processes are typically related to PROC 21, 24, 25. Processes where the removal of material is intended, but the expected release remains low, include for example: cutting of textile, cutting, machining or grinding of metal or polymers in engineering industries.	

Amounts used	
Annual site tonnage (tonnes/year) as copper:	13
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Copper removal. Default emission value from ERC 12a is assumed: 2.5% This value is not taking into account RMM so a 92% reduction is still applied.	
CONTRIBUTING SCENARIO E-GES-DU2.1 (SpERC-Formulation)	
<i>Contributing scenario description: SpERCv1.1: Formulation of metal compounds</i>	
Frequency and duration of use: Continuous release. Emission days (days/year) 20	
Processes, tasks, activities covered: Mixing and blending of metal compounds into preparations in following formulating industries: catalyst, glass, pigments, paints, coatings plastics, rubber and stabilisers, water treatment chemicals.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	67
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air: The spERC emission factor of 0.004% is the maximum of the 90th percentiles of reported site-specific release factors to air. Risk reduction measures for dusts include electrostatic precipitators, fabric, ceramic or bag filters, and dry, semi-dry or wet scrubbers. The most commonly used are fabric or bag filters, or wet scrubbers.	
Waste water: The spERC emission factor of 0.5% is the maximum of the 90th percentiles of reported site specific release factors to waste water. > 60% of the sites have RMM for water. It is assumed that the 90 th percentile used for the spERC is from a site without RMM for water. Therefore an additional treatment step is added. The waste water treatment can be either onsite or offsite with an efficiency of 92% Copper removal. Suitable measures include: chemical precipitation, sedimentation, filtration and electrolysis (rarely used.)	
CONTRIBUTING SCENARIO E-GES-DU2.1 (SpERC-Use)	
<i>Contributing scenario description: SpERCv1.1: Use of metal compounds</i>	
Frequency and duration of use: Continuous release. Emission days (days/year) 20	
Processes, tasks, activities covered: Industrial use of metal compounds in following sectors: crystal manufacture, leather tanning, pigments, paints, coatings, plastics, rubber and textiles.	
Amounts used	
Annual site tonnage (tonnes/year) as copper:	190
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air: The spERC emission factor of 0.1% is the maximum of the 90th percentiles of reported site-specific release factors to air. Risk reduction measures for dusts include electrostatic precipitators, fabric, ceramic or bag filters, and dry, semi-dry or wet scrubbers. The most commonly used are fabric or bag filters, or wet scrubbers.	
Waste water: The spERC emission factor of 0.6% is the maximum of the 90th percentiles of reported site specific release factors to waste water. > 50% of the sites have RMM for water. It is assumed that the 90 th percentile used for the spERC is from a site without RMM for water. Therefore an additional treatment step is added. The waste water treatment can be either onsite or offsite with an efficiency of 92% Copper removal. Suitable measures include: chemical precipitation, sedimentation, filtration and electrolysis (rarely used.)	

2.2 Control of Worker exposure

GENERIC INFORMATION COMMON TO ALL CONTRIBUTING SCENARIOS

The information here applies to all contributing scenarios unless otherwise indicated in the contributing scenarios themselves.

Product characteristics	Solid (High, medium and low dustiness) and liquid (aqueous solution.)
Amounts used	Not relevant for workplace assessment
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Human factors not influenced by risk management	Respiration volume under conditions of use, room size and ventilation rate, area of skin contact with the substance under

	conditions of use: MEASE defaults. Body weight 70kg.
Other Operational conditions affecting exposure	Worse case assumptions of MEASE used: wide dispersive use, direct handling and extensive contact.
Technical conditions and measures at a process level (source) to prevent release	Activity controlled in accordance with PROC descriptor.
Technical conditions and measures to control dispersion from source towards the worker	Low, Medium, High dustiness, Aqueous solutions: No LEV required.
Organisational measures to prevent/limit releases, dispersion and exposure	Assumes a good basic standard of occupational hygiene is implemented.
Conditions and measures related to personal protection, hygiene and health evaluation.	Low, Medium, High dustiness, Aqueous solutions: No PPE required.
Measures specific for contributing scenarios:	
PROC 1: Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems	No additional or alternative measures required.
PROC 2: Continuous process but where the design philosophy is not specifically aimed at minimizing emissions It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages	Technical conditions and measures to control dispersion from source towards the worker: In high dustiness conditions LEV is required.
PROC 3: Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required.
PROC 4: Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.
PROC 5: Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.
PROC 7: Air dispersive techniques. Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting. Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may lead to waste water and waste.	Product characteristics: Liquid (aqueous solution) only. Technical conditions and measures to control dispersion from source towards the worker: LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: PPE is required; APF=4.
PROC 8a: Sampling, loading, filling, transfer, dumping, bagging in non-dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.

PROC 8b: Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.
PROC 9: Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.
PROC 10: Low energy spreading of e.g. coatings including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.	Product characteristics: Liquid (aqueous solution) only. No additional or alternative measures required.
PROC 13: Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.	Product characteristics: Liquid (aqueous solution) only. No additional or alternative measures required.
PROC 14: Processing of preparations and/or substances (liquid and solid) into preparations or articles. Substances in the chemical matrix may be exposed to elevated mechanical and/or thermal energy conditions. Exposure is predominantly related to volatiles and/or generated fumes, dust may be formed as well.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.
PROC 15: Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.	Technical conditions and measures to control dispersion from source towards the worker: In high dustiness conditions LEV is required.
PROC 17: Lubrication at high energy conditions (temperature, friction) between moving parts and substance; significant part of process is open to workers. The metal working fluid may form aerosols or fumes due to rapidly moving metal parts.	Product characteristics: Liquid (aqueous solution) only. No additional or alternative measures required.
PROC 19: Addresses occupations where intimate and intentional contact with substances occurs without any specific exposure controls other than PPE.	Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=40. In medium dustiness conditions PPE is required; APF=10.
PROC 20: Motor and engine oils, brake fluids Also in these applications, the lubricant may be exposed to high energy conditions and chemical reactions may take place during use. Exhausted fluids need to be disposed of as waste. Repair and maintenance may lead to skin contact.	Product characteristics: Liquid (aqueous solution) only. No additional or alternative measures required.

PROC 21: Manual cutting, cold rolling or assembly/disassembly of material/article (including metals in massive form), possibly resulting in the release of fibres, metal fumes or dust.	Product characteristics: Solid, low dustiness only. No additional or alternative measures required.
PROC 22: Activities at smelters, furnaces, refineries, coke ovens. Exposure related to dust and fumes to be expected. Emission from direct cooling may be relevant.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions.
PROC 23: Sand and die casting, tapping and casting melted solids, dressing of melted solids, hot dip galvanising, raking of melted solids in paving Exposure related to dust and fumes to be expected.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions.
PROC 24: Substantial thermal or kinetic energy applied to substance (including metals in massive form) by hot rolling/forming, grinding, mechanical cutting, drilling or sanding. Exposure is predominantly expected to be to dust. Dust or aerosol emission as result of direct cooling may be expected.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.
PROC 25: Welding, soldering, gouging, brazing, flame cutting Exposure is predominantly expected to fumes and gases.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions.
PROC 26 Transfer and handling of ores ,concentrates, raw metal oxides and scrap; packaging and un-packaging, mixing, blending and weighing of metal powders or other minerals.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.

Section 3 Exposure Estimation

SECTION 3.1 - ENVIRONMENTAL EXPOSURE

Units: PEC STP, freshwater and marine water in µg Cu/l. Sediment and soil PECs in mg Cu/kg dw						
CONTRIBUTING SCENARIO E-GES-DU0						
	Freshwater	Marine water	FW sediment	MW sediment	STP	Soil
PEC	Not applicable as no discharge to water					57.9
RCR	Not applicable as no discharge to water					0.90
CONTRIBUTING SCENARIOS E-GES-DU1.1 all ERC codes, all SpERCs						
	Freshwater	Marine water	FW sediment	MW sediment	STP	Soil
PEC	5.4 - 5.5	1.4 - 1.5	75 - 77	28 - 29	40	44 - 50
RCR	0.69 – 0.70	0.25 - 0.27	0.86 – 0.88	0.04	0.17	0.68 – 0.77

SECTION 3.2 - WORKER EXPOSURE

CONTRIBUTING SCENARIO PROC 1				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.01	0.01	120	0.0125
Med dustiness	0.01	0.01	120	0.0125
High dustiness	0.01	0.01	120	0.0125

Aqueous solution	0.001	0.001	120	0.125
CONTRIBUTING SCENARIO PROC 2				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.01	0.01	240	0.025
Med dustiness	0.5	0.5	240	0.025
High dustiness	0.1	0.1	240	0.025
Aqueous solution	0.001	0.01	240	0.25
CONTRIBUTING SCENARIO PROC 3				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	120	0.0125
Med dustiness	0.1	0.1	120	0.0125
High dustiness	0.1	0.1	120	0.0125
Aqueous solution	0.01	0.01	120	0.125
CONTRIBUTING SCENARIO PROC 4				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	240	0.025
Med dustiness	0.5	0.5	240	0.025
High dustiness	0.625	0.625	240	0.025
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 5				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	240	0.025
Med dustiness	0.5	0.5	240	0.025
High dustiness	0.625	0.625	240	0.025
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 7				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.5	0.5	240	0.025
CONTRIBUTING SCENARIO PROC 8a				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	480	0.05
Med dustiness	0.5	0.5	480	0.05
High dustiness	0.5	0.5	480	0.05
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 8b				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	240	0.025
Med dustiness	0.25	0.25	240	0.025
High dustiness	0.313	0.313	240	0.025
Aqueous solution	0.01	0.01	240	0.25
CONTRIBUTING SCENARIO PROC 9				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	240	0.025
Med dustiness	0.5	0.5	240	0.025
High dustiness	0.5	0.5	240	0.025
Aqueous solution	0.01	0.01	240	0.25
CONTRIBUTING SCENARIO PROC 10				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.05	0.05	240	0.25

CONTRIBUTING SCENARIO PROC 13				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.01	0.01	240	0.25
CONTRIBUTING SCENARIO PROC 14				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	240	0.25
Med dustiness	0.1	0.1	240	0.25
High dustiness	0.25	0.25	240	0.25
Aqueous solution	0.01	0.01	240	0.25
CONTRIBUTING SCENARIO PROC 15				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	120	0.013
Med dustiness	0.5	0.5	120	0.013
High dustiness	0.5	0.5	120	0.013
Aqueous solution	0.01	0.01	120	0.125
CONTRIBUTING SCENARIO PROC 17				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.01	0.01	240	0.25
CONTRIBUTING SCENARIO PROC 19				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5		990	0.103
Med dustiness	0.5	0.5	990	0.103
High dustiness	0.625	0.625	990	0.103
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 20				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.001	0.001	240	0.25
CONTRIBUTING SCENARIO PROC 21				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	990	0.103
CONTRIBUTING SCENARIO PROC 22				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.7	0.7	990	0.103
Med dustiness	0.7	0.7	990	0.103
High dustiness	0.7	0.7	990	0.103
CONTRIBUTING SCENARIO PROC 23				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.2	0.2	990	0.103
Med dustiness	0.2	0.2	990	0.103
High dustiness	0.2	0.2	990	0.103
CONTRIBUTING SCENARIO PROC 24				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.4	0.4	990	0.103
Med dustiness	0.4	0.4	990	0.103
High dustiness	0.275	0.275	990	0.103
CONTRIBUTING SCENARIO PROC 25				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR

Low dustiness	0.2	0.2	990	0.103
Med dustiness	0.2	0.2	990	0.103
High dustiness	0.2	0.2	990	0.103
CONTRIBUTING SCENARIO PROC 26				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.27	0.27	990	0.103
Med dustiness	0.27	0.27	990	0.103
High dustiness	0.45	0.45	990	0.103

Section 4. Guidance to check compliance with the Exposure Scenario

Environment

Scaling tool: Metals EUSES IT tool (free download: <http://www.arche-consulting.be/Metal-CSA-toolbox/duscaling- tool>).

Scaling of the release to air and water environment includes:

- Refining of the release factor to air and waste water and/or and the efficiency of the air filter and waste water treatment facility.
- Scaling of the PNEC for aquatic environment by using a tiered approach for correction for bioavailability and background concentration (Clocal approach). See Annex 1-7.

It should be noted that the PEC values and associated maximum allowable tonnages presented in this document have been modelled on the basis of standardised (default) assumptions on levels of emission associated with a generic process, fate and behaviour of a compound in a localised environment and the presumed efficiency of Risk Management Measures (e.g. on-site waste water treatment plans and municipal sewage treatment plants). These standardised assumptions may not accurately reflect the conditions that prevail at a particular site. As such, the information presented in this document should be regarded as a guidance tool only. It remains the responsibility of the user to ensure that a compound is used safely within the context of their site and in full consultation with the relevant local authorities.

Health

Scaling considering duration and frequency of use. Collect process occupational exposure monitoring data. It should be noted that the evaluation of worker safety presented in this document is based on standardised (default) assumptions on levels of emission associated with generic processes, the behaviour of a compound in a particular working environment and the presumed efficiency of Risk Management Measures (e.g. LEV; RPE). These standardised assumptions may not accurately reflect the conditions that prevail within a specific workplace. As such, the information presented in this document should be regarded as a guidance tool only. It remains the responsibility of the user to ensure that a compound is used safely within the context of their site and in full consultation with the relevant local authorities.

Predictions for inhalation exposure in the workplace may be further refined using the modelling approach set out in the VRA (2008), Chapter 4.1.2, Human Health Effects.

Exposure Scenario – PROFESSIONAL USE OF COPPER SULPHATE

1. Title	
Free short title: Professional downstream use of Copper sulphate. Generic exposure scenario covering all applications.	
Systematic title based on use descriptors	
Sector(s) of Use	22
Process Categories .	2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 14, 15, 17, 19, 21, 22, 25, 26
Environmental Release Categories	8a-c, 8d-f, 9a, 9b, 10a, a0b, 11a, 11b
Processes, tasks, activities covered: All downstream use of Copper sulphate. All possible processes, tasks and activities described by the selected PROC and ERC use descriptors.	
Assessment Method: The 'Metals EASE' model (MEASE) is used to estimate worker exposure. Environment: Predicted exposures calculated using EUSES 2.0 model. Local concentrations are based on measured regional specific PEC data from three European countries.	

2. Operational conditions and risk management measures	
2.1. Control of environmental exposure	
GENERIC INFORMATION COMMON TO ALL CONTRIBUTING SCENARIOS	
<i>The information here applies to all contributing scenarios unless otherwise indicated in the contributing scenarios themselves.</i>	
Product characteristics: Solid (High, medium and low dustiness) and liquid (aqueous solution.)	
Frequency and duration of use: Continuous release. Emission days (days/year) 365	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Receiving surface water flow rate	1800m3/day
Other given operational conditions affecting environmental exposure: None	
Technical conditions and measures at process level (source) to prevent release: None	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil: None	
Organisation measures to prevent/limit release from site: None	
Conditions and measures related to municipal sewage treatment: Default: 200l per capita (10000 capital per STP). 92% removal assumed. Sludge disposal to land assumed.	
Conditions and measures related to external treatment of waste for disposal: External treatment and disposal of waste should comply with applicable regulations. Waste should be taken to a controlled offsite location for incineration, disposal or recycling.	
Conditions and measures related to external recovery of waste: External recovery and recycling of waste should comply with applicable regulations.	
Amounts used: Individual maximum tonnages cannot be derived for wide dispersive uses.	

2.2 Control of Worker exposure	
GENERIC INFORMATION COMMON TO ALL CONTRIBUTING SCENARIOS	
<i>The information here applies to all contributing scenarios unless otherwise indicated in the contributing scenarios themselves.</i>	
Product characteristics	Solid (High, medium and low dustiness) and liquid (aqueous solution.)
Amounts used	Not relevant for workplace assessment

Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Human factors not influenced by risk management	Respiration volume under conditions of use, room size and ventilation rate, area of skin contact with the substance under conditions of use: MEASE defaults. Body weight 70kg.
Other Operational conditions affecting exposure	Worse case assumptions of MEASE used: wide dispersive use, direct handling and extensive contact.
Technical conditions and measures at a process level (source) to prevent release	Activity controlled in accordance with PROC descriptor.
Technical conditions and measures to control dispersion from source towards the worker	Low, Medium, High dustiness, Aqueous solutions: No LEV required unless otherwise stated in contributing scenario.
Organisational measures to prevent/limit releases, dispersion and exposure	Assumes a good basic standard of occupational hygiene is implemented.
Conditions and measures related to personal protection, hygiene and health evaluation.	Low, Medium, High dustiness, Aqueous solutions: No PPE required unless otherwise stated in contributing scenario.
Measures specific for contributing scenarios:	
PROC 2: Continuous process but where the design philosophy is not specifically aimed at minimizing emissions It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages	Technical conditions and measures to control dispersion from source towards the worker: In medium and high dustiness conditions LEV is required.
PROC 3: Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required.
PROC 4: Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.	Technical conditions and measures to control dispersion from source towards the worker: In high, medium and low dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=10.
PROC 5: Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage.	Technical conditions and measures to control dispersion from source towards the worker: In high, medium and low dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=10.
PROC 8a: Sampling, loading, filling, transfer, dumping, bagging in non-dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	Technical conditions and measures to control dispersion from source towards the worker: In high, medium and low dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=10.
PROC 8b: Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	Technical conditions and measures to control dispersion from source towards the worker: In high, medium and low dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high

	dustiness conditions PPE is required; APF=4.
PROC 9: Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.	Technical conditions and measures to control dispersion from source towards the worker: In high and medium dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=4.
PROC 10: Low energy spreading of e.g. coatings Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.	Product characteristics: Liquid (aqueous solution) only. No additional or alternative measures required.
PROC 11: Air dispersive techniques. Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting. Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls..	Product characteristics: Liquid (aqueous solution) only. Technical conditions and measures to control dispersion from source towards the worker: LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: PPE is required; APF=10.
PROC 13: Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.	Product characteristics: Liquid (aqueous solution) only. No additional or alternative measures required.
PROC 14: Processing of preparations and/or substances (liquid and solid) into preparations or articles. Substances in the chemical matrix may be exposed to elevated mechanical and/or thermal energy conditions. Exposure is predominantly related to volatiles and/or generated fumes, dust may be formed as well.	Technical conditions and measures to control dispersion from source towards the worker: In high, medium and low dustiness conditions LEV is required. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=10.
PROC 15: Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.	Technical conditions and measures to control dispersion from source towards the worker: In high dustiness conditions LEV is required.
PROC 17: Lubrication at high energy conditions (temperature, friction) between moving parts and substance; significant part of process is open to workers. The metal working fluid may form aerosols or fumes due to rapidly moving metal parts.	Product characteristics: Liquid (aqueous solution) only. Technical conditions and measures to control dispersion from source towards the worker: LEV is required.
PROC 19: Addresses occupations where intimate and intentional contact with substances occurs without any specific exposure controls other than PPE.	Conditions and measures related to personal protection, hygiene and health evaluation: In medium dustiness conditions PPE is required; APF=10. In high dustiness conditions PPE is required; APF=40 and limit maximum exposure time to 4hrs/day.
PROC 20: Motor and engine oils, brake fluids Also in these applications, the lubricant may be exposed to high energy conditions	Product characteristics: Liquid (aqueous solution) only. No additional or alternative measures required.

and chemical reactions may take place during use. Exhausted fluids need to be disposed of as waste. Repair and maintenance may lead to skin contact.	
PROC 21: Manual cutting, cold rolling or assembly/disassembly of material/article (including metals in massive form), possibly resulting in the release of fibres, metal fumes or dust.	Product characteristics: Solid, low dustiness only. No additional or alternative measures required.
PROC 22: Activities at smelters, furnaces, refineries, coke ovens. Exposure related to dust and fumes to be expected. Emission from direct cooling may be relevant.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions. PPE is required; APF=4 under all conditions.
PROC 25: Welding, soldering, gouging, brazing, flame cutting Exposure is predominantly expected to fumes and gases.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions.
PROC 26 Transfer and handling of ores ,concentrates, raw metal oxides and scrap; packaging and un-packaging, mixing, blending and weighing of metal powders or other minerals.	Product characteristics: Solid only: high, medium and low dustiness. Technical conditions and measures to control dispersion from source towards the worker: LEV is required under all conditions. Conditions and measures related to personal protection, hygiene and health evaluation: In high dustiness conditions PPE is required; APF=10. In medium dustiness conditions PPE is required; APF=4.

Section 3 Exposure Estimation

SECTION 3.1 - ENVIRONMENTAL EXPOSURE

Units: PEC STP, freshwater and marine water in µg Cu/l. Sediment and soil PECs in mg Cu/kg dw						
	Freshwater	Marine water	FW sediment	MW sediment	STP	Soil
PEC	<6		No data		<54	No data
RCR	<0.76		No data		<0.23	No data

SECTION 3.2 - WORKER EXPOSURE

CONTRIBUTING SCENARIO PROC 2

	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.01	0.01	240	0.025
Med dustiness	0.1	0.1	240	0.025
High dustiness	0.5	0.5	240	0.025
Aqueous solution	0.001	0.01	240	0.25

CONTRIBUTING SCENARIO PROC 3

	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	120	0.0125
Med dustiness	0.1	0.1	120	0.0125
High dustiness	0.5	0.5	120	0.0125
Aqueous solution	0.01	0.01	120	0.125

CONTRIBUTING SCENARIO PROC 4

	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR

Low dustiness	0.1	0.1	240	0.025
Med dustiness	0.5	0.5	240	0.025
High dustiness	0.5	0.5	240	0.025
Aqueous solution	0.1	0.1	240	0.25
CONTRIBUTING SCENARIO PROC 5				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	240	0.025
Med dustiness	0.5	0.5	240	0.025
High dustiness	0.5	0.5	240	0.025
Aqueous solution	0.1	0.1	240	0.25
CONTRIBUTING SCENARIO PROC 8a				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	480	0.05
Med dustiness	0.5	0.5	480	0.05
High dustiness	0.5	0.5	480	0.05
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 8b				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	240	0.025
Med dustiness	0.25	0.25	240	0.025
High dustiness	0.625	0.625	240	0.025
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 9				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	240	0.025
Med dustiness	0.5	0.5	240	0.025
High dustiness	0.5	0.5	240	0.025
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 10				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 11				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution			240	0.025
CONTRIBUTING SCENARIO PROC 13				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 14				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	240	0.25
Med dustiness	0.5	0.5	240	0.25
High dustiness	0.5	0.5	240	0.25
Aqueous solution	0.1	0.1	240	0.25
CONTRIBUTING SCENARIO PROC 15				
	Inhalation		Dermal	
	Exposure (mg/m3)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.1	0.1	120	0.013
Med dustiness	0.5	0.5	120	0.013
High dustiness			120	0.013
Aqueous solution	0.01	0.01	120	0.125

CONTRIBUTING SCENARIO PROC 17				
	Inhalation		Dermal	
	Exposure (mg/m ³)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.25	0.25	240	0.25
CONTRIBUTING SCENARIO PROC 19				
	Inhalation		Dermal	
	Exposure (mg/m ³)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	990	0.103
Med dustiness	0.5	0.5	990	0.103
High dustiness	0.75	0.75	990	0.103
Aqueous solution	0.05	0.05	240	0.25
CONTRIBUTING SCENARIO PROC 20				
	Inhalation		Dermal	
	Exposure (mg/m ³)	RCR	Exposure (mg/day)	RCR
Aqueous solution	0.001	0.001	240	0.25
CONTRIBUTING SCENARIO PROC 21				
	Inhalation		Dermal	
	Exposure (mg/m ³)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.5	0.5	990	0.103
CONTRIBUTING SCENARIO PROC 22				
	Inhalation		Dermal	
	Exposure (mg/m ³)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.25	0.25	990	0.103
Med dustiness	0.25	0.25	990	0.103
High dustiness	0.25	0.25	990	0.103
CONTRIBUTING SCENARIO PROC 25				
	Inhalation		Dermal	
	Exposure (mg/m ³)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.4	0.4	990	0.103
Med dustiness	0.4	0.4	990	0.103
High dustiness	0.4	0.4	990	0.103
CONTRIBUTING SCENARIO PROC 26				
	Inhalation		Dermal	
	Exposure (mg/m ³)	RCR	Exposure (mg/day)	RCR
Low dustiness	0.675	0.675	990	0.103
Med dustiness	0.45	0.45	990	0.103
High dustiness	0.45	0.45	990	0.103

Section 4. Guidance to check compliance with the Exposure Scenario

Environment

No scaling information available.

Health

Scaling considering duration and frequency of use. Collect process occupational exposure monitoring data. It should be noted that the evaluation of worker safety presented in this document is based on standardised (default) assumptions on levels of emission associated with generic processes, the behaviour of a compound in a particular working environment and the presumed efficiency of Risk Management Measures (e.g. LEV; RPE). These standardised assumptions may not accurately reflect the conditions that prevail within a specific workplace. As such, the information presented in this document should be regarded as a guidance tool only. It remains the responsibility of the user to ensure that a compound is used safely within the context of their site and in full consultation with the relevant local authorities.

Predictions for inhalation exposure in the workplace may be further refined using the modelling approach set out in the VRA (2008), Chapter 4.1.2, Human Health Effects.

Exposure Scenario – CONSUMER USE OF COPPER SULPHATE

1. Title	
Free short title: Consumer use of Copper sulphate. Generic exposure scenario covering all applications.	
Systematic title based on use descriptors	
Sector(s) of Use	21
Product Categories .	1, 9a, 9b, 12 ,24, 30, 31, 35
Environmental Release Categories	8a-c, 8d-f, 9a, 9b, 10a, a0b, 11a, 11b
Processes, tasks, activities covered: Use in adhesives, fertilisers, coatings and inks, lubricants and greases, putties, fillers and construction chemicals, washing and cleaning products, photo-chemicals, polishes and waxes.	
Assessment Method: Consumer exposures based on separate Voluntary Risk Assessment undertaken by the Copper industry. Local concentrations are based on measured regional specific PEC data from three European countries.	

2. Operational conditions and risk management measures

2.1. Control of environmental exposure

Product characteristics: liquid (aqueous solution/slurries.) Sintered products (low dustiness). Concentrations are invariably low.

Amounts used: Individual maximum amounts cannot be derived for wide dispersive uses.

Frequency and duration of use: Continuous release. Emission days (days/year) 365

Environmental factors not influenced by risk management

Local freshwater dilution factor 10

Local marine water dilution factor 100

Receiving surface water flow rate 1800m3/day

Other given operational conditions affecting environmental exposure: Indoor and outdoor use.

Organisation measures to prevent/limit release from site: None

Conditions and measures related to municipal sewage treatment: Default: 200l per capita (10000 capital per STP). 92% removal assumed. Sludge disposal to land assumed.

Conditions and measures related to external treatment of waste for disposal: External treatment and disposal of waste should comply with applicable regulations..

Conditions and measures related to external recovery of waste: No recovery assumed.

2.2 Control of CONSUMER exposure

GENERIC INFORMATION COMMON TO ALL CONTRIBUTING SCENARIOS

The information here applies to all contributing scenarios unless otherwise indicated in the contributing scenarios themselves.

Product characteristics	liquid (aqueous solution/slurries.) Sintered products (low dustiness). Concentrations are invariably low.
Amounts used	Individual maximum amounts cannot be derived for wide dispersive uses.
Frequency and duration of use/exposure	No information available from Chemical Safety Report.
Human factors not influenced by risk management	None
Other Given Operational conditions affecting exposure	None

Conditions and measures related to information and behavioural advice to consumers	None
Conditions and measures related to personal protection and hygiene	Wash hands after use.
Measures specific for contributing scenarios:	
Use of preparations containing copper compounds. Dermal contact to face cream, hair care products, paint and inks	No specific measures identified.
Worse case exposure from all contributing scenarios – dermal exposure to paints	No specific measures identified.
Background exposure from other copper containing products and articles	No specific measures identified.

Section 3 Exposure Estimation

SECTION 3.1 – ENVIRONMENTAL EXPOSURE

Units: PEC STP, freshwater and marine water in $\mu\text{g Cu/l}$. Sediment and soil PECs in mg Cu/kg dw

	Freshwater	Marine water	FW sediment	MW sediment	STP	Soil
PEC	<6		No data		<54	No data
RCR	<0.76		No data		<0.23	No data

SECTION 3.2 – CONSUMER EXPOSURE

CONTRIBUTING SCENARIO – Hair care products

	Inhalation		Dermal	
	Exposure (mg/m^3)	RCR	Exposure (mgCu/day)	RCR
Hair care products	Negligible	~0	4.3E-06	

CONTRIBUTING SCENARIO – All exposures combined

	Inhalation		Dermal	
	Exposure	RCR	Exposure	RCR
Total exposure (mg/person/day)	0.0005		4.03	

CONTRIBUTING SCENARIO – All exposures combined

	Exposure (mg/kg/day)	RCR
Total exposure	0.019	0.46

Section 4. Guidance to check compliance with the Exposure Scenario

Environment: No scaling information available.

Health: No scaling information available.