



SAFETY DATA SHEET

According to Regulation (EC) No 2015/830 amending Annex II of Regulation (EC) No 1907/2006 (REACH)

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Version: 7.0

Revision date: 22-05-2017

Replaces version: 6.0
(08/11/2016)

COPPER SULPHATE, PENTAHYDRATED

SECTION 1: Identification of the substance and of the company

1.1. Product identifier

Identification of the substance: Copper sulphate, pentahydrated

CAS Number: 7758-99-8
EC number: 231-847-6
REACH Registration number: 01-2119520566-40-0009

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

Fertiliser, industrial use, additive for animal feeding.
Do not use for other purposes than those described in this SDS.

1.3. Details of the supplier of the safety data sheet

Identification of the society or company: **INDUSTRIAS QUIMICAS DEL VALLÉS, S.A.**
Address: Av. Rafael Casanova, 81
08100 – Mollet del Vallés (Barcelona) - Spain
Telephone: (34) 935.796.677
Fax: (34) 935.791.722
E-mail: fsegur@iqvagro.com

1.4. Emergency telephone number (34) 935.796.677
(8:00 AM - 17:00 PM EST)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) 1272/2008

Acute toxicity category 4: H302: Harmful if swallowed.
Eye damage category 1: H318: Causes serious eye damage.
Hazardous to the aquatic environment acute category 1: H400: Very toxic to aquatic life.
Hazardous to the aquatic environment chronic category 1: H410: Very toxic to aquatic life with long lasting effects.

2.2. Label Elements

Labelling according to Regulation (EC) 1272/2008



DANGER

Hazard statements

H302: Harmful if swallowed
H318: Causes serious eye damage.
H410: Very toxic to aquatic life with long lasting effects



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Precautionary statements

- P273: Avoid release to the environment
P280: Wear chemical resistant gloves and clothing and safety goggles.
P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P305+P351+P338+ P310: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
P501: Dispose of contents/container in accordance with local regulation.

REACH Authorization N°: 01-2119520566-40-0009

2.3. Other hazards

No information available.

SECTION 3: Composition/information on ingredients

3.1. Substance

Information on hazardous components.

Chemical name	Content (%)	EC number	CAS Number	Classification Regulation (EC) 1272/2008	Hazard statement(s)*
Copper sulphate, pentahydrated	≥80%	231-847-6	7758-99-8	Acute tox.cat. 4 Eye damage cat. 1 Aquatic acute cat. 1 Aquatic chronic cat. 1	H302 H318 H400 M=10 H410

The full text of H phrases is listed in Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

- In case of inhalation: Move patient from exposure and into fresh air. Keep victim at rest in a position comfortable for breathing. Seek medical advice.
- In case of contact with skin: Take off contaminated clothing. Wash skin with plenty of soap and water. If irritation persists, seek medical advice. Wash contaminated clothing before reuse.
- In case of eye contact: In case of contact with eyes, rinse immediately with plenty of water for at least 15 minutes and seek medical advice. Seek medical advice if irritation persists, or if there is tissue damage.
- In case of ingestion: Rinse mouth with water.
Obtain medical advice.
Keep at rest. Do not induce vomiting.

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

- Most important symptoms and effects, both acute and delayed : Eye irritation, metallic taste, burning sensation in the epigastrium, nausea, diarrhoea, hematuria/haemoglobinuria, jaundice, oliguria, hypotension.



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

Indication of any immediate medical attention and special treatment needed : If swallowed: practise gastric lavage. Hidroelectrolitic control. In necessary administer BAL, EDTA o PENICILAMINE. Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing Media

Suitable extinguishing media: Water spray, carbon dioxide, dry chemical powder or appropriate foam.

Unsuitable extinguishing media: Water spray.
For safety reasons do not use full water jet.

5.2. Special hazards arising from the substance or mixture

Special hazards arising from the substance: Emission of toxic fumes under fire conditions.

5.3. Advice for firefighters

Protective equipment and actions: High temperatures can lead to high pressures inside closed containers. Avoid inhalation of vapors. Use appropriate respiratory protection. Do not allow spillage from extinguishing media to reach drains or watercourses.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: Avoid inhalation of vapors.
Use an appropriate respirator.

For emergency responders: Eliminate any source of ignition and ventilate the area.

6.2. Environmental precautions

Environmental precautions: Keep spills out of municipal sewers and open bodies of water.

6.3. Methods and material for containment and cleaning up

Methods and material for containment and cleaning up: Contain and absorb spill with inert inorganic non-combustible, material, such as sand or earth, and remove it to a container for disposal according to local regulations.
Clean the surface thoroughly to remove residual contamination.
Avoid open flames or sources of ignition (e.g. pilot lights on gas hot water heater).
Ventilate area and wash spill site after material pickup is complete.
Dispose of in accordance with current laws and regulations.

6.4. Reference to other sections

Reference to other sections : No information available.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Recommendations: Avoid contact with eyes, skin, and clothing. Wear protective gloves and clothing and safety goggles.

Advice on general occupational hygiene: Do not handle material near food or drinking water. Do not smoke. Observe the rules of hygiene and safety at work.

Other information: Keep only in the original container.

7.2. Conditions for safe storage, including possible incompatibilities



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Conditions for safe storage, including possible incompatibilities:

Keep material away from sources of ignition (e.g. hot surfaces, sparks, flame and static discharges).
Store in hermetic recipients, preferably full, in a cool, dry, ventilated area away from sources of heat and direct sunlight.
Keep away from incompatible materials (see section 10).
Prevent access to unauthorized persons.
Do not store this material near food or drinking water.
Do not open containers under pressure.
Keep in glass, suitable plastic, aluminum or laquer-lined containers.

7.3. Specific end use(s)

Specific end use(s):

Smoking is not permitted in work areas.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters.

Control parameters (DNEL):

See section 11

Control parameters (PNEC):

See section 12

8.2. Exposure controls

Appropriate engineering controls :

No information available.

Individual protection measures, such as personal protective equipment:

Eye/face protection:

Chemical safety goggles are recommended. Wash contaminated goggles before reuse.

Skin protection:

Avoid contact with skin. Use of chemical resistant gloves is recommended. Wear protective clothing.

Hand protection:

Compatible chemical-resistant gloves are recommended. Rinse and remove gloves immediately after use. Wash hands with soap and water. Wash contaminated gloves before reuse.

Other:

Measures should be taken to prevent materials from being splashed into the eyes or on the skin.

Thermal hazards :

No information available.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance :

Blue crystalline solid

Odour:

Odourless

pH :

3,5-4,5 (10% solution, 20°C)

Melting/Freezing point :

Decomposes without melting at 110°C

Boiling Point :

Decomposes without melting at 110°C

Flash Point :

Not applicable to an inorganic solid

Evaporation Rate :

Not applicable to an inorganic solid

Flammability (solid, gas) :

Not flammable



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Vapor pressure at 20°C :	Not applicable to inorganic solid at environmentally relevant temperatures
Vapor density :	Not applicable to inorganic solid at environmentally relevant temperatures
Relative density :	2.286 g/cm ³
Solubility(ies) :	22 g/100g H ₂ O a 25°C
Partition coefficient (n-octanol/water):	Not applicable
Auto-ignition temperature:	No auto-ignition
Decomposition temperature:	>110 °C
Viscosity:	Not applicable

9.2. Other information

Other information : Non- explosive, non-oxidising

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity : Not reactive

10.2. Chemical stability

Chemical stability : The product is stable when stored under normal storage conditions. It is efflorescence and tends to stick together when in contact with moisture. It loses water slowly as of 30°C. Total loss of water at 250°C.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions : No information available.

10.4. Conditions to Avoid

Conditions to Avoid: Excessive heat, flame or other ignition sources.

10.5. Incompatible materials

Incompatible materials: Alkaline products, contact with metals.

10.6. Hazardous decomposition products

Hazardous decomposition products: Carbon monoxide and nitrogen oxides may be formed during combustion.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on toxicological effects :

- Acute oral toxicity: LD₅₀ (rat)= 482 mg/kg b.w. (Test Guideline OECD 401).
Classification. Harmful if swallowed
- Acute dermal toxicity: LD₅₀ >2000 mg/kg (rat) (Test Guideline OECD 402). Not classified
- Acute inhalation toxicity: available information on particle size distribution indicates that exposure will not occur by the inhalation route
- Irritation: Dermal: Causes serious skin irritation
Eye: Causes serious eye irritation
- Skin sensitization: Not sensitizer (guinea pig) (Test Guideline OECD 406)
- Genotoxicity: Not genotoxic. (In vitro, bacteria, Test Guideline OECD 471) (In vivo, Test Guideline CE method B.12)
- Carcinogenesis: Copper compounds do not show carcinogenic potential
- Toxicity for reproduction: NOAEL (rat) > 1500 ppm (Test Guideline OECD 416).
Not toxic for reproduction
- Repeated dose toxicity and STOT-RE:



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Forestomach lesions:

NOAEL (rat): 16.7 mg Cu/ kg b.w. /day

NOAEL (male mice): 97 mg Cu/ kg b.w. /day

NOAEL (female mice): 126 mg Cu/ kg b.w./ day

Liver and kidney

Oral and systemic DNEL =0.041 mg Cu/kg b.w./ day (Safety factor 100, oral absorption 25%). Not classified.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity:

Daphnia magna (pH 5.5 - 6.5) L(E)C₅₀: 25.0 µg Cu/L

Chronic freshwater toxicity:

PNEC of 7.8 µg dissolved Cu/L, assessment factor of 1, local risks

Chronic marine waters toxicity:

PNEC of 5.2 µg dissolved Cu/L, assessment factor of 1, local risks

Chronic freshwater sediment toxicity:

PNEC of 87 µg dissolved Cu/L, assessment factor of 1, local risks

Chronic terrestrial toxicity:

PNEC of 65.5 µg dissolved Cu/kg, dry weight, assessment factor of 1

Toxicity to Sewage Treatment Plant (STP)

PNEC: 0.23 mg Cu/L, assessment factor of 1

Micro-organisms:

12.2. Persistence and degradability

Persistence and degradability :

Copper ions derived from copper sulphate pentahydrate cannot be degraded.

“Rapid” removal was demonstrated, defined as 70% removal within 28 days.

Copper ions bind strongly to soil forming stable Cu-S complexes. Re-mobilisation of copper ions to the water column is therefore not expected.

12.3. Bioaccumulative potential

Bioaccumulative potential :

Copper is an essential nutrient regulated by homeostatic mechanisms and does not bioaccumulate. Bio-available copper ions are rapidly removed from the water column.

12.4. Mobility in soil

Mobility in soil :

Copper ions bind strongly to sediment forming stable Cu-S complexes. median water-soil partitioning coefficient (K_p) is 2120 L/kg.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment :

The PBT and vPvB criteria do not apply to inorganic substances, such as copper and its inorganic compounds. Copper (as copper sulphate pentahydrate) is not PBT or vPvB.

12.6. Other adverse effects

Other adverse effects:

Copper sulphate pentahydrate does not contribute to ozone depletion, ozone formation, global warming or acidification.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment containers :

Dispose of empty containers in authorized hazardous waste facilities. Containers shall be disposed of as hazardous waste.

Appropriate methods for waste disposal of the substance or mixture :

Dispose product remains in authorized hazardous waste facilities.

Wastewater discharge :

Do not contaminate water with the product or its container (Do not clean



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application equipment near surface water/Avoid contamination via drains from farmyards and roads).

SECTION 14: Transport information

14.1. Land Transport (ADR/RID)

UN number: UN3077
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, Copper sulphate



Class: 9
ADR/RID classification: M7
Packing group: III
Label: 9
Special provisions: 274,335,601
Limited quantities: 5 kg
Packing instructions: P002,IBC08,LPO2,R001
Special packing provisions: VV1
Hazard identification number: 90
Kemler code: 000

14.2. Sea Transport (IMDG)

Marine pollutant: Yes
UN number: UN3077
Packing group: III
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, Copper sulphate
Class: 9
Label: 9
EmS guide: F-A, S-F

14.3. Air Transport (IATA)

UN number: UN3077
Packaging group: III
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, Copper sulphate,
Class: 9
Label: 9

SECTION 15: Regulatory information

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

Other EU regulations : Copper sulphate is included REGULATION (EC) No 1831/2003 on additives for use in animal nutrition

Chemical safety risk assessment: Exposure scenarios found attached to this safety data sheet.

SECTION 16: Other information



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Reason for revision:

Safety data sheet adapted according to CE regulation 2015/830 amending the annex II of REACH regulation.

Changes to the previous version:

Not applicable.

H statements from section 3

Acute toxicity category 4:

H302: Harmful if swallowed.

Eye damage category 1:

H318: Causes serious eye damage.

Hazardous to the aquatic environment acute category 1:

H400: Very toxic to aquatic life.

Hazardous to the aquatic environment chronic category 1:

H410: Very toxic to aquatic life with long lasting effects.

Acronyms:

DNEL: Derived no effect level

PNEC: Predicted non effect concentration

LC50: 50% of lethal concentration

LD50: 50% of the letal dosis

LD: Lethal Dose

LC: Lethal Concentration

OECD: The Organisation for Economic Co-operation and Development

NOAEL: No-observed-adverse-effect level

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

IATA: International Air Transport Association

IMDG: International Maritime Dangerous Goods Code

PBT: Persistent, Bioaccumulative and Toxic

vPvB: Very Persistent very Bioaccumulative

UN: United Nations

w/w: weight / weight

b.w.: Body weight

EC: European Commission

Information in this MSDS is based on the available published sources and is believed to be accurate. No warranty, express or implied, is made and our company assumes no liability resulting from the use of this MSDS. The user must determine suitability of this information for his application. The specifications of this safety data sheet describes the safety requirements of our product, this is not a guarantee of characteristics. They are based on current state.

Copper sulphate exposure scenarios

Exposure scenarios considered	
ES1	Copper sulphate production as a result of chemical synthesis in a batch process
ES2	Industrial use, users and professional use
ES3	Consumer use
ES4	Dispersive use

ES 1.

Scenario 1: Chemical Synthesis

Copper sulphate production as a result of chemical synthesis in a batch process: General description scenario

Life cycle	Copper sulphate manufacturing
Title	Copper sulphate manufacture via chemical synthesis
Uses and emission and process descriptors	
SU: Uses descriptors SU10 (SU8 & SU9): Formulation [mixing] of preparations and/or re-packaging (excluding alloys)	ERC: Environmental descriptor ERC1 – Manufacture of substances spERC – Production of metal compounds PROC: Process descriptor PROC 3 - Use in closed batch process (synthesis or formulation) Industrial setting
Processes, tasks, activities covered (environment)	Copper sulphate manufacture via chemical synthesis
Processes, tasks, activities covered (worker)	Chemical Synthesis, centrifugation and drying. Packing in bags & big-bags.

1.1. Operational conditions and environmental risk management measures	
1.1.1. Control of environmental exposure in the Copper Sulphate manufacturing via chemical synthesis Control (ERC1)	
Product characteristics	
Solid (High, medium and low dustiness) and liquid (aqueous solution)	
Punctual release quantification	
Maximum daily use at a site	0.09 t/day Biological WWTP 0.2 t/ day Physico Chemical WWTP
Maximum annual use at a site	32 t/year Biological WWTP 71.25 t/year Physico-Chemical WWTP
Frequency and duration of use	
365 days per year	
Environment factors not influenced by risk management	
Dilution factor in fresh water is 10 if the superficial water use is 18000 m ³ /day (default)	
Dilution capacity, marine: 100 (default)	
Other given operational conditions affecting environmental exposure	
Closed-system process	
Technical conditions and measures at process level (source) to prevent release	
Due to the nature of the substance, the process should take place in as closed conditions as possible.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Waste water: The waste water treatment can be in place or external with a 92% of copper removal capacity. Air: No risk management measures assumed; 5% emission.	
Organizational measures to prevent/limit release from site	
<ul style="list-style-type: none"> - Substance handling only by trained and authorized people. - The handling process should be documented and supervised. 	
Conditions and measures related to municipal sewage treatment plant	
WWTP Capacity	Capacity: 2000 m ³ /day (default)
Sludge treatment of the Municipal STP	Incineration or land disposal
Conditions and measures related to external treatment of waste for disposal	
92% removal of Cu to sludge assumed.	
Conditions and measures related to external recovery of waste	
Disposal via land, taken into account the PEC value (see table in 1.3)	

1.1.2: Control of environmental exposure in the metal compounds manufacturing (spERC)	
Product characteristics	
Solid (High, medium and low dustiness) and liquid (aqueous solution)	
Punctual release quantification	
Maximum daily use at a site	25.89 t/day Biological WWTP 57.5 t/day Physico Chemical WWTP
Maximum annual use at a site	9450 t/year Biological WWTP 21000 t/year Physico-Chemical WWTP
Frequency and duration of use	
365 days per year	
Environment factors not influenced by risk management	
Dilution factor in fresh water is 10 if the superficial water use is 18000 m ³ /day (default)	
Dilution capacity, marine: 100 (default)	
Other given operational conditions affecting environmental exposure	
Closed-system process	
Technical conditions and measures at process level (source) to prevent release	
Due to the nature of the substance, the process should take place in as closed conditions as possible.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Waste water: The waste water treatment can be in place or external with a 92% of copper removal capacity. Air: No risk management measures assumed; 5% emission.	
Organizational measures to prevent/limit release from site	
<ul style="list-style-type: none"> - Substance handling only by trained and authorized people. - The handling process should be documented and supervised. 	
Conditions and measures related to municipal sewage treatment plant	
WWTP Capacity	Capacity: 2000 m ³ /day (default)
Sludge treatment of the Municipal STP	Incineration or land disposal
Conditions and measures related to external treatment of waste for disposal	
92% removal of Cu to sludge assumed.	
Conditions and measures related to external recovery of waste	
Disposal via land, taken into account the PEC value (see table in 1.3)	

1.2. Operational conditions and risk management measures for workers				
1.2.1. Worker exposition conditions in closed batch process (synthesis or formulation) industrial setting uses (PROC3)				
Product characteristics				
Solid (High, medium and low dustiness) and liquid (aqueous solution)				
Amounts used				
Varying (risk limited by exposure not quantities)				
Frequency and duration of use/exposure				
Daily > 4 hours				
Human factors not influenced by risk management				
Respiration volume under conditions of use	MEASE default (Calculation tool: www.ebrc.de)			
Room size and ventilation rate	MEASE default (Calculation tool: www.ebrc.de)			
Area of skin contact with the substance under conditions of use	240 cm ²			
Body weight	70 kg			
Other given operational conditions affecting workers exposure				
Worst case assumptions from MEASE : Wide dispersive use, direct handling and extensive contact The process should take place in as closed conditions as possible to avoid workers exposure				
Technical conditions and measures at 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 dustiness	Medium dustiness	High dustiness	Aqueous solution
PROC 3	LEV not required	LEV not required	LEV required	LEV not required
Organisational measures to prevent /limit releases, dispersion and exposure				
Best available techniques and good hygiene measures assumed				
Conditions and measures related to personal protection, hygiene and health evaluation				
	Low dustiness	Medium dustiness	High dustiness	Aqueous solution
PROC 3	No PPE required	No PPE required	No PPE required	No PPE required

ES 2.

Scenario 2: Industrial use, users and professional use

Industrial downstream use of Copper Sulphate: Users and Professional Use

Life Cycle	Industrial Use stage of Copper sulphate
Title	Generic downstream industrial use of Copper sulphate
Uses and emission and process descriptors	
SU: SU3 – Industrial use SU: SU22 – Professional use PC: Various <u>ERC:</u> ERC 2 – Formulation of mixtures ERC 3 – Formulation in materials ERC 4 – Industrial use of processing aids in processes and products, not becoming part of articles ERC 5 – Industrial use resulting in inclusion into or onto a matrix ERC 6a – Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6b – Industrial use of reactive processing aids ERC 6d – Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers ERC 7 – Industrial use of substances in closed systems ERC 12a – Industrial processing of articles with abrasive techniques (low releases) spERC F – Industrial formulation of metal compounds spERC U – Industrial use of metal compounds <u>PROC:</u> PROC 1 – Use in closed process, no likelihood of exposure PROC 2 – Use in closed, continuous process with occasional controlled exposure PROC 3 – Use in closed batch process (synthesis or formulation) PROC 4 – Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 – Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7 – Industrial spraying	PROC 8a – Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b – Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9 – Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10 – Roller application or brushing PROC 13 – Treatment of articles by dipping and pouring PROC 14 – Production of preparations or articles by tableting, compression, extrusion, pelettisation PROC 15 – Use as laboratory reagent PROC 17 – Lubrication at high energy conditions and in partly open process PROC 19 – Hand mixing with intimate contact and only PPE available PROC 20 – Heat and pressure transfer fluids in dispersive, professional use but closed systems PROC 21 – Low energy manipulation of substances bound in materials and/or articles PROC 22 – Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting PROC 23 Open processing and transfer operations with minerals/metals at elevated temperature PROC 24 – High (mechanical) energy work-up of substances bound in materials and/or articles PROC 25 – Other hot work operations with metals PROC 26 – Handling of solid inorganic substances at ambient temperature
Processes, tasks, activities covered (environment)	Downstream use of Copper sulphate All possible processes, tasks and activities described by the selected ERCs
Processes, tasks, activities covered (worker)	Downstream use of Copper sulphate All possible processes, tasks and activities described by the selected PROCs

2.1 Operational conditions and environmental risk management measures	
2.1.1 Control of environmental exposure relating to: ERC 2, 3, 4, 5, 6a, 6d, 7, 12a, spERC F, spERC U	
Product characteristics	
Solid (High, medium and low dustiness) and liquid (aqueous solution)	
Frequency and duration of use	
Su 3 and SU 22: 220 days/year SU 8, 9 and 10: 350 days/year	
Environment factors not influenced by risk management	
Dilution factor in fresh water is 10 if the superficial water use is 18000 m ³ /day (default)	
Dilution capacity, marine: 100 (default)	
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	
Waste water: The waste water treatment can be in place or external with a 92% of copper removal capacity. Air: Due to negligible volatility of copper the default ERC values for air emissions are unreasonably high.	
Organizational measures to prevent/limit release from site	
None	
Conditions and measures related to municipal sewage treatment plant	
Waste Water Treatment Plant	92% removal assumed
WWTP Capacity	2000 m ³ /day, default
Incineration of the sludge of the Municipal STP	Not considered, land disposal assumed
Conditions and measures related to external treatment of waste for disposal	
Waste is taken to a controlled offsite location for incineration, disposal or recycling	
Conditions and measures related to external recovery of waste	
As applicable	

2.2 Operational conditions and risk management measures for workers relating to: PROC 1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 14, PROC 15, PROC 17, PROC 19, PROC 20, PROC 21, PROC 22, PROC 23, PROC 24, PROC 25, PROC 26

Product characteristics

Solid (High, medium and low dustiness) and liquid (aqueous solution)

Amounts used

Varying (risk limited by exposure not quantities)

Frequency and duration of use/exposure

Daily > 4 hours

Human factors not influenced by risk management

Respiration volume under conditions of use	MEASE default (Calculation tool: www.ebrc.de)
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Room size and ventilation rate	MEASE default (Calculation tool: www.ebrc.de)
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Area of skin contact with the substance under conditions of use	240 cm ²
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Body weight	70 kg
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Other given operational conditions affecting workers exposure

Worst case assumptions from MEASE : Wide dispersive use, direct handling and extensive contact

Technical conditions and measures at 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 dustiness	Medium dustiness	High dustiness	Aqueous solution
PROC 1	LEV not required	LEV not required	LEV not required	LEV not required
PROC 2	LEV not required	LEV not required	LEV required	LEV not required
PROC 3	LEV not required	LEV required	LEV required	LEV not required
PROC4	LEV not required	LEV required	LEV required	LEV not required
PROC5	LEV not required	LEV required	LEV required	LEV not required
PROC7	N.A	N.A	N.A	LEV not required
PROC8a	LEV not required	LEV required	LEV required	LEV not required
PROC8b	LEV not required	LEV required	LEV required	LEV not required
PROC9	LEV not required	LEV required	LEV required	LEV not required
PROC10	N.A	N.A	N.A	LEV not required
PROC13	N.A	N.A	N.A	LEV not required
PROC14	LEV not required	LEV required	LEV required	LEV not required
PROC15	LEV not required	LEV not required	LEV required	LEV not required
PROC17	N.A	N.A	N.A	LEV not required
PROC19	LEV not required	LEV not required	LEV not required	LEV not required
PROC20	N.A	N.A	N.A	LEV not required
PROC21	LEV not required	N.A	N.A	N.A

	Low dustiness	Medium dustiness	High dustiness	Aqueous solution
PROC22	LEV required	LEV required	LEV required	LEV required
PROC23	LEV required	LEV required	LEV required	N.A
PROC24	LEV required	LEV required	LEV required	LEV required
PROC25	LEV required	LEV required	LEV required	LEV required
PROC26	LEV required	LEV required	LEV required	LEV required
Organisational measures to prevent /limit releases, dispersion and exposure				
Best available techniques and good hygiene measures assumed				
Conditions and measures related to personal protection, hygiene and health evaluation				
	Low dustiness	Medium dustiness	High dustiness	Aqueous solution
PROC 1	No PPE required	No PPE required	No PPE required	No PPE required
PROC 2	No PPE required	No PPE required	No PPE required	No PPE required
PROC 3	No PPE required	No PPE required	No PPE required	No PPE required
PROC4	No PPE required	No PPE required	PPE required (Inhalation APF=4)	No PPE required
PROC5	No PPE required	No PPE required	PPE required (Inhalation APF=4)	No PPE required
PROC7	N.A	N.A	N.A	PPE required (Inhalation APF=4)
PROC8a	No PPE required	No PPE required	PPE required (Inhalation APF=10)	No PPE required
PROC8b	No PPE required	No PPE required	PPE required (Inhalation APF=4)	No PPE required
PROC9	No PPE required	No PPE required	PPE required (Inhalation APF=4)	No PPE required
PROC10	N.A	N.A	N.A	No PPE required
PROC13	N.A	N.A	N.A	No PPE required
PROC14	No PPE required	No PPE required	PPE required (Inhalation APF=4)	No PPE required
PROC15	No PPE required	No PPE required	No PPE required	No PPE required
PROC17	N.A	N.A	N.A	No PPE required
PROC19	No PPE required	PPE required (Inhalation APF=10)	PPE required (Inhalation APF=40)	No PPE required
PROC20	N.A	N.A	N.A	No PPE required
PROC21	No PPE required	N.A	N.A	N.A
PROC22	No PPE required	No PPE required	No PPE required	N.A
PROC23	No PPE required	No PPE required	No PPE required	N.A
PROC24	No PPE required	No PPE required	PPE required (Inhalation APF=4)	N.A
PROC25	No PPE required	No PPE required	No PPE required	N.A
PROC26	No PPE required	No PPE required	PPE required (Inhalation APF=4)	N.A

ES 3.

Scenario 3: Consumer use

Consumer exposure to Copper sulphate present in products

Life cycle	Use stage of Copper sulphate		
Product categories (PC)	1, 9a, 9b, 12, 24, 30, 31, 35		
Article categories (AC)	4, 5, 6, 10, 13		
Processes, tasks, activities covered			
This scenario covers consumer end use of the following product types containing Copper sulphate:			
Adhesives	Washing and cleaning products		
Fertilizers	Photo chemicals		
Coatings and inks	Polishes and waxes		
Lubricants and greases	Putties, fillers and construction chemicals		
3.1. Operational conditions and risk management measures			
3.1.1. Control of consumer exposure			
Product characteristics			
Consumer products containing Copper sulphate are typically in liquid/slurry form. Sintered products are solid, with low dustiness. Concentrations of Copper sulphate in consumer products are invariably low.			
Exposure Assessment			
Expositions exciding DN values are not expected when applying risk management measures or following the described operation conditions. When other risk management measures or operational conditions are adopted, users should assure the risk management at equivalent level			
3.2. Exposure and risk estimation			
Routes of exposure			
The most relevant routes of exposure are summarised below. Selection of the worst-case exposure route is based on consumer estimations from the Cu VRA (2008).			
	Inhalation	Dermal	Oral
Massive or sintered copper/copper compound products.	Not relevant	Dermal contact to handling of coins, copper jewellery	Not relevant
Preparations containing copper powder/copper compounds.	Inhalation exposure through unintentional use cigarette smoking	Dermal contact to face cream, hair-care products, paint	Oral exposure through food supplements
Worst-case exposure considered in generic consumer exposure scenario.	Inhalation exposure through unintentional use cigarette smoking	Dermal exposure through paint	Oral exposure through food supplements
External exposure (mg/person/day)	Typical: none Reasonable worst case: 0.0005	Typical: none Reasonable worst case: 4.03	Typical: none Reasonable worst case: 2
Long Term Exposure			
	Unit	Exposure concentration	Justification
Internal dermal + inhalation systemic (occupational)	mg/kg bw/d	1.9×10^{-2}	Reasonable worst-case internal exposure estimate from Cu VRA
Risk characterisation ratio (combined dermal and inhalation)	-	0.46	Based on DNEL for repeated dose effects (see section 5.11).

ES 4

Scenario 4: Dispersive use

Wide dispersive use of Copper sulphate

Life cycle	Use (wide dispersive use) stage of Copper sulphate
Uses and emission and process descriptors	
SU: SU21 – Consumer use SU22 – Professional use PC: Various <u>ERC</u> : ERC8a-c: Wide dispersive indoor use of substance ERC8d-f: Wide dispersive outdoor use of substance ERC9a: Wide dispersive indoor use of substance in closed systems ERC9b: Wide dispersive outdoor use of substance in closed systems	ERC10a: Wide dispersive outdoor use of long-life articles with low release ERC10b: Wide dispersive outdoor use of long-life articles with high or intended release ERC11a: Wide dispersive indoor use of long-life articles with low release ERC11b: Wide dispersive indoor use of long-life articles with high or intended release <u>PROC</u> : Not applicable, see Professional and Consumer uses.
4.1. Operational conditions and environmental risk management measures	
4.1.1. Control of environmental exposure relating to: ERC 8a, 8b, 9a, 9b, 10a, 10b, 11a, 11b	
Product Characteristics	
Copper sulphate can be in any form in a substance or article.	
Frequency and duration of use	
365 days/year	
Environment factors not influenced by risk management	
Dilution factor in fresh water is 10 if the superficial water use is 18000 m ³ /day (default)	
Flow rate of receiving surface water should be sufficiently high to dilute the effluent concentration of the STP below the PNEC for water and sediment	
Other given operational conditions affecting environmental exposure	
Indoor or outdoor use of products containing Copper sulphate is possible.	
Conditions and measures related to municipal sewage treatment plant	
Presence of municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
At the end of the lifecycle the article should be correctly disposed of. Waste from articles containing Copper sulphate should be disposed of correctly in accordance to local regulations.	

5. Guidance to evaluate whether a site works inside the boundaries set by the ES1, ES2, ES3 and ES4

5.1. Environment

The orientation is based in assumed operational conditions which could not be applicable in all sites. Then each site must define their own scaling tool to determine the appropriate risk management measures.

The waste water required removal efficiency can be achieved by mean of on site or external technology.

The air treatment efficiency can be achieved by mean of on site independent or combined technologies,

If the scaling shows a non safety use condition (RCRS > 1), additional risk measures or a site specific chemical safety assessment are required

5.2. Workers

Expositions exciding DN values are not expected when applying risk management measures or following the described operation conditions.

When other risk management measures or operational conditions are adopted, users should assure the risk management at equivalent level